

Montgomery County north of Houston, a 1983 Minute Order by the State Department of Highways and Public Transportation allowed local businesses and governments to contribute land and finances to speed improvements bordering Interstate 45.

CONCLUSIONS

Table 3 gives a summary of the financing methods described in this paper. Although many of these methods have been used in other locales, a few are unique to Texas.

Involving the private sector in project funding has resulted in an attendant interest in accelerating project implementation. Because "time is money," a developer is willing to donate funds to advance a project's schedule.

The practicality of the new schemes has yet to be clearly established. Some limitations are

- The inability of developers to deduct local taxes from income tax when such taxes directly benefit the taxpayer,
- The concern that roadway alignments and priorities are overly influenced by the location of large parcels of land, and
- The risk of relying on property value increases to fund roadway projects.

On the other hand, it is also evident that new approaches to funding are evolving. Although there may be some shortcomings in these new approaches, experience in their application should result in refinement of these approaches.

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Private Enterprise and Highways

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In the activities required to create a highway—identification, promotion, land acquisition, design and construction, operation, maintenance—there is a spectrum of possibilities for involvement of the private sector and market processes. The current position in the United Kingdom is described and on that basis, with some wider generalization, future possibilities are analyzed. Highway maintenance is progressively moving to the private sector. There appears to be no reason why most of the maintenance program for main roads could not be delegated to the private sector. A preferred method is outlined. For highways generally, statutory position limits the degree of market provision. It is argued that Parliament would not generally provide powers of compulsory acquisition of homes to private enterprise. Hence the market alone cannot be expected to provide new roads. Some possibilities for the government and the private sector acting together so that the latter could become more involved in highways are explored. An experiment with private funding that was finally declined by government is described. It is argued that this experiment was not necessarily representative and that further trials should take place. Estuarial and river crossings, about which public attitudes appear to be different, provide much scope for privatization. Government would underwrite the requisite statutory powers and could call for bids for the design, con-

struction, operation, and maintenance of the project. The bids would effectively be the tolls required by the bidder, to be collected either directly from users or from the government on the basis of vehicle counts. The Channel Tunnel and the Dartford Crossing of the Thames are examples.

Activities involved in the creation of a highway may usefully be categorized as

1. Identification of a viable route,
2. Promotion,
3. Acquisition of requisite land and other rights,
4. Design and construction,
5. Operation, and
6. Maintenance.

These activities may be grouped into three stages: Activities 1–3 are the preconstruction stage, Activity 4 may be termed the construction stage, and Activities 5 and 6 are the postconstruction stage. In the following discussion these stages will be treated separately. Also, the provision of highways by the private sector is considered a possible part of the highway network, not a substitute for the status quo.

“Privatization,” in the context of highways and at the present time, covers a spectrum of possibilities. At one extreme all of the activities for a highway are implemented by private-sector enterprises using the market mechanism. Activity 2 would then relate to the establishment of sufficient capitalization for the enterprise. At the other extreme all activities are carried out by government (national or local), that is, the public sector. Activity 2 then relates to achieving a measure of consent.

At present in the United Kingdom there is a mix of government and private enterprise involvement. For most roads, all but Activities 4 and 6 are wholly or mainly within the domain of government. Construction is generally carried out by private firms of contractors. Design is sometimes done by government but often by private consultants. Until recently maintenance has generally been carried out by the public sector, often using direct labor (i.e., “force account”) and sometimes contractors. Throughout, government maintains its role in setting standards and enacting regulations.

UNITED KINGDOM PERSPECTIVE

As this paper is inevitably written from a United Kingdom perspective, a discussion of some of the relevant attributes of the highway scene in the United Kingdom is in order.

Britain, a small island with high population density, has a dense and pervasive highway network. The first motorway construction program is coming to an end (1). With some exceptions, such as in Glasgow and Leeds, most of the new roads are interurban. Comparatively little new highway construction has taken place in cities—virtually none in London.

As car ownership increased after World War II, demands for new roads increased, but financial stringency prevailed and it was not until December 1958 that the first modest (8-mi) stretch of motorway was opened, and the “1000 miles motorway programme” got under way. This was essentially an interurban program and it was realized that urban roads would need to be added to it. Until the end of the 1960s there was a large measure of consensus about the desirability of new roads, both rural and urban. This position has changed increasingly since the early 1970s.

As is the case in a number of other developed countries, increasing environmental and other concern in some sections of the community manifested itself as hostility to plans for new highways, especially within cities. As a result, substantial proposals for new roads in towns were abandoned. More recently, a number of new studies of road improvements in cities have been mounted. The time taken for statutory processes enabling construction to proceed has become extremely long (10 to 15 years between initial survey and start of construction are not uncommon) (2).

There is no recent history of significant private road building in Britain. By the late middle ages, the system of Roman roads had fallen into a sad state of neglect. The dissolution of the monasteries, which had maintained roads in their neighborhoods, hastened road decay. The Highways Act of 1555, noting that the roads were “very noisome and tedious to travel in and dangerous to all passengers and carriages” laid the responsibility for upkeep on the Parishes. For 4 (later 6) days between

Easter and Midsummer landowners had to provide labor, horses, and tools; householders and laborers had to work themselves or provide substitutes. Fines were payable in default. This was, in effect, a system of forced or, as it became known, statutory labor.

As might be expected, that system did not work well. By the mid-17th century road conditions were worse than ever. This led to the creation of the Turnpike Acts (the first in 1663) that incorporated tolls. These were private acts of Parliament that established toll road trusts on petition from groups of local citizens. The trustees would set tollbars or tollgates at each end of the road in question and levy charges on the users. By 1829 there were more than 1,100 such trusts controlling nearly 20,000 mi of road. It was “privatization of highway maintenance” in almost a strict sense (the charges levied were defined in the act and could not easily be changed).

Though the system was quite successful in substantially improving the state of many roads, the financial results were, overall, disappointing for the trustees. The initial 21-year duration of the acts was increased to 31 years in a vain attempt to improve out-turn. By 1830 the total debt of the trusts was £8.5 million of which £1 million was unpaid interest. The advent of the railway hastened the end. In 1864 a parliamentary committee recommended handing over the trusts to public authority. For more than 100 years now, virtually all roads in the United Kingdom have been in the domain of government and the Queen’s Highway has been free of direct user charges.

It should be added that tolls on bridges have survived rather better and that there are a few privately owned bridges. Interestingly, public attitudes toward bridges or tunnels appear to be rather different from those toward highways. The kind of objections often heard during public inquiries on highway schemes are seldom encountered on estuarial or river-crossing schemes.

Since the advent of the present United Kingdom government, encouragement of private enterprise and privatization of various publicly owned enterprises have been policy. In transport infrastructure, the proposed Channel Tunnel and the intended privatization of the existing Dartford Tunnel are cases in point.

CAN THE MARKET ITSELF PROVIDE?

Leaving aside, for this paper, political philosophy, the following main advantages of greater privatization are advanced:

- The same outputs would be achieved with less input as measured by money, time, or physical units (productive efficiency).
- There would be less misallocation of resources, hence less economic distortion, through greater use of the market mechanism (allocative efficiency).
- Because funding would be external to the Treasury exchequer (i.e., not included in the Public Sector Borrowing Requirement) more roads would be built, or roads would be built earlier than would otherwise be the case, to the benefit of the community.

For this paper, these propositions are taken as given.

For a private enterprise to “supply” a road (i.e., carry out all of the stages mentioned previously) there are at least two prerequisites:

- The road would have to be financially profitable and
- The enterprise would have to obtain authority to build.

Whether or not a new interurban toll road in the United Kingdom would be financially profitable to the enterprise is arguable, given the existing free network. Certainly the possibility cannot be excluded, though it may well be that there is more scope in the case of urban or semiurban roads with their denser traffic flows. The question, however, does not need to be addressed for two reasons. First, if all of the facilities the market was to provide were in fact available and the market did not provide, it must be assumed to know what it is doing. Far from being a failure, this could be a market success—avoiding productive or allocative inefficiency. Second, the facilities are not indeed present and, for the reasons advanced later, are quite unlikely to become available in the United Kingdom.

Authority to build would need to be acquired by normal private acts of Parliament. The powers thus granted would have to include powers of compulsory acquisition of property, as is the case when government or its agencies build public works. To rely on acquisition by negotiation—the enterprise paying sufficiently to persuade all unwilling vendors to sell—would render the whole effort nugatory.

Studies of householders’ surplus (the difference between the price at which a householder willingly sells and the market price) have indicated that there is an irreducible minority that will not sell. There are examples, both in the United Kingdom and the United States, of householders who have been determined not to sell and have withstood the great nuisance (and sometimes reduction of property value) of major private development being built around them. For the author, this was epitomized by a charming 80-year-old widow living in a lovely “Rose Cottage” who very naturally had no interest whatever in even discussing a possible sale. The alternative route would cost an extra £250,000 (1965 prices); the market price of the cottage was perhaps £15,000.

The power to acquire compulsorily would have to be accompanied by “house rules” regarding compensation. In the United Kingdom this would be market price, sale costs, disturbance costs, and a conventionally formulated home-loss payment. In the absence of agreement between the parties, the statutory Lands Tribunal would settle the values. No such generally applicable compensation code can be universally equitable. Householders’ surplus varies substantially across the community and the unwilling seller of his home would be manifestly a loser.

Whether or not a private enterprise would obtain the requisite powers from Parliament to build a road would depend on attitudes in the community. Attitudes toward a person’s home and land (“real property”) can be distinguished from attitudes toward other (“personal”) property. For example, the law treats land matters differently from others. It may be atavistic, but land—and especially its compulsory acquisition—is seldom other than an emotional issue. Free market provision assumes that government itself would not substantially intervene. In such circumstances this author does not believe that Parliament

in the United Kingdom would grant such power as to enable a private enterprise to promote, build, and operate a new highway “for profit” (as it would be represented).

Against this view could be advanced the precedent of the railways in the 19th century. In the United Kingdom they were promoted, built, and operated by private enterprise using Parliamentary bills to obtain powers. (Interestingly, the first, worldwide, motorway proposal was the private London-Brighton Motorway Bill, lodged in Parliament in November 1905. An extraordinarily farsighted measure, it was not followed through for reasons that can now be only speculative.) But times change. The railways were built at a time when all new technology was usually perceived as manifestly in the public interest. Population and built-up areas were less. Fewer homes had to be compulsorily acquired. The early railways had opened economic and social horizons for nearly all people by orders of magnitude. Promotion of new railways, and their Parliamentary bills, became a lively and extensive “industry”—it was not accidental that leading engineers had their offices near Parliament. Few bills were rejected; most of the rejected ones had been opposed by other, existing, railway companies for commercial reasons. It has been stated that at the height of the railway era, half of the Members of Parliament had railway interests. Attitudes were very different then. Present attitudes and circumstances lead to the view expressed here. Whether attitudes may change with time to enable future roads to be established by the free market and private enterprise must be a more open question. In the United Kingdom there is no significant evidence of such changes.

In other countries, where population density is less, population is more mobile, and attitudes toward individual property rights are different, circumstances may well permit market provision of highways with government involvement limited to only benevolent encouragement and subsequent statutory protection. But the very characteristics that may ease the previously mentioned land problem (e.g., lower population density) may make profitable routes more elusive. That may be the situation in some developing countries where the generation effect of a new highway is its main economic justification.

In such cases, the private enterprise considering investment in a new road would need to look to revenue beyond toll income. Development gain on land acquired with the highway land itself may offer possibilities. There are historic precedents for such internalization of external benefits in the case of railways, and more recently in the case of transit stations (3). Little in this area appears to have been done in the case of highways. It is a possibility worth active exploration, but the time scale would be long, hence political stability would be essential.

THE MARKET AND GOVERNMENT TOGETHER?

In the foregoing the market has been considered in a rather strictly defined sense, so as to remove from further consideration possibilities that in the author’s view would not be practical. That is far from saying that there cannot or should not be greater private involvement. Before the public-private mix of highway activities is considered, two kinds of government involvement in that mix may usefully be distinguished.

First, government could limit itself to the provision of statutory powers for the selected enterprise and the enactment of regulations—including if thought necessary the setting of operational limits (e.g., maximum unit tolls). It could call for bids—positive, negative, or neutral—for all other activities. It would in this way set the legal and administrative framework within which the market alone would be encouraged to operate.

Examples of that approach in the United Kingdom are the Channel Tunnel and the recent call for bids for the taking over by private enterprise of the two existing toll road tunnels under the Thames at Dartford coupled with the provision of a third crossing. It is noteworthy that government intends to proceed by act of Parliament without the usually protracted local public inquiries. Certainly the latter would normally be inconsistent with the tempo required by viable private enterprise.

There are few if any conceptual or systemic difficulties in such a procedure and there are clear advantages. Though both the Channel Tunnel and the Dartford crossing are rather special cases, discrete river and estuarial crossings appear to be suitable for this approach: the property taken is comparatively small, environmental disbenefits are limited, and public attitudes toward such projects are and have for a long time been different from attitudes toward major roads. Also, even where government carries out such schemes under the normal Highways Act, the river or harbor authorities have long-standing statutory powers. Often government must therefore use some form of parliamentary procedure in any event. For such schemes, adoption for the entire procedure of what are known as Parliamentary “hybrid” bills would not be considered so exceptional, but such procedure for the whole program of new trunk roads would not be practical. A more limited approach, using hybrid bills for a small specific number of urban roads, might be feasible.

The second kind of government involvement is the provision of statutory powers and entry into the public-private mix of activities as outlined previously. In the next three sections possibilities for altering the existing mix within the three stages involved are considered.

PRECONSTRUCTION STAGE

Given that government requires a road from A to B, specifies the physical standards, and later ensures statutory authority to build, there is little reason in principle why it could not at that stage call for bids from the private sector for a package including the construction stage (also maintenance) and most if not all of the preconstruction stage activities.

In the United Kingdom this would not be feasible in practice. The main reason is that, with existing highway legislation and procedures, government could not specify the “product” for which it was seeking bids with sufficient certainty to enable sensible, equitable, and firm bids. Two examples suffice:

- The preparatory and statutory procedures could take anything from 5 to 15 years; both the actual duration and the required resource intensity during that period are unpredictable.
- In a fair proportion of schemes, both the alignment and

some material details of the road must be changed as a result of, *inter alia*, public inquiries.

Were government prepared to use Parliamentary bills, many though not all of these objections would be mitigated. Deposited plans for bills have wide though specified limits of deviation, and procedures in Parliament normally take 12 months only (at the time of writing, increasing procedural objections against the Channel Tunnel Bill indicate that the time scale may be rather longer). However, it must be added that to attempt such a change of procedure generally would be an act of bravery, if not heroism, by any Secretary of State for Transport. Public opinion would be unlikely to support him. Parliament itself does not take kindly to considering specific bills when the authority and procedure for the project are already available in existing legislation.

For a more limited objective of, for example, a small number of specified roads in London, Parliamentary bill procedure may become workable. At some stage, a United Kingdom Government may decide that a small number of new roads should be built in London. If it decides to seek powers using the normal Highways Act, two matters arise. First, the time between that decision and contractual commitment to build will be such that the contract stage will be reached not in the life of that government, not even in the life of its successor, but perhaps in the administration after that. Whether policy can survive such changes is doubtful. Second, for the reasons mentioned, the scope for increased private-sector involvement would therefore be limited. If government proceeded by hybrid bill, the outcome would be more (though not entirely) certain. Government would then also have the option of adopting more private-sector involvement. But, as is seen in the next section, the omens are not promising.

CONSTRUCTION STAGE

Enterprises could bid for constructing and maintaining the road on the basis of collecting “tolls” for, say, 25 years rather than conventional payment. It would be the unit toll values that would form the substance of the bid. In countries where toll roads were normal there could be actual toll collection. In other countries, such as the United Kingdom, government could pay the enterprise a toll for each vehicle counted (automatically) using the road. The enterprise would thus take the risk of usage. Government would have the advantage of deferred payment, which would be based on a measure of utility. This would be a modest step to greater private involvement. The advantage of funding external to the Treasury exchequer is captured by this method.

In 1983–1984 there was an effort in the United Kingdom by the West Midlands County Council to mobilize this method (4). The “Black Country Route,” a 7-mi dual carriageway traversing an industrial area, was in the process of detailed design and specification and had high local priority. Using conventional funding from the Department of Transport program, however, priority was less and completion was not expected for 10 to 12 years. By virtue of “toll-bidding” it was expected to halve this time using private-sector finance.

The council had reached an agreement with one consortium (a bank, a national contractor, and a finance company) whereby the latter would bid on a toll basis, effectively a royalty arrangement to last 25 years. The actual construction contract was intended to be let to tender by the consortium. Government was asked for authority to proceed. If authority were granted, government would be committed to 70 percent of the final cost including royalties. The proposal was rejected.

Details of the rejected proposals have not been published. The departmental press statement quoted the minister as saying that "proposals for private financing of this scheme are not acceptable . . ." and the departmental view was that they "contained unacceptable financial uncertainty and risk. . ." At the time, the view in the industry was that government had found the proposal too costly compared with conventional funding. The council had estimated the final cost of the proposal at between £87 million and £123 million before contracts were signed and any private finance became involved. The scheme had been earlier referred to elsewhere as a "£30 million road" (conventional price estimate). Departmental estimates based on a firm bid are not publicly known.

As stated in a recent paper by Osborne (5), financing cost in the private sector is bound to be greater than the borrowing cost to government. Also, the target return for the investment will be higher than that provided by government securities because the former is subject to market risk. Whether or not the efficiency of the market and private sector can make sufficient inroads into these acknowledged *ex ante* differences is the real question. What is certain is that government would be mistaken if by deploying private-sector funding and enterprise it expected a "free lunch." Osborne's principal conclusion (5) is "that Government (or at least the civil service) is not truly committed to the idea of private finance for public sector infrastructure. It seems to us that Government is having difficulty in striking a balance between the unviable project and the bonanza . . . so as to yield a reasonable return on investment for the risk and expertise involved."

A further advantage of the proposal was said to be that the consortium would take the whole construction cost risk whereas conventionally in the United Kingdom a significant proportion of that risk is taken by government under the terms of the normal construction contract used for highways. But that advantage cannot be claimed as linked solely to the proposal. If government wished to avail itself of such facilities it could write its conventional construction contracts accordingly.

The negative result of this proposal was disappointing, but this sole example does not offer a sound basis for concluding whether or not such schemes are beneficial. There are at least two reasons for that. First, competitive toll bids from several consortia were not obtained. Second, it is known that government was concerned about the possibility of too high a royalty cost and the consortium about too low a revenue. It is understood that the proposal incorporated lower and upper cut-off points.

Before conclusions can be drawn about the viability of such private financing of new roads, competitive bids without cut-off points should be invited. Whether or not the market would deliver such bids may be speculative.

For such further experiments it could be desirable to include the detailed design activity in the bidders' obligations. If the

centerline of the road has been established and the land acquisition settled, or nearly so, there is no compelling reason why this should not be tried. It would not materially increase private involvement in the United Kingdom because design is already carried out mostly by private firms, but it could be more attractive to bidders.

Two conventionally funded highway schemes, where the department already owns the requisite land, are about to be the subject of experimental "design and build" bids. Ideally such bids should include maintenance for a long period (12 years is being considered), but it is understood that the period will be open to offer by the bidder. The results of these experiments will not be available for a considerable time but will be awaited with interest. A claimed advantage of this system, viz less construction risk to government, is not an advantage generated by this system alone.

POSTCONSTRUCTION STAGE

In relation to highway maintenance, which is traditionally the province of the public sector (local government in the United Kingdom) and is often done by direct labor ("force account"), much is already happening with the objective of deploying greater private-sector input. The Local Government Planning and Land Act (1980) has since April 1981 required direct labor organizations to tender for work in competition with the private sector. Since then government has progressively lowered the threshold level of cost above which such tendering is compulsory.

Consultants have been and are increasingly being appointed to manage the maintenance of long stretches of roads. The site work is then done by contractors. "Lane rental" schemes have been developed and found a useful technique.

The original lane rental schemes involved a contractor bidding time as well as price. He was then paid a bonus if early or charged a rental if late. The rental rate was a proxy for the delay costs to the traveling public. Later schemes charged the contractor a rental from the beginning, which he allowed for in his bid. Such a rental could be either "overall" or "lane by lane" depending on how many lanes were rendered inoperative by the contractor. Early reports of the results of these schemes appear to be favorable.

There is clearly much scope for deploying the market and the private sector in highway maintenance. This is especially the case in developing countries where most highway maintenance is done by force account. Studies in such countries have shown that the value of the existing highway asset base is often sharply declining as a result of poor or insufficient maintenance. Studies have also shown that the unit costs of maintenance by force account are far from those achievable by private enterprise.

Even where contractors are employed, the conventional method—unit price payment for detailed activities that the contractor is instructed to carry out by the supervising agency—may not be the best procedure. More trials should be made of a "per kilometer" method, which is quite consistent with the deployment of market processes.

The per kilometer method is one whereby the contractor bids for a long-term contract to keep a substantial length of road

“convenient to the user” for a rate of payment of £X per, say, month. The level of these rates would be “profiled” over the duration of the contract, either by the bidder in his offer or by the employer in the specification using normalized indices. “Convenient to the user” would be specified not by telling the contractor what he has to do but by setting up objectively measurable criteria and defining exactly how they are to be measured. For example, the contract would not require the contractor to rod drains or clean gullies. It would require the pavement surface to be clear of accumulated water and would spell out the test that would establish whether or not the pavement passed or failed in that respect. At specified frequencies, which would have tolerances and could vary over the year, a monitoring team would inspect the road and if any of the tests were failed the month’s payment would be forfeit. (A more complicated method would be to have a sliding scale of forfeiture depending on the number and kinds of tests that were failed). The normal sanctions for successive nonperformance would apply. The profile of monthly payments would mitigate “gaming.”

The crux of such a system is whether or not practical objective and readily determinable tests can be established. Such tests need be only proxy for the required quality but need to give unequivocal results. It is fair to add that opinion appears to differ among maintenance experts as to whether or not such tests can be established. The author is advised that with a reasonable amount of preparatory work in the country (standards will of course differ) it should be possible to devise the tests and requisite form of contract.

Development and fairly extensive trials of this system are advocated because, if a successful and widely applicable method of this kind emerges, there will be considerable advantages in its deployment, not only in developing countries. Among such advantages would be the generation of expertise for achieving the ends of maintenance among contractors who would not be instructed by the government employer as to means. Contractors would of course engage and retain the necessary technical expertise. The role of government, or its supervising agency, would be to monitor contractual compliance and implement sanctions in the event of failure. That appears to be preferable to the status quo.

Finally, under the rubric “operation” of highways, the main function other than maintenance is policing. Though conceptually highway policing could also be delegated to the private sector, it would undoubtedly be unacceptable to the community and is not considered further.

CONCLUSIONS

This paper is based on circumstances in the United Kingdom, and is in effect a report from the United Kingdom to the

conference. But it may be of wider interest. In countries that share the relevant attributes, conclusions are likely to be similar. The absence of such attributes and the constraints they offer would correspondingly offer wider possibilities.

In the maintenance of highways, private enterprise and the market mechanism can be extensively deployed. *Prima facie* there appears to be no compelling case for the use of anything other than private enterprise on the main highway network.

For design and construction, where private enterprise is already extensively deployed, there appears to be scope for further trials of funding by the private sector with revenue from government based on the usage of the highway and the unit rates the main subject of the bid.

For particular river or estuarial crossings, the “set pieces” so to speak, there is considerable scope for government to carry out prompt statutory processes and invite bids for other activities from the private sector. This may also apply to a limited number of urban roads.

For highways generally, if government can underwrite the statutory requirements, there may be scope—but if so it would be modest—for increasing the contribution of the private sector to the preconstruction stage activities.

The market alone cannot supply highways in the United Kingdom.

In several countries circumstances are currently favorable to the wider deployment of market processes and private enterprise in highways. Accordingly,

- The opportunity should be taken to try out many variants of such deployment. Not all will be successful but those that are will provide a valuable addition to the repertoire of highway methods.
- It is essential to take the opportunity to monitor carefully, over a long time, both the methods and the results so that after the event conclusions about their validity may be soundly based.

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