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Road operation projects: lucrative for institutional investors

- Over the past years the expansion of **road infrastructure in Germany** has fallen **far behind traffic growth.** This is mainly due to the continuing scarcity of public-sector funds. Between 1980 and 2001 road traffic in Germany rose by roughly 70% while gross capital expenditure on road construction declined slightly in real terms in the same period. The transport infrastructure threatens to be a bottleneck impeding Germany's further economic development.
- In view of this precarious situation, new financing instruments will have to be developed for the transport infrastructure. A **transition from** pure **budget financing to user financing** of road infrastructure **would be helpful**. Road pricing makes it easier to mobilise private capital for infrastructure measures. In the near term, **"operator models"** (e.g. Germany's A-Model) will play the **most significant role**. Germany ideally fulfils the prerequisites for implementing such models, partly because of the high volume of traffic there. Furthermore, the models can provide a lucrative opportunity for institutional investors.
- It will be a challenge to create investment options or an alternative type of investment in which the long-term nature of infrastructure investments can be combined with the long-term commitments of **certain categories of institutional investors**. **Life insurers** and **pension funds** are, by nature, prime candidates here.
- Investments in suitable transport infrastructure offer low yield volatility and are less vulnerable than other investments to economic cycles. Historically, the growth of traffic volume has been very little affected by the ups and downs of the overall economy. Investments in **transport infrastructure projects** can therefore be regarded as robust, defensive, **long-term investments bearing attractive yields**.
- We expect to see **institutional investors** showing **growing interest in the A-Model**. Infrastructure investments – in the UK and Australia, for instance – have already developed into attractive and safe havens for institutional investors.

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Road operation projects: lucrative for institutional investors

This study takes up the theme of an earlier report on the need for privatisation and competition in Europe's transport sector ("Verkehr in Europa – Privatisierung und Wettbewerb unverzichtbar", November 2002; published in German only). It focuses on private financing of road transport infrastructure. A major section is devoted to the opportunities and risks of the A-Model in Germany. The study also looks into the potential advantages that road construction projects hold for institutional investors. Finally, the report turns to Australia, which already has considerable positive experience with privately operated roads.

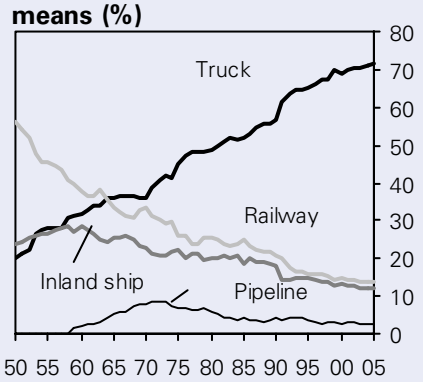
1. Need for more privatisation in road construction

In Germany, the last few decades were marked by disproportionately strong growth in transport volume, above all in goods traffic. The increase was mainly in road transport, as trucks – due to their specific system characteristics (flexibility, speed etc.) – are superior to the competing means of transport, i.e. rail and inland waterways. The latter have steadily lost market share. The above-average increase in goods traffic is likely to continue and a decoupling of traffic growth and economic expansion is not on the cards. Cross-border traffic in particular will register further strong growth rates. This is suggested by the continuing division of labour in Europe, the eastern enlargement of the European Union from spring 2004, and the central location of Germany, which will further expand its role as transit country in Europe. Road traffic will remain the principal means of transport.

Worryingly, the expansion of road infrastructure has fallen far behind traffic growth. This is especially pronounced in Germany, where it is mainly due to the continuing scarcity of public-sector funds. Between 1980 and 2001 road traffic in Germany rose by roughly 70% while gross capital expenditure on road construction declined slightly in real terms in the same period. Net spending probably did not increase in line with demand either. For almost one-third of roads and bridges, the latest investment was more than 30 years ago (see chart). Only 25% of investment in the sector took place within the past decade. The overall picture is negative despite extensive new road schemes and upgrading of existing routes in east Germany after reunification.

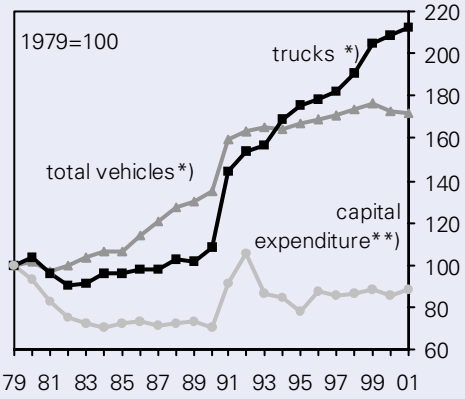
Another example: the 1992 Federal Transport Infrastructure Plan (Bundesverkehrswegeplan) suffered from a chronic shortage of financing right from the start. The draft of the new Plan, which was published in March 2003, foresees investment of EUR 150 bn in transport infrastructure in the period from 2001 to 2015. Per year, this corresponds roughly to spending on all areas of transport in 2002. Only about half of the EUR 150 bn is earmarked for roads, even though they will have to bear the bulk of the future growth of goods traffic. It also remains to be seen whether the Plan is actually put into effect. It would not be the first to require revision as a result of empty public coffers. In any case, traffic jams on German motorways have become the order of the day, and the transport infrastructure threatens to be a bottleneck impeding Germany's further economic development. Too many urgently required upgrades, new roads and maintenance investments are currently being postponed.

Goods traffic in tonne-kilometres, by transport means (%)



Source: BGL

Gross capital expenditure on road transport (real) and transport volume in Germany



*) total road traffic (domestic)
**) gross capital expenditure on roads and bridges

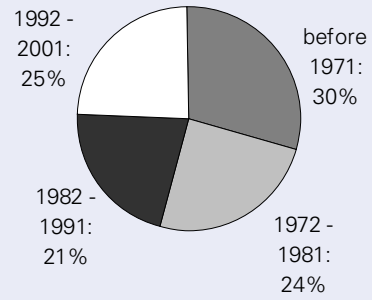
Sources: DIW Verkehr in Zahlen, DBR calculations

Need for more user financing and privatisation

In view of this precarious situation, new financing instruments will have to be developed. We believe a gradual transition from pure budget financing to user financing of road infrastructure would be helpful. This would make it possible to generate a continuing stream of revenues and make transport infrastructure less dependent on the current budget situation. The earmarking of revenues from road charges as well as some compensation through reductions in other transport-related taxes are a major prerequisite (mainly for reasons of acceptance). Furthermore, road pricing makes it easier to mobilise private capital for infrastructure measures as investments can be refinanced from user fees. Greater participation by the private sector usually has the advantage that projects are completed more quickly and work in the construction phase is more efficient; foreign experience suggests that costs can potentially be reduced by 10-20%, especially by awarding projects on the basis of competitive bidding.

Age structure of gross fixed assets 2001*)

Roads & bridges



*) Investment in specified years as percentage of the total

Source: DIW Verkehr in Zahlen

Forms of privatisation

Greater private-sector participation in road infrastructure is desirable in our view. There are basically three variants, which differ according to the size of the role played by private enterprise. In the case of private pre-financing, private enterprise finances and carries out the construction; the public sector retains full control of planning, and pays back the construction and interest costs in instalments. While this allows projects to be completed more quickly, it does not really reduce the strain on the public finances as the expenditure is merely postponed.

Greater private-sector participation in financing of road infrastructure is desirable

In "operator models", private enterprise designs, builds and finances the infrastructure project, and then operates it for an agreed period of time before transferring it – depending on the contract – back to the public sector. During this time the investor obtains revenues through some form of road pricing under a concession from the government. Private enterprise plays a greater role here than in the case of pure pre-financing. These models have the advantage that transport projects are generally executed more cheaply and earlier than if financed under the transport budget in the conventional way. The private investor has a financial interest in completing the project as quickly as possible in order to obtain toll revenues. He will also want to provide infrastructure that is free of bottlenecks and maintain it in good condition. Only then will the stretch of road generate profit by attracting "customers" to use it. This means that roadworks, for example, are likely to be completed more quickly. The public sector benefits not only from reduced strain on the budget: it does not have to bother about operation and maintenance of the infrastructure either. It is naturally important that the risks be divided appropriately between the public sector and the private investor (see chapter 2).

Advantages of "operator models": faster and cheaper

Other public-private partnership models go further than this and provide for the privatisation of regional networks or the entire motorway network. Ownership of the entire network might, for instance, be transferred to a new "Motorway plc" (Autobahn AG) and the shares of the company then placed in the capital market. In an alternative model, ownership would not be transferred, but a private company would be granted a franchise to manage, operate and maintain the network. This operating company could solicit bids for concessions for specific stretches of motorway. The decision between such models would depend on various criteria, such as the amount of public financing required and the toll rate.[1]

[1] See Buhl, Ingeborg and Münch, Rainer, Privatisierung des Bundesautobahnnetzes, Deutsche Bank Research, 1994.

German conditions favourable for "operator models"

"Operator models" stand to benefit from increasingly heavy traffic in Germany

All in all, we see operator models as an ideal way of raising private capital to help finance the transport infrastructure, even relatively quickly. Conditions in Germany are favourable for operator models. For instance, the traffic on German roads is heavy and will increase further, especially in the goods transportation sector. Besides, many schemes only involve joining up stretches of road or (as in the A-Model) building additional lanes. The sums required for these relatively small projects are low, which would allow not-so-large operating companies also to submit tenders. Moreover, the high volume of traffic means that the toll rate could be relatively low without endangering the refinancing. If the toll is an acceptable rate – and drivers save sufficient time – it will not induce many to use alternative routes. Use of the toll revenues can then be planned more reliably.

Two types of operator models in Germany

In Germany there are two types of operator model: the A-Model (A as in *Autobahn*) for the upgrading of motorways, which is the subject of the next chapter, and the F-Model (F as in *Fernstrasse*) based on the *Fernstrassenbauprivatfinanzierungsgesetz* – a mouthful that means the law on the private financing of the construction of trunk roads. In the F-Model, the construction, operation and financing of a project can be assigned to private partners, who are given the right to charge tolls (on all vehicles, i.e. including passenger cars) to refinance their expenditure. As a general rule, no funds are to come from the transport budget, but seed capital amounting to 20 to 50% of the investment volume can be obtained from the government. The law applies only to new bridges, tunnels and mountain-pass crossings forming part of a motorway or trunk road, and to dual carriageways. As a result of these restrictions, there have so far been very few projects eligible as F-type operator models. The transport ministry (BMVBW) has a list of ten projects (currently with a total investment value of EUR 2.9 bn), and in only two cases have the concessions been awarded and construction begun (the Warnow crossing in Rostock and the Trave crossing in Lübeck). The Warnow crossing will be the first F-Model project to be opened to

Major differences between the two operator models

	A-Model	F-Model
Legal basis	- - -	Law on private financing of trunk road construction
Object	30-year concession beginning at set-up of construction site	30-year concession beginning at start of operation
Obligations of private operator	For stretches of motorway: - build (additional lanes) - maintain (all lanes) - operate (all lanes) - finance	Build, maintain, operate and finance: ◆ bridges, tunnels and mountain-pass crossings on motorways and federal highways ◆ dual carriageways
Grantor	Federal **and** *Land* govt.	Local authority **or** *Land* govt.
(Re-)financing contribution		
Truck users	Yes, country-wide toll on heavy goods vehicles (max. loaded weight 12 t or over)	Yes, project-related toll
Car users	No	Yes, project-related toll
Government (seed capital)	Yes (fed. govt.: yes, 50% on avg)	Yes, if necessary (fed. govt.: 20-50%)
Project-related toll	No	Yes

Source: BMVBW

traffic, in September 2003. It was a setback for the F-Model when the government recently stopped the plan for private financing of another scheme (the Strelasund crossing), and when it became clear that the Hochmosel crossing will be delayed by more than a year. The invitations to tender had already been issued for both projects.

2. Germany's A-Model – opportunities and risks

The A-Model is linked to the introduction – planned for September 2003 – of a distance-related toll on heavy goods vehicles weighing more than 12 tonnes (see box below). In this model, a private company is assigned responsibility for the construction of additional lanes (widening motorways from four to six, or from six to eight lanes), maintenance (of all lanes), operation (of all lanes) and the financing. In return, the company obtains a concession for a certain period (30 years). At the end of the period it transfers the road back to the government. The toll receipts for the relevant stretch of road are to be passed on to the private investor. In addition, seed capital, which can amount to around 50% of the estimated conventional cost of the project, is paid from the road construction budget. The reasoning behind this payment is that the motorway is also used by cars and light trucks, but they are not subject to the toll.

One of the key criteria in the award of the contract for the stretches of motorway is the amount of seed capital sought by the bidder. There are basically two ways in which the contract can be awarded. In "conventional planning" the road scheme is planned by public bodies and only put out to tender when the plan approval procedure has been completed. The successful bidder, the concessionaire, undertakes to build, operate and maintain the infrastructure. In the "competition of ideas", the scheme is put out to tender before or during the planning phase. This gives greater scope for the creativity of the private partners. Nonetheless, the basic specifications are still stipulated by the public sector.

Experts have drafted standard concession agreement

The BMVBW currently has a list of twelve possible motorway sections with a total length of 523 kilometres. A group of experts commissioned by the BMVBW has submitted proposals for the main part of the tender documentation for the A-Model (including a standard concession agreement), and has drawn up feasibility studies on three pilot projects. Hopefully, the first invitations to tender can be issued before the end of this year and all contracts will have been awarded by 2006.

A-Model dependent on introduction of truck toll in Germany

Use of the A-Model will depend on the introduction of the toll on heavy goods vehicles, scheduled for the end of August 2003. The revenue from a specific stretch of motorway is to be used to refinance the relevant investment by the concessionaire. The toll, which will apply to trucks from 12 t upwards, will replace the present fixed-price vignette. The average toll rate is to be 12.4 cents (previously 15 cents) per kilometre, with the actual rate varying according to the number of axles and emission category of the individual vehicle. The toll will initially apply only on motorways, but it can also be introduced on stretches of federal highways if traffic there becomes very heavy owing to drivers' avoiding the motorway. The toll will generally be collected electronically – through an on-board unit (OBU) that uses satellite positioning and

Possible pilot stretches for A-Model projects (additional motorway lanes)
Status: December 2002

Road	Stretch	Length km
A 5	AS Baden-Baden - AS Offenburg	38.9
A 61	AK Frankenthal - AD Hockenheim	38.1
A 8	W Bubesheim - AS Augsburg-West	45.6
A 10	AD Havelland - AD Schwanebeck	40.8
A 24	AS Neuruppin/Süd - AD Havelland	31.3
		72.1
A 3/A 67/ A 60	AS Flughafen - AD Mainspitz	19.8
A 1	AD Buchholz - Bremer Kreuz	74.8
A 1	AK Lotte/Osnabrück - AK Münster/Süd	49.6
B 1/A 44	AK Dortmund-Ost (B 236) AK Werl	26.0
A 57	AK Strümp - AK Köln-Nord	37.4
A 4	AS Düren - AK Kerpen	18.4
A 2	AK Kamen - AS Beckum	31.2
A 7	AD Bordesholm - AS HH-Othmarschen	70.7
	Total	**522.6**

Source: BMVBW

mobile radio technology. The flow of traffic is not held up. Nor are vehicles compelled to use certain lanes or observe a toll-related speed limit. Truck drivers who rarely use German motorways can pay the toll manually (without an OBU) at points of sale, located at filling stations for example, or via the internet. An estimated 1.2-1.4 million heavy goods vehicles will be subject to the toll, about 35% of them from other countries. The revenue is expected to come to around EUR 3.4 bn per year.

Truck toll to come at end-August 2003

The electronic toll system planned in Germany is probably the most modern world-wide, but it is also the most complex of its kind. This has raised doubts that it can be installed in time. Early this year there were still reports of technical difficulties and problems with the compatibility of different software systems. In 2002 the scheme had already been delayed by a legal objection to the tender procedure for the toll system. And the European Commission expressed misgivings about the system. These related to the toll rate (considered unjustified on the basis of current EU legislation) and to competitive aspects (compensation for German freight transport companies was seen as unpermitted state aid). The Commission has, however, approved the scheme.

Advantages of the toll scheme:

- **electronic registration**
- **no lane restrictions**
- **no toll-related speed limit**

Since no project can be undertaken under the A-Model without the toll, a delay in the introduction of the toll scheme would be very regrettable. Nonetheless, it currently seems very unlikely that it will start punctually on August 31, 2003.

But doubts about punctual introduction of toll

Risks and risk allocation in road operation projects

The relevant literature suggests many ways in which the risks of operator models can be categorised. One can distinguish, for example, between political risk, entrepreneurial risk, and acts of God. Or risks can be classified according to the phase in the value chain, as risks during the design, building or operating phase. The following sections give an overview of the main risks involved in road operation projects in general and those of the A-Model in particular. They also outline different ways and instruments of risk allocation. These are based on the standard concession agreement proposed for the A-Model by the group of experts, mentioned above.

Information on risk allocation in general ...

Main criterion in risk allocation: ability to influence risk

The assignment of risks to individual economic agents should always be based on carefully considered criteria. Probably the most important criterion is the degree to which the agents can influence and control the risks. Going by this principle, risks should be borne by the party that can best influence them. Risks that cannot be influenced should be divided among the parties to the agreement. Alternatively, risks may be distributed according to who causes them or stands to benefit from them (principle of equivalence). Another angle is that risk should be assigned to the party best able to bear it. Generally it is best if the risk allocation is included, as far as possible, in the concession agreement in order to avoid complicated negotiations later if a risk materialises. This precaution leads to higher transaction costs when the agreement is concluded, but provides much greater legal certainty during the term of the agreement. It is safe to say that these theoretical principles and criteria can never be applied fully in practice: reality is more complex. Each project has different specific risks, so risk allocation must always be negotiated on a case-by-case basis. This naturally also applies to the A-Model.

... and special features of the A-Model

In A-Model projects, user cannot be included in risk allocation

One characteristic of the A-Model is that the user of the infrastructure cannot be included in the risk allocation, as the toll is levied at a standard rate throughout the country, not specifically for each project. If this were not the case, the user could, for example, be assigned a share in the risks by varying the toll rate. This means that with the A-Model the risks have to be split between the grantor (the federal or *Land*, i.e. state, government) and the concessionaire (the private operating company). The standard concession agreement for the A-Model foresees a number of instruments for sharing the risks. One is the payment of compensation if certain risks materialise. The concession agreement can also stipulate that if certain high-probability risks which the concessionaire cannot control do materialise, then the concessionaire must bear the costs up to a certain (low) limit (i.e. excess); this cuts down on administrative work during the operating phase. As a "last alternative" the agreement can also be terminated under certain circumstances by either side.

Risks during planning and construction

Assumption of planning risks depends on tender procedure for specific project

As a general rule, risks during the planning phase have to be borne by the party responsible for them. In conventional planning this is the government. If completion of the plan approval procedure is held up by mistakes during planning or by delays in the purchase of land, for instance, then the grantor has to bear the related costs. Similarly, in the competition of ideas, it is the bidder or concessionaire who bears the risk arising from any mistakes in his own planning; he is responsible, for instance, if his ideas prove impracticable. But the government does not escape all responsibility for risk in the competition of ideas, as it still has to assume some risks that would also arise with conventional planning (e.g. those connected with the acquisition of land). So, all in all, the grantor bears the greater share of the risks in the planning phase. If, through the fault of the contracting authority, the concessionaire is unable to start construction until later than planned, the grantor has to reimburse the concessionaire for any additional costs incurred.

Construction risks usually have to be borne by concessionaire

By contrast, the entrepreneurial risks during construction have to be borne by the concessionaire since he – as the party that can influence the risks during this phase – is then responsible. Typical risks during construction are cost overruns, delays or faulty execution (even if this is not recognised until later). Unforeseeable costs due to geological problems (geological risk) have to be borne by the concessionaire up to a certain amount, the remainder by the grantor. If the project company engages a sub-contractor for some of the construction work, then the sub-contractor is naturally liable for deficiencies in his part of the work.

Risks during operation

Traffic-volume risk is relatively low in A-Model projects

In operator models, the main risks lie in the operating phase – a simple reason being the length of the contract. One particularly important risk is traffic volume, as it directly determines the toll revenues. The A-Model is subject to much less risk on this score than projects for the construction of entirely new roads or the F-Model, as the volume of traffic that has been using the various routes is well known. Besides, since heavy goods vehicles will have to pay tolls on the entire German motorway network, there is less danger of drivers making evasive detours. This makes it easier to forecast traffic volumes. Nonetheless, the longer-term outlook is still subject to uncertainty.

Concessionaire's influence on traffic volume is limited

The allocation of the traffic-volume risk is another case in which the basic question arises: who can influence the risk? The specifics of the A-Model leave the concessionaire very little scope for influencing the traffic volume: he is not permitted to vary the toll rate, and the scope for attracting additional users through exceptionally high quality roads is undoubtedly limited. This would suggest that the private operator should bear only a relatively small proportion of the traffic-volume risk. For legal reasons, however, exemption of the private company from this risk through the provision of a minimum-traffic guarantee or risk corridor would not be compatible with the classification of the A-Model as a public works concession, as it would largely relieve the concessionaire of the entrepreneurial risk. In other words: the concessionaire basically has to bear the traffic-volume risk himself.

Protection against government influence on traffic volume ...

Traffic volume greatly influenced by political decisions

Unlike the concessionaire, the contracting authority can influence the traffic volume on a particular stretch of road through a multitude of political decisions. This implies considerable risks for the concessionaire. Subsequent approval of transport routes parallel to the tolled road (e.g. a new railway) will reduce the amount of traffic using the road. The same applies to obstructions affecting the complementary infrastructure if, for instance, motorway access or preceding motorway segments are not built, are obstructed or temporarily closed (because of roadworks, for example).

Besides these political risks that primarily affect transport volume and have only an indirect influence on the concessionaire's revenues, there are other risks that impact the revenues directly. Most of these are beyond the concessionaire's control. The most important are risks regarding registration and collection of the toll, e.g. problems in registering all liable vehicles, controls on payment (toll evaders) or variations in collection technology. The possibility of changes in the definition of liable vehicles is another risk. And naturally there is the risk that the toll rates may be altered during the term of the concession.

... provided through risk sharing

Main risk-sharing instrument: compensation ...

The risks mentioned above have a direct impact on traffic volume and/or the operating company's revenues. But they are greatly influenced by the government. The standard concession agreement therefore contains a number of instruments to alleviate these risks. For instance, potential risks can be reduced by increasing the planning certainty for candidates right at the beginning of the bidding: the contracting authority provides detailed information on the traffic forecast on which the project is based. With this information, a bidder for a concession is in a better position to assess the profit he can expect from the project. By far the most important instrument, though, is compensation. Such payments are to be made to the concessionaire if one of the above-mentioned risks occurs and causes a substantial decline in monthly toll revenues. But payment is only due if a certain threshold – specified in the concession agreement (to reduce transaction costs during the operating period) – is exceeded; in other words, the concessionaire bears part of the risks himself.

... e.g. in event of change in toll rate during concession

A practical solution is also foreseen for any change in the toll rate during the concession. A certain rate is indicated in the tender documentation as basis for the bidders' planning. The agreement stipulates that if the toll rate is hiked during the concession period then the amount paid to

the concessionaire is to be limited if he would otherwise obtain an unjustified increase in revenue. By the same token, compensation may be paid to the concessionaire if the toll rate is lowered significantly. Here again there are to be certain thresholds that must first be exceeded or underrun.

Finally, the standard concession agreement also contains arrangements providing protection against the risk of inflation. If inflation remains higher than foreseen, the concessionaire will have inflation-related additional costs that he cannot recoup by raising the toll rate. This squeezes his margins. Here, too, compensation is to be paid.

Payment of toll to concessionaire: different concepts

Problem of toll evasion still unsolved

A further risk lies in the procedure for paying the toll over to the concessionaire. There are two different views on this question. In the proposals submitted by the group of experts mentioned above, the concessionaire is paid the revenues that are theoretically due to him under the motorway toll law. In this case, the risk for the concessionaire is that the traffic prediction may prove to have been wrong, i.e. the actual volume of traffic may be lower than the forecast. The BMVBW, on the other hand, proposes that the concessionaire be paid the toll revenues that are actually obtained. The risk for the concessionaire is then that the revenues received may be lower than the amount really due. Such a discrepancy could arise, for example, as a result of problems with the recording of liable traffic movements and checks on payment of the toll (toll evaders). Although there is provision for compensation of such revenue shortfalls, the onus of proof lies, in the BMVBW proposal, with the concessionaire. We agree with the experts' proposal as it allocates the risk more fairly: after all, the concessionaire has no influence on the system used to record and collect the toll. At the same time, though, this proposal harbours the risk for the government that it may have to pay over more money than it collected.

Protective instruments make traffic-volume risk bearable for concessionaire

Important to address project-specific risks

To sum up: It can be said that, as a rule, the concessionaire bears the traffic-volume risk himself as his main entrepreneurial risk. However, even though the concessionaire may have to pay excess, this risk is alleviated by the instruments foreseen in the standard agreement to protect the operator in the event of political decisions affecting the volume of traffic and revenues. Risk-related features of any given project can also be specifically addressed. So, all in all, assumption of the traffic-volume risk is not a knock-out criterion for private companies.

A-Model is step in the right direction

A-Model convinces through a raft of advantages

The A-Model represents an important step towards user financing and participation by the private sector in the funding of Germany's road infrastructure. A particularly positive aspect is that it relieves the government of budgetary expense and planning work. It should also allow necessary projects to be completed more quickly, and more cheaply. Another welcome feature is that under the A-Model some of the truck toll will flow back into road infrastructure (though the plans for use of the revenues can be criticised on a number of points). Since A-Model projects relate "only" to the widening of existing sections of motorway, they are less complex than schemes for the construction of new segments, such as those under the F-Model. They also require less investment. Since the toll is to be charged across the whole

motorway network, drivers are unlikely to switch much to alternative routes. Moreover, increased use of these private-operator models in Germany will give firms experience that enables them to bid successfully for similar projects abroad, in countries where road operation schemes have been in use for some time. After all, Germany is not alone in having strained public finances and a need for greater involvement of private capital in the construction of transport infrastructure.

Efficiency suffers if projects are too small

Regrettably, the A-Model is only a partial solution: there is no comprehensive privatisation strategy for Germany's motorways. Moreover, the planned contractual arrangements may deter investors – foreign investors especially – though the provision of standardised documentation should help to overcome these difficulties. From a business point of view, some of the envisaged projects may be too small to be efficient; where possible, the larger schemes should not be split into several smaller ones. If segments are too small they might also not be lucrative for foreign bidders. All things considered, awarding the contracts in overly small lots (perhaps with the aim of helping small and medium-sized construction firms) is unlikely to lead to the hoped-for improvements in efficiency. The argument that concentration on large transport projects would force the *Mittelstand* enterprises out of road construction, one of their traditional domains, does not hold water. Medium-sized construction companies can bid for specific projects by teaming up with other firms. They already do this now. Ways to increase the capital available to them are set out in the following chapter.

EU takes first step towards harmonisation of user financing

Over the medium to long term, the concept for user financing of the road infrastructure should include all road users. This means the toll should also apply to light trucks and cars (though some form of compensation would be necessary). Harmonisation at the European level is desirable. In April 2003 the European Commission tabled a draft directive on electronic charging systems. It aims to create a European electronic charging service to ensure the interoperability of payment systems in the EU internal market. According to the (ambitious) timetable a charging service is to be provided to all commercial vehicles (those over 3.5 tonnes or able to carry over nine people) from 2005 and to all other classes of vehicle from 2010.

3. Private road construction projects – lucrative for institutional investors?

Construction companies and suppliers are "classical" investors in private infrastructure projects

In Germany, the bulk of risk capital (equity and surrogates) invested in private infrastructure projects still comes from consortia dominated by construction companies and their suppliers. In the past, such investments seldom promised a sufficiently high return to justify participation by other investor categories.[2] Moreover, there may have been some – slight – cross-subsidisation of the return on the back of construction and supplier margins.

Circle of investors needs to be widened in future, though

Given an estimated building volume of EUR 3.8 bn in the first tranche of the A-Model and the need for probably EUR 400 to 600 m in risk capital, the circle of investors might need to be widened. From the industry investor's point of view this is underlined by the following factors:

[2] In the UK and Australia, though, there are already functioning markets with institutional and private investors.

- From a shareholder value perspective, lengthening the balance sheet, thereby reducing the capital ratio and endangering targeted returns on the capital employed, needs to be avoided.
- The length of time for which capital is tied up: infrastructure projects are typically of a long-term nature and thus restrict the possibility of making capital available for other activities or follow-up projects.
- Since banks are required under Basel II to have higher capital ratios, they may be less willing to lend, particularly if the assets are going to be undercapitalised because their capital ratio is currently considered too low.

Winning new institutional investors would definitely benefit construction companies

Especially at a time when the business environment is difficult and the equity markets are in poor shape for raising capital, classical industry investors will have to free up existing capital, or shorten the period for which it is tied, if they want to be in a position to bid for new concessions. Winning other investors would help industry investors not only here. They would also benefit in more ways, e.g. through the development of a secondary market. This would lead to benchmarking against capital market yields (mark-to-market) and thus enhance the tradability of the paper issued to finance the investment. In addition, the better pricing of various packages (construction, maintenance, financing) would help avoid the need for cross-subsidisation from construction and supplier margins.

Above all, "independent" institutional capital should help the individual project companies influence the private (construction and maintenance companies) and public partners to meet their obligations as stipulated in the contract. This would also help to reduce the latent conflict of interests facing industry investors, between earning margin on construction and maintenance, and achieving profit as concessionaire.

Possible institutional investors

As perceived by institutional investors, infrastructure investments essentially have two main characteristics. They are, firstly, relatively illiquid and of significant dimensions and, secondly, the payment streams are spread over a long period. With concession periods of 30 years or more, the A-Model projects will be no different here. It will be a challenge to create investment options or an alternative type of investment in which the long-term nature of infrastructure investments can be combined with the long-term commitments of certain categories of institutional investor.

Life insurers and pension funds are potential investors in infrastructure projects

Institutional investors such as life insurers, pension funds and possibly also *Pensionskassen* (a German type of pension fund) are, by nature, prime candidates here. In view of the weak state of the capital markets, such investors are currently on the lookout for investments other than plain vanilla deals. This is evidenced by the shifts in their portfolios, into hedge funds and private equity funds for instance. They are also looking for new ideas in order to meet set yield targets despite the weakness of the capital markets.

Transport infrastructure projects: a defensive, long-term investment offering attractive returns

Investments in suitable transport infrastructure offer low yield volatility and are less vulnerable than other investments to economic cycles. Historically, the growth of traffic volume has been very little affected by the ups and downs of the overall economy. Investments in suitable transport infrastructure projects can therefore be regarded as robust, low-volatility, defensive and long-term investments bearing attractive yields. Reference projects and experience in other countries have shown

that capital investments in suitable road infrastructure projects can be classified as medium risk with a targeted internal rate of return (IRR) of 15 to 18%.

Listed specialised funds will open infrastructure projects to large numbers of investors

Even though there are "natural" categories of institutional investors such as pension funds or life insurers, private investors may also play a role in the medium term. They could be encouraged by closed-end investment funds, whose structure provides scope for positive tax effects, or by listed funds that concentrate on investments in infrastructure. Such funds could bundle several investments and offer them in listable form to a broader circle of individual investors.

Attractiveness of A-Model for institutional investors

Besides the reasons given above, additional arguments why A-Model projects are an attractive proposition for investors from outside the construction industry are as follows:

- The A-Model is a programme, and not just a series of separate projects, which will make it easier to create a new type of investment with an interesting minimum volume.

Economies of scale easy to achieve

- Being part of a programme will help the individual projects to achieve economies of scale; this will in turn benefit the programme as a whole. It will also help parties seeking to penetrate the market (e.g. institutional investors).

- Due to the considerable number of projects and the related financing volume, the programme is suitable as an addition to existing infrastructure portfolios (invested in power stations, for example); it will improve diversification. This will be the case particularly if the first tranche consisting of twelve projects is followed by further A-Model packages.

Market risks of A-Model are largely quantifiable

- The A-Model is not a greenfield project, whose market risks are difficult to assess; it applies to existing transport corridors for which historical data is available. Nor does the A-Model suffer from classical user barriers such as point-to-point tolling of individual segments (the entire motorway network will be tolled), which should be attractive for institutional investors. Moreover, the toll will apply to heavy goods traffic, where demand is more stable than in other areas.

Investment hurdles must be overcome

If a new institutional investor class is to come forward, it will be necessary to deal with a number of critical aspects, some relating to the projects or programmes and others on the investor side:

Investors need some protection against risks they cannot influence

- Extraneous risks: Arrangements (e.g. compensation) for revenue shortfalls due to risks that are beyond the control of an investor in the A-Model (e.g. uninterrupted functioning of the tolling system, the setting of the toll rate, correct registration of users, collection of full toll, political measures that lead to a reduction in traffic on the relevant road section).

- Market volume: Only if there are prospects of a considerable project volume will it be possible to overcome any initial reluctance of demand for sound infrastructure investments. If projects are scarce or (too) small, it could reduce the interest of potential institutional investors with a broad investment horizon, because of high opportunity costs associated with participating in a project.

- Speedy implementation of projects and programmes: It is essential to keep the period up to the award of a project as short as possible, i.e. the time from the start of the pre-qualification of potential bidders to financial close. The number of bidders should be restricted to a reasonable figure through pre-selection.

Necessary to avoid delays in award of tender

- Points of reference: The fact that only a limited number of privately financed road projects have been completed within an acceptable timeframe in Germany is problematic; it will take effort to convince and attract international institutional investors. Much the same applies to the contracting authorities' experience regarding the core parameters needed to make projects marketable.

- Legal environment: Transparent, stable criteria for the award of tenders and a legally reliable framework are essential. This will have to include uniform tax treatment of different projects.

Stable and reliable award criteria are vital

- Market yields: Yields in Germany should be able to compete with those attainable elsewhere.

Yields must stand up to international comparison

- Market liquidity: If the market is to attract new institutional investors, it is crucial to overcome the illiquidity of investments in the A-Model (unsuitable for secondary market trading), i.e. to ensure their fungibility and marketability.

Assuming that these hurdles can be overcome satisfactorily, it is then a question of providing investment instruments that are compatible with the supervisory regulations the investors have to observe.

Institutional risk capital will be key to avoiding domination of the road projects by just a few strong companies and opening up ways for the *Mittelstand*, with its competence in construction and supply, to participate in new fields of business. Institutional capital, focused on long-term value creation, can and should become the motor of privately financed road infrastructure in Germany.

We expect to see institutional investors showing growing interest in the A-Model. Infrastructure investments – in the UK's PFI/PPP schemes and in Australia, for instance – have already developed into attractive and safe havens for institutional investors. This has continued apace since the crash of the technology sector, which previously experienced heavy demand from institutional investors that invest in private equity funds.

Institutional investors expected to show growing interest in A-Model

4. Privatisation of road infrastructure in Australia

Overview of the Australian toll-road market

Road transport plays an important role in Australian life. Approximately 90% of passenger travel and 20% of freight transport is done by road.[3] In Sydney, 90% of passenger trips each day are made by car. By world standards Australia has an extensive network of roads with a total of about 800,000 kilometres. Australia has a long history of operating and maintaining roads privately and collecting tolls during a concession period. However, in the last 10 years, Australia has been through a notable phase of infrastructure privatisation, particularly in the road

Long history of user financing of road infrastructure in Australia ...

[3] Source: Australian Bureau of Statistics 2002. Passenger travel is measured by the total distance travelled by persons. Freight transport is measured by the total distance each unit weight of freight is carried by all modes of transport.

(incl. bridges), airport and railway sectors. This has led to the development of new investor classes that specialise in the infrastructure sector. These investors focus particularly on projects with long-term defensive cash flows, attendant stable returns and reasonable investment security. Today, many institutional investors have become familiar with the toll-road investment case, and benefit from equity stakes in toll-road operators or investments in specialised funds focusing on infrastructure projects.

... has led to the development of new investor classes

Including the Cross City Tunnel (which will be described in the following case study in more detail) there is a total of 7 private toll roads in Australia:

Toll roads in greater Sydney

- The **M4 Motorway** is a 42 km tolled motorway in the western area of Sydney and is owned by Statewide Roads Ltd. The project was originally opened with 4 lanes (known as F4) in 1992, and extended to 6 in 1998. It is operated under a 21-year concession valid until 2010 and is the oldest Australian toll road.
- The **M5 Motorway** is a 22 km tolled motorway located in the south-western area of Sydney. The M5 is owned and operated by Interlink Roads Pty. Ltd. It was opened in 1992 and since then has undergone progressive and extensive expansion. The toll road is operated under a 30-year concession.
- The **M2 Motorway** is a 21 km dual carriage tollway located in the north-western suburbs of Sydney. It is owned and operated by Hills Motorway Ltd. The AUD 650 m M2 was opened in May 1997 after 3 years of design and construction. Hills Motorway Ltd. owns the tollway under a 45-year concession which is operated and maintained by Tollaust.
- The **M1 Eastern Distributor** is a 4 km tolled motorway (including a 1.7 km tunnel) that is owned by Airport Motorway Ltd. The AUD 700 m project was opened in 1999 and is operated on Airport Motorway's behalf by Leighton Contractors. The toll road is operated under a 48-year concession.
- The **Western Sydney Orbital** (currently under construction) is a 40 km privately tolled motorway linking the M5 and M2 in Sydney. It is owned by Westlink Motorway Ltd. The AUD 1.5 bn project achieved financial close in February 2003 and will be operated by Westlink under a 43-year concession from then on. Start of operation is expected for 2007. The Western Sydney Orbital will be the largest toll road in Australia and probably the second largest in the world.
- **Melbourne CityLink** is a 22 km fully electronic toll road between Melbourne's north-western and south-eastern districts. The CityLink is owned and operated by Transurban Group Ltd. The AUD 2 bn motorway project was opened in 2000 and will be operated under a 34-year concession.

Road construction projects in Australia

Toll road	Opened to traffic	Average traffic volume (weekdays)
Cross City Motorway	2006	90,000 vpd*)
Melbourne CityLink	2000	641,000 vpd
Eastern Distributor	1999	39,500 vpd
M2	1997	68,000 vpd
M4	1992	94,000 vpd
M5	1992	92,000 vpd
Sydney Harbour Tunnel (southbound)	1992	35,000 vpd
Sydney Harbour Bridge (southbound)	1933	75,000 vpd

*) vpd = vehicles per day

Source: Deutsche Bank AG

In addition, the New South Wales Roads and Traffic Authority (RTA) owns 2 more toll roads in Sydney: the Sydney Harbour Tunnel and Sydney Harbour Bridge. The RTA has recently called for tenders for the private financing of the AUD 800 m Lane Cove Tunnel toll road in Sydney.

In the following case study, the **Cross City Tunnel** project shall be highlighted, as it represents one of the most recent and innovative infrastructure investment cases in Australia.

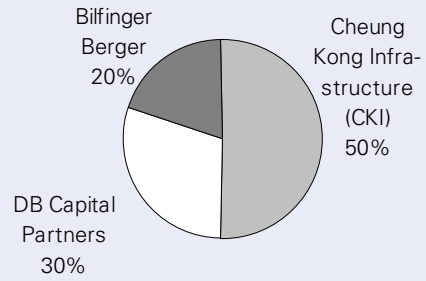
Case study: Cross City Tunnel in Sydney

Cross City Tunnel (CCT) is a toll road project in Sydney worth AUD 1 bn

Cross City Tunnel (CCT) is an AUD 1 bn build-own-operate-transfer (BOOT) greenfield toll-road project in Sydney tendered by the RTA. Upon completion, CCT will comprise a twin two-lane tunnel of 2.2 km in length running east to west under the Sydney Central Business District (CBD), providing an underground by-pass for traffic travelling east-west across the CBD. The CCT project is being undertaken by the Cross City Motorway (CCM) consortium which comprises Cheung Kong Infrastructure Holdings Limited of Hong Kong (50%), DB Capital Partners Australia (the private equity arm of Deutsche Asset Management Australia, 30%), and Bilfinger Berger BOT GmbH (20%), the investment company of Bilfinger Berger AG.

In December 2002, CCM achieved financial close and signed a 33-year concession with the RTA consisting of approximately 3.5 years of construction and 29.5 years of operation. At the end of the concession term the CCT will be transferred back to the RTA. The future shape of the project was set out in the contractual agreements. Construction of the CCT project is being undertaken by the Baulderstone Hornibrook Bilfinger Berger Cross City Tunnel Joint Venture pursuant to a fixed-time, fixed-price turnkey design and construction contract with CCM. Construction commenced in January 2003 and operation is to start in late 2006, also undertaken by Baulderstone Hornibrook. The tunnel will be financed by an each-way toll for cars and trucks (of AUD 2.50 and AUD 5, respectively, at 1999 prices) collected by an advanced electronic tolling system and will save up to 20 minutes on a cross-city trip despite the short distance.

Shareholding structure of CCT



Source: Deutsche Bank AG

Deutsche Bank acted as key adviser

Deutsche Bank AG acted as joint project sponsor (along with Bilfinger Berger BOT AG), sole financial adviser, lead debt arranger and underwriter, equity arranger and underwriter and interest rate hedge provider.

Highlights of the CCT

Existing surface road conditions across the Central Business District of Sydney are extremely poor

Currently, over 500,000 vehicles access the Sydney CBD per day. The existing surface road conditions across the CBD are extremely poor and require travel through congested streets. Traffic movements are further compromised by Sydney's complex system of one-way streets, many bus routes and large numbers of pedestrian crossings.

The CCT project is significant for a number of reasons:

No interruption of traffic flows in the CCT

- CCT will be the first fully electronically tolled road in Sydney, so there will be no interruption of traffic flows (such as by toll booths). This will considerably reduce travelling times.
- CCT is forecast to result in more than 90,000 vehicles per day being removed from the CBD surface traffic network, leading to improved environmental quality, a reduction in traffic noise and an improvement in air quality.

Travel times through the CBD to be reduced by up to 20 minutes

- CCT will offer improved reliability and efficiency of travel within central Sydney. Travel times are expected to be reduced by up to 20 minutes, with more than 16 sets of traffic lights being avoided.

Tender process

BOOT tender

Consistent with the New South Wales (NSW) government's policy for the provision of privately financed infrastructure, in early 2001 the RTA invited tenders from the private sector to build, own and operate the Cross City Tunnel and to transfer it back to the government at the expiry of the concession period (BOOT tender). The tender invited by the RTA contained the following conditions:

- Payment to the RTA of a "Development Fee"[4] of AUD 54 m.
- Payment to the RTA of a "Business Consideration Fee", i.e. an additional payment to the RTA for the right to occupy and operate the tunnel. This is effectively the competitive financial component of the bid.
- A maximum concession term of 33 years.

Three consortia shortlisted

Following an expression-of-interest stage during which potential bidders were shortlisted, full bids were submitted by 3 consortia in October 2001:

- The CCM consortium, consisting of CKI, DB Capital Partners and Bilfinger Berger and advised by Deutsche Bank.
- The E-Tube consortium, consisting of Leighton Contractors and Macquarie Infrastructure Group and advised by Macquarie Bank.
- The Sydney City Tunnel consortium consisting of the Transfield and Multiplex Constructions and advised by UBS Warburg.

For the purposes of efficiency and limitation of sunken development cost, the RTA felt the shortlisting of 3 bidders sufficient. After a detailed Q&A process, the CCM consortium was announced as preferred tenderer in February 2002.

Financing structure

Key factors: traffic volume and toll levels

The CCT project was awarded on a BOOT basis. This implies full transfer of patronage risk to the private sector in addition to the usual construction and operating risks. When determining the appropriate financing structure, particular emphasis needs to be placed on the key risk elements and structures as well as techniques to allocate such risks to the party most able to efficiently manage and mitigate those risks. Project revenues during operation and hence CCT's debt service capability during operation are largely dependent on CCT traffic volume and level of tolls applied, representing an additional investment risk for lenders and investors which needs to be reflected in the financing structure.

Relying on low toll structure and conservative traffic forecasts

CCT addressed the key issues associated with patronage risk in a way that allowed it to put a successful financing structure in place by:

- applying a low toll structure (lowest of the Sydney toll roads);
- implementing an electronic tolling system as well as a local traffic flow system on alternative routes;

[4] Fee for e.g. documentation costs, costs of tendering and assessment of bids tendered, consultants advising the RTA etc.

- relying on proven traffic forecasts based on extensive records in Sydney:
- introducing traffic-reducing measures on key alternative routes.

Objective: to minimise the effect of toll saturation

The structures outlined above reflect the objective to minimise the risk of toll saturation in terms of the passenger's willingness to pay toll and thus the risk of passengers using alternative untolled roads. Other traffic-related operating risks outside the control of CCM (i.e. political and demographic influences on risk position) were appropriately allocated between CCM and the RTA.

Taking into account the above-outlined risk structure of the CCT project, the total project cost of AUD 1 bn is funded by AUD 420 m in junior fund commitments (equity and equity-like subordinated debt instruments) and AUD 580 m in senior debt.

Shareholder funds and cash equity injected according to shareholding structure

Junior funds in the form of equity bridge facilities and cash equity at financial close totalling AUD 420 m are injected into the project according to the shareholding structure of CCT: CKI with 50% of the total, DB Capital Partners with 30%, and Bilfinger Berger BOT, a strategic industrial investor, with 20%.

A return on funds during construction is only paid to the shareholders who have directly contributed cash equity to the project.

Syndication of the facility was over-subscribed

Senior debt is provided in the form of an AUD 580 m 7-year limited-recourse term-loan facility underwritten by Deutsche Bank AG and Westpac. The margin is priced at 150 bp over the relevant interest reference rate, the bank bill swap yield (BBSY), during the construction period, rising thereafter to 160 bp over BBSY in the operational phase (29.5 years). Syndication of the facility to a group of 14 Australian and international institutions was successful and closed over-subscribed. The project will be operational for 4.5 years before first refinancing is required.

Successful syndication of the facility was secured through: shareholders with strong banking background, short tenor of 7 years, attractive conditions (due to relatively short tenor in contrast to the usual 12-15 year commitments), relatively conservative cash-flow forecast, and strong liquidity and performance support package during the construction phase (i.e. equity injection upfront, performance bonds, etc.).

For investors, relatively early refinancing may allow for generation of an IRR increase

The 7-year tenor of the facility and the following refinancing opportunities in particular provide benefits to CCM through the potential for more attractive pricing and the possibility to set, for example, more favourable cover ratios and levels of reserve accounts. For lenders, the relatively early refinancing is attractive through the option to either refinance the project after a relatively short time should CCM (out)-perform the business plan or exit the obligation should the business plan be under-performed. For investors, relatively early refinancing may allow for generation of an IRR increase.

Remarkably, it is the first time that a bullet structure has been adopted for a greenfield transaction in Australia and it has been well received in the market.

The CCT project is the first of three toll roads (incl. Western Sydney Orbital) to be in the market for financing. The lead time of CCT resulted in a precedent case with regard to determining the appropriate financing structure and pricing, which underlines the prominence of this transaction.

Institutional investment in CCT

Investors have opportunity to capture development profits

Historically, DB Capital Partners have primarily focussed on investing in development infrastructure opportunities and have sought to apply traditional private-equity techniques to infrastructure investing – i.e. maintain a primary focus on acquiring, managing and, ultimately, exiting investments with the aim of achieving capital gain.

Private greenfield projects – such as CCT – offer investors the opportunity to capture development profits that can be achieved by initially taking acceptable development risk at an early stage of a project, effectively managing such development risks and ultimately crystallising value accretion once the asset has matured and is sold to more yield-oriented investors.

To sum up: the CCT project is attractive for institutional investors, such as DB Capital Partners, for the following reasons:

Strong support for CCT from representatives of political factions

- Experience and financial strength of CKI and Bilfinger Berger, the consortium partners. The latter are, in particular, an important mitigating factor for the assumption of construction and operating risks.
- Strong support from the major representatives of political factions.
- Attractive business case (e.g. anticipated traffic demand, improved travel time savings).
- Appropriate risk-return profile which is reflected in the financing structure.

Institutional investors represent an attractive source of financing, because often large-scale infrastructure assets go beyond the capacity of industry investors and the liquidity of the relevant debt market.

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3. Private road construction projects – lucrative for institutional investors?
4. Privatisation of road infrastructure in Australia

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1. Need for more privatisation in road construction
2. Germany's A-Model – opportunities and risks

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