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ROUND TABLE

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The Round Table to assess reforms of urban transit systems, entitled "Privatisation and regulation of urban transport systems", took place in Paris. It was chaired by Mr. Yves Crozet of the *Laboratoire d'Economie des Transports (LET),* based in Lyons (France). The background reports were by Dr. Rosário Macário (*Instituto Superior Tecnic,* Lisbon Technical University*,* Portugal), who focused primarily on the broad trends driven by urban transit reform; Mr. Matthew Karlaftis (National Technical University of Athens, Greece), who looked more closely at the cost implications of reform initiatives; Prof. Martin Wachs and his co-authors (Rand Corporation, Los Angeles and University of California, Berkeley, United States), who focused on changes in labour relations stemming from regime change in transit activities; and Mr. Rainald Borck (University of Munich and the *Deutsches Institut fürWirtschaftsforschung,* or DIW, Germany), who shed new light on how the relative importance of socio-economic categories shape the urban transit reform process at the local level.

1. INTRODUCTION

The Round Table began with the observation that major international cities are, to some extent, competing to attract businesses. As economies become increasingly service-led and intangible major cities are trying to capture some of the foreign direct investment flowing from one part of the world to another as the opportunities arise. Such investment may be attracted by local market outlets, but equally so by the scope to export worldwide.

Because major cities can give rise to agglomeration economies, for instance by connecting up different levels of services, the quality of their transit systems is an important factor in terms of competitiveness. For such cities, a transit development strategy implies working out how best to become part of the global economy. This is bound to depend on national guidance as to the role the country wishes to play on the world stage and the resources it gives over to achieving that goal. But at a more local level, transit issues, and more precisely the quality of public transport, will have repercussions on factors such as a city's vibrancy.

At the same time, economic change and social aspirations oblige governments to practise sound financial management and, more specifically, to allocate resources as rationally as possible. For public transport, which has seen its market share considerably eroded by private cars and has consequently fallen seriously "into the red", the question of private-sector involvement in the provision of transit services was bound to arise. Expectations in this regard are for better-managed resources and a more commercial approach, which should alleviate the financial burden on urban transit.

It is important to stress that, while the Round Table was entitled "Privatisation and Regulation of Urban Transit Systems", its main purpose was to gain insight from urban transit reforms. The leading aspect of those reforms is private-sector involvement in public transport service provision in various forms and to varying degrees, ranging from virtually full privatisation, or competition "on" the market, to the contracting out of services by the authorities, or competition "for" the market. In both Europe and the United States there are numerous variations on this theme.

What are the outcomes of these far-reaching changes in urban transit regimes? What insight can be gained from the wide variety of experiences in the developed world? The Round Table endeavoured to answer these questions. For a synthesis of the Round Table debates we propose to take a two-step approach, beginning with a reminder of the challenges raised by such issues, before going on to see what major lessons can be learned from the experiences described during the Round Table.

2. CHALLENGES OF A NEW REGULATORY FRAMEWORK FOR URBAN TRANSIT

2.1 The crucial question of urban sprawl

In his introductory report to the March 2006 JTRC Round Table on *Transport, Urban Form and Economic Growth*, held in Berkeley, California, David Banister wrote: "*Trying to unravel the complexities of the interrelationships between travel, urban form and sustainable development is difficult. Underlying the discussion is the requirement to have some vision of the city in its desired form – it should be viable (economic justification), have vitality (inclusive and fair), and it should be healthy (high quality of life and environmental quality). Transport provides an essential element in city vitality, viability and health (…). The EU vision is based on maintaining the quality of urban life, urban planning and sustainable development, where mixed uses, high densities and good environmental conditions are seen as being central to both improving economic performance and the vitality of cities.*"

The Round Table began by highlighting a pitfall in this area, namely thinking "centrally" when the economy itself is tending to become decentralised. This implies polycentricism, of which there is clear evidence in today's world. To use an image, Ford-type mass production is becoming a thing of the past. In urban travel, polycentricism has seen the emergence of a dual model as people travel, on the one hand, within the city and, on the other, between suburbs. The second case is becoming more common than the first. Each city does, of course, have its own specific requirements and there is little uniformity. Yet in every case, a certain level of transit service is necessary to the city's economic development, and this is a strategic issue. For example, labour market size, which contributes to regional competitiveness by smoothing the match between job supply and demand, is determined by the level of transit services: skilled jobs are less accessible if transit services do not allow people to travel to work. The economy may suffer if opportunities to fill jobs with appropriately skilled workers are jeopardised because travel opportunities are confined to a limited area.

There is a tendency to distinguish between two distribution models for spatial activity: the North American and the European. The "extensive" cities of North America are at one end of the scale and the "intensive" cities of Europe at the other. However, it should be borne in mind that the suburbanisation trend so typical of North America is also gaining ground in Europe, and one of the questions here is whether that trend is not itself a factor in economic development rather than just an outcome. One reason for suburbanisation may be residential choices (private home ownership) but another is the rise in land prices, and it is generally accompanied by an increase in the space given over to recreation, shopping and working on the city outskirts. As for transport, urban sprawl means

that the North American model does not lend itself to transit services, and over 85% of trips are by private car. Speeds are therefore higher and distances greater. Car travel is comfortable and, in this context, better access actually means greater speed. In Europe, with its denser cities and markedly less predominant car use, it is hard to increase the speed of travel, as this always depends on infrastructure which is costly to provide and hard to incorporate into an historic environment. Consequently, the variables that can serve to maintain, if not to increase, the share of transit systems include comfort and frequency.

A point worth noting is that the American model, based on car use and long distances, makes heavy use of environmental resources and gives off high levels of greenhouse gases, for example – in any case far more than in Europe, where the authorities are trying to maintain the share of transit systems. Nevertheless, it is hard to gain a clear picture of the implications of this urban sprawl, as even in sprawling cities there may appear to be numerous jobs around, through residential areas themselves becoming business districts; and it is very hard to say what specific steps the authorities should take to combat urban sprawl. One vital form of action would be to target the property market, upstream from transit services, and have an impact on housing cost. Admittedly, all city councillors are committed to developing their towns and cities and hope to attract residents and businesses. Yet this growing sprawl poses a formidable problem for those in charge of organising public transport. We might add that public transport is not really adapted to increasingly complex living and working patterns, particularly in a world where people string together a series of activities throughout the day, for instance, or where there is high growth in recreational activities. Consequently, while public transport is benefiting from investment, its share of the travel market is on the decline. While the purpose of investment in public transport is to help to reduce congestion and strike a better environmental balance, the evidence shows that the results are mixed precisely where such concerns make sense, i.e. in major cities. Opinion polls report that people are in favour of developing public transport, but in fact most of them use their cars. Public transport is valuable as an option: people are keen on keeping this option open, even if their actual behaviour proves the contrary. So public transport has to contend with private car use, which is in fact the most popular mode of transport.

2.2 New questions stemming from changing levels of responsibility

The developments described above are prompting new questions. In many cases, transport falls within the remit of more than one tier of government, e.g. the municipal authorities and the region. This is because urban sprawl and longer trips are leading to overlapping areas of local responsibility, a situation which was hitherto unknown. Where transport is concerned and particularly public transport, new legal and economic arrangements are clearly required. At the same time, transport is a network activity, meaning that some parts of the network are profitable and others not. Hence the following questions:

- What incentive framework should be drawn up by the national authorities?
- Which public agency is best placed to determine what the structure of the local transit system should be?
- Which economic agent is best placed to operate the transit system?

There is a distinction to be made here between strategy, tactics and the operational level. Strategy is the domain of local authorities and tactics that of local government agencies, while the

operational level decides how to allocate the factors of production. Another possible distinction is between players who, respectively, "design", "fund", "use" and "operate" the transit system.

As for the "economic" dimension of a transit system, analyses have shown that, at the local or mayoral level, notions of prestige may result in transit system costs being overlooked, although transit services are an integral part of the passenger transport market. In such a market, public transport is perceived as an inferior good, i.e. a good that individuals use less as their incomes rise. A fundamental challenge here is to reinvent public transport to encourage the return of the more affluent classes. At the same time, the cost of using public transport is not only monetary but includes access to travel information, frequent services, good transfer facilities, accessible networks/connections and short waiting/travel times. On each of these points, public transport finds it hard to compete with private car use. That being so, the crucial question is: which player is best placed to determine the structure of the transit system?

2.3. The public/private debate

There is a need to maintain a core network of public transport, just as there is a need to adapt to the new spatial configuration stemming from urban sprawl. This means combining protection of the core network with the development of new services. Injecting a dose of competition is perceived by many observers to be vital to the development of public transport systems. Innovation boosting while ensuring efficient resource use are often said to be the cardinal virtues of the private sector. So it is not surprising that many public authorities have considered introducing some form of privatisation into public transport. Numerous options are possible and some are even specific to individual countries. Without going as far as the privatisation and full competition launched on the UK bus market in the 1980s (with the exception of London), some authorities have sought to turn their backs on the inefficiencies that are alleged to be inherent to public management. Those inefficiencies are: a degree of negligence, linked to a tendency to over-invest with regard to the actual cost of solutions adopted; a mismatch between service provision and the real level of changing demand; and a failure to focus on measures to bring down operating costs. Many experts feel there is a need to combine accessibility, which is vital and consubstantial with the notion of transport, and competitiveness. This implies "market efficiency" and therefore private sector involvement.

However, while government intervention in urban transit is often characterised by heavy emphasis on redistribution, or ideology, its economic justification is often based on the following arguments:

- If the congestion/environmental costs associated with private car use are not internalised, replacing private cars with public transport in cities could make the entire urban transit system more efficient;

- The fixed operating costs of urban transit systems are high. So an increase in the number of passengers will normally reduce costs per user and possibly prices. The ensuing size advantage for operating companies is behind the trend towards more concentrated urban transit markets. The monopoly or oligopoly power enjoyed by service providers could give rise to pricing behaviour that would make transit systems less efficient and crowd out the user groups that are dependent on them. Consequently, it was felt that government involvement, or public ownership, was a prerequisite if transit systems were to be efficient;

- Finally, accessibility, i.e. the provision of a basic service giving vulnerable user groups access to mobility, is viewed as a "merit good"; in other words, a service that governments should provide because it is a fundamental right, even if it is not economically rational.

Thus within the "transit market", with its social inequalities in terms of access to transport opportunities, there are also "transit fares" which do not fully reflect the actual costs of such transport use. In Europe, public transport users pay only a small share of the costs of service provision, while private car users, in virtually every case, are not charged for the congestion they cause, not to mention the uncertainty surrounding the potential long-term costs to the environment from their greenhouse gas emissions. Conversely, public transport users have no perception of deriving any advantage from the fact that this form of travel is better for the environment.

It was not the aim of the Round Table to focus on the environmental dimension of urban transit, but rather on the potential for a better match between public transport and the demand for urban travel, particularly through forms of privatised, or more precisely, contracted transit services. Yet in addressing the competitiveness of transit services, the emphasis is on the role they could potentially play and hence on a better environmental balance for passenger travel as a whole. This raises the question of whether some form of privatisation is a viable solution.

As for the efficiency of the service provider, it is worth noting that in many cases government support has not improved the availability or quality of urban transit services for all that, but rather increased the fiscal burden to such an extent as to jeopardise the very viability of such services.

One final question that springs to mind is the extent to which the pursuit of market-led objectives is compatible with the social dimension of public transport, for instance. The social dimension is complex, however; first because private car users are not all affluent, far from it – bear in mind private car use on the outskirts of a conurbation, where there is no public transport – and, second, because public transport investment in city centres is largely of benefit to those who live there. Yet they are the affluent classes, at least in Europe. So it is not always easy to judge investment in transport in terms of redistribution.

This Round Table synthesis will now look at the conclusions reached on some of the issues above, in particular the involvement of the private sector in urban transit service provision.

3. INSIGHT GAINED FROM THE ROUND TABLE

The first point to be made is that transit services fit into a broader economic and social framework and must therefore adapt to policies in other fields, such as purchase tax and private car use, property and housing; or user charges for competing infrastructure. In practice, public transport has to cope with the omnipresence of private cars, which they complement rather than supplant. Social developments, such as the growth in recreation or the fact that people string together a whole series of activities, have also led to a sharp decline in public transport use over the long term, and consequently heavy financial losses. Ultimately, public authorities could be said to be maintaining or purchasing services which are at best of only partial use to the community. Yet in London, for

instance, since the congestion charge was launched and some of the revenue reallocated to increasing bus services, there has been a sharp rise in bus passengers and these services are doing much to ensure that the introduction of a congestion charge in London will not be reversed.

However, the question is not whether public transport should be subsidised, but rather what the optimal level of subsidy should be. There are no ready answers, owing to factors such as economies of scale for transit service operators, a positive environmental balance for those services, or equity and the social dimension, which some experts maintain make any approach to the issue virtually impossible.

In strictly financial terms, the evidence shows that user subsidies account for between 20% and 100% of the operating costs of transit services in Europe. Budgetary difficulties in most of the developed world – together with the emergence of a school of thought and a body of research during the 1980s which showed that the main impact of transit subsidies was to undermine productivity and innovation in subsidised enterprises – triggered a political process that introduced a degree of deregulation/privatisation to the transport sector.

From these experiences, the Round Table gained the following insights:

- In terms of productive efficiency only, the decrease in subsidies that has accompanied the contracting/privatisation of transit services has led for the most part to higher fares and lower pay within transit enterprises, at least in the United States. The rise in fares has tended to have more of an adverse effect on the number of passengers. Above all, the increase in productive efficiency apparently stems from a decline in pay. In this field, however, the conclusions reached by studies in Europe and the United States are very different. It is also clear that the way in which productive efficiency is measured affects the findings. While some of the studies do highlight a rise in productive efficiency and a fall in costs, the magnitude of those changes is hard to assess with precision. It may be fairly safe to say that government-run services push up costs, owing to higher trade union membership in public enterprises and to the tendency for such enterprises to be larger in size; which does not exactly match the requirements of the markets they serve. While private firms pay less and impose longer working hours, they can also be said to attract fewer skilled workers and have a high staff turnover. All this has been proved to have an adverse impact on the number of accidents, the maintenance of production equipment and, for instance, staff training costs. It would appear, in fact, that there are few technical efficiency gains to be achieved by using a private service provider, and such gains actually stem from wage cuts. The Round Table wishes to highlight the fact that a public enterprise is not intrinsically less efficient than its private sector counterpart, thus ruling out any dogmatism in that respect.

- With regard to the range of services offered to the public, which in turn is contingent on the leeway enjoyed by the provider, the tendency among private operators is to run fewer off-peak services in sparsely populated areas. In more general terms, private operators focus on profitable markets and neglect unprofitable ones. So, to maintain consistency across the network, governments should continue to subsidise unprofitable services, without necessarily benefiting from profitable routes. This implies that the authorities should, in some cases, break down a network into "lots", paradoxically in order to maintain the network, i.e. they should separate unprofitable from profitable sections when contracting out services. This is because the authorities are trying to achieve accessibility, whereas a private operator bases levels of service on production costs. A crucial problem here is the overall co-ordination and coherence of a transit system. This is an issue where

the potential implications are just as interesting as the question of competition for service provision. Cases involving the privatisation and deregulation of public transport services – in particular the United Kingdom's policy for bus services other than in London, and for national rail services – have highlighted failures in terms of passenger information, good connections and transfer facilities, and pricing consistency. Each operator has tended to pursue a strategy that maximises profits but undermines the overall coherence of the network industry. In other words, while overall integration is highly beneficial, it does not stem from cost-benefit analysis by individual firms. Consequently, public transport provision is not a least-cost issue, and the presence of numerous private operators on the market does not mean there should be a public agency overseeing network coherence. Then again, the management of such matters by a public agency will not necessarily be rational and flawless either.

- Another potential issue is stable competition in a sector left to market forces. Experience would appear to show that, in a field characterised by increasing returns to scale, competition is giving rise to a more concentrated market. In terms of buses in the UK, for instance, there are now only five major operators left out of the 140 originally in the market when it was deregulated. The question here is twofold: namely, the possibility of illegal agreements; and the power of public authorities when faced with private quasi-monopolies.

- One aspect of the latest developments in public ownership theory is that an efficient producer may in fact need few incentives to cut costs; otherwise the quality of the services on offer will be jeopardised, even when there is not necessarily any scope for them to be cut. A producer may thus become efficient because the workforce is not encouraged to prevent costs from rising. In other words, too many incentives may ultimately be counter-efficient, at least for some types of good or service. Indirectly, this is again the idea that a strategy to get public transport out of the rut involves portraying it not as an inferior good, as low-cost as possible, but as a good with a high intrinsic value. It involves encouraging the more affluent classes to return to public transport and thus strengthen some of the quality-related features of such services, such as the opportunity for executives to work when travelling by train. New information and communication technologies have a crucial role to play here.

- On such issues, where a private agent provides "public good" services, the type of contract binding the public authorities to a private operator is clearly strategic. The contract may specify issues such as the type and allocation of risk, network size, service quality, pricing levels and subsidy levels. A variety of formulae are possible. However, some of the Round Table experts stressed that, rather than giving guidance on every aspect of such contracts, public authorities should bear in mind the need to maintain a form of competitive pressure on the sub-contractor(s). Many experts maintain that there should be market efficiency in public transport and that this implies incentives for a specific level of performance. Other experts argue that the main aim should be commercial performance if the pitfall we saw earlier is to be avoided, namely, operators offering particularly poor service in the name of efficiency and low costs. It is therefore most important for private operators to benefit if their services attract more passengers.

- Many other problems await public authorities, however, with regard to contracts. The evidence shows that such contracts, once signed, are often renegotiated and that when they come up for renewal the formulae very often become more advantageous to private operators with, in particular, an extended duration or the full coverage of costs. When

contracts come up for renewal, private operators can be said to have acquired more in-depth knowledge of the market – being at the top of the learning curve, so to speak – and hence possess asymmetric information compared with the public agency managing the matter. A public agency does not necessarily have the required expertise, and cannot collect the information it needs to assess the services on offer and their production costs. It may not be in a position to complete such a task. Furthermore, the hidden administrative costs, which can be likened to transaction costs, may mean that such matters are managed without the transparency and neutrality that such decision-making requires. Private contractors, for their part, inevitably practise rent-capture behaviour. This is because there are subsidies on these markets. At the same time, these operators are working with short time horizons that are not conducive to long-term action. Long-term contracts would destroy any competitive advantage and are therefore not initially offered by public authorities. In practice, as soon as contracts are signed, many operators ask to renegotiate and, when the contracts are renewed, private operators usually manage to have the terms altered in their favour. Contract renewal is an opportunity for established operators to receive what amounts to a premium, comparable to a form of inertia, and attributable in some cases to the fact that the public agency is ill-informed about the strategic aspects of the services provided.

The Round Table experts concluded that shifting the responsibility for public service provision over to the private sector has little chance of success if the contract does not allow operators scope for innovation. There is a real need to foster innovation in public transport, as there has been in community taxi/on-demand bus services, which can supplement transit provision in sparsely populated areas for specific categories of the population or at specific peak times. In this regard, the time at which a service runs may be just as crucial as the route served. The crux of the matter is not necessarily to offer the same service under a different regime, although it may be more economical, but to meet changing demand. It is on such questions as these that promoting innovation becomes strategic. In some respects, the Round Table discussions placed greater emphasis on the need to promote innovation and on the potential role of the private sector than on the assumption of systematically higher resource allocation through recourse to the private sector.

4. CONCLUSIONS

The challenges facing government in the field of urban transit systems are strategic coherence, productive efficiency and long-term funding. Where such funding is concerned, those who use transit systems should logically be the main contributors. But property owners, who benefit indirectly from transit services, should also contribute in some way. By the same token, real-estate developers should be given less leeway if they fail to include urban transit services in their projects. On all of these points and in spite of the practical difficulties involved, new funding and policy options should be envisaged by the authorities.

As to the question of productive efficiency, the conclusions of the Round Table are qualified in that a public enterprise is not necessarily less productive than its private counterpart, at least in terms of technical efficiency. It is more a question of which operator is best prepared to be thrust into a transport market dominated by private cars. The Round Table felt that the answer to that question was largely based on the operator's ability to innovate. This brings to mind not only transport-on-demand, for instance, but also business practices based on new information and communications technologies. It is here, on the key role of innovation, that private sector involvement in transit service provision can make a difference, in any case more so than on questions of efficiency.

Whatever the contracting/privatisation option, public transport will always be subject to a large number of regulatory arrangements. In a contracting process, information therefore plays a strategic role. It enables an operator's performance to be monitored, from the commercial as well as the efficiency standpoint, and it can be used to assess the implications of choices made by the authorities in charge, as well as to compare operators. Information is also an integral part of any bidding process. It cannot be emphasized strongly enough how crucial information is, and how necessary it is for there to be a mandatory, transparent process of access to all data on the services provided. That process may, in fact, be delegated to a specialist agency. Access to little or no information may mislead the authorities as to the actual quality, range and economic relevance of the services provided by a transit operator. This touches on the idea of governance, and the Round Table in its conclusions placed strong emphasis on these points.

Finally, there is the broader issue of strategy, which is more of concern to the national authorities. The leading question here is global warming. Consequently, governments must ensure that all the economic signals to households point in the same direction, i.e. towards a reduction in transport-generated emissions. The areas most closely concerned are taxation but also housing and land-use policies and many of the regulations on environmental performance or vehicle use. Such an initiative will require a long-term approach, but should make public transport part of a new dynamic, different to the one prevailing to date. This should reveal the full potential for innovation that the private sector can unleash when it comes to new patterns of organisation.

INTRODUCTORY REPORTS

THE POLITICAL ECONOMY OF URBAN TRANSIT

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SUMMARY

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1. INTRODUCTION

In most countries, the public sector interferes in the operation of urban transit in many distinct ways. In the past, public transit systems have usually been operated by the public sector itself, with pricing and investment decisions directly under political control. Many countries have begun to privatise transit companies, but even then, regulations of pricing and investment decisions usually remain. One specific aspect is that public transit is usually heavily subsidised. According to the American Public Transit Association (2006), total fares in several thousand public transit authorities in the US accounted for only 33% of operating costs and 23% of total operating and capital costs, while for Europe corresponding figures show fares cover about half of operating costs (APTA, 2005). Urban transit is obviously heavily subsidised through general tax revenue. Interestingly, automobile travel too, often does not cover the full costs of road construction and usage (let alone environmental and accident costs). Indeed, in the US, user fees (including gasoline taxes, licence fees and other charges) accounted for only 60% of total highway expenditures (Brueckner, 2005). In Europe, higher petrol taxes suggest that subsidies to automobile travel should be significantly lower. These subsidies obviously have repercussions on individual commuting choices. For instance, subsidising automobile travel may provide incentives for individuals to move further out from the city centres into the suburbs.

Subsidies also impact the optimal investment policies in urban transit or alternative transport systems such as roads. The choice of transport system obviously depends on the part of the cost that is borne by individuals. Subsidising transport may therefore lead to overinvestment (Brueckner, 2005)[1]. Both subsidies and the choice of transport system have efficiency and redistributive consequences. Indeed, it will usually be the case that different groups of individuals have a preference for or against public transit and, likewise, for or against subsidies for alternative transport modes. Winston (2000) argues that public involvement in urban transportation will remain large because transportation policy is shaped by political interests.

This paper presents a selective survey of the political economy of urban transit. It will ask who benefits and who pays for different regulations, in particular, pricing and investment policies. In so doing, the author reviews in a non-technical manner recent contributions to the political economics of subsidising transport and of determining the configuration of urban transport systems. The general idea is to determine the effects of the analysed policies on urban structure and on the distribution of residents' welfare.

Before proceeding, it is worth emphasizing the scope of the paper. It will deal with issues from a positive political point of view. That is, different political measures such as subsidies will be evaluated according to the political support they generate, which in turn depends on their distributional impact. Brief mention will be made of efficiency effects of transport policies but these will be only cursory. Also, the main focus of the analysis is on urban economic models (although non-urban models will briefly be discussed). These models explicitly incorporate the interaction of transport costs and land use. When the political sphere interferes with housing and transport markets, this will affect land use and urban spatial structure. Thus, an important question is how different measures affect consumers' location decisions, commuting times, housing prices and mode

choice. Moreover, the paper looks at subsidies and system choice in a relatively abstract manner. Thus, questions such as institutional arrangements, ownership and regulation will be mostly disregarded, and no strong effort will be made to gauge the empirical evidence in support of the presented models[2]. This is not because these issues are unimportant. In fact, ownership questions probably do play an important role in the working of urban transit. For instance, Winston (2000) claims that government failure is responsible for poor performance of urban transit and should be remedied by privatising government monopolies. However, in order to distil the distributional implications of transit policies, it is useful to abstract from these questions.

The paper is organised as follows. The next chapter very briefly reviews some normative criteria for public transit policies. Chapter 3 then presents some elements of the political economy of public transport in general models, i.e. models that disregard the explicitly spatial aspects of urban transport. Chapter 4 provides the theoretical background for the urban economic models analysed in the sequel. Chapter 5 then describes the political economy of transport subsidies and Chapter 6 turns to the political choice of transport system. Chapter 7 discusses how the two approaches – choice of subsidies and of transport system – can be combined. The last chapter concludes the paper with some general remarks on the political economy of transit reform.

2. NORMATIVE THEORY OF REGULATION

Before the advent of political economic theories of regulation, analysis of pricing and investment choices was based on welfare economic analysis (Braeutigam, 1989). The basic tenet of welfare economics is that prices should reflect marginal social costs[3]. From this prescription, a natural case for subsidies in transit emerges through the existence of economies of scale or economies of traffic density. Economies of scale imply that average costs are higher than marginal costs and, hence, marginal cost pricing will not cover costs. Subsidies to transit providers are necessary to cover losses. Economies of scale arise from large fixed costs in the case of rail service. For bus service, technological economies of scale are likely to be small, but average costs for users decline with service frequency, since waiting times decrease (the so-called Mohring effect).

In the case of multiple services, cross-subsidies emerge from an application of pricing rules such as the simple Ramsey rule, where the deviation between price and marginal cost is inversely proportional to the price elasticity of demand of the relevant service.

Other cases for subsidising transit have been made. For instance, a first-best policy includes congestion prices for automobile travel, but if congestion costs are not internalised, subsidies to public transit may be a second-best response to reduce automobile travel. The empirical case for this instrument is, however, weakened somewhat since the cross-price elasticity between automobile travel and transit prices seems to be low.

For the case of optimal investment in a transportation mode, we find similar rules going from simple to complex. In the most basic framework, the capacity of a system should be expanded until the marginal social benefit equals the long-run marginal cost. Social benefits include the time savings for users of a transport facility and reduced congestion. In the case where congestion is

efficiently priced, congestion tolls exactly cover the costs of optimal capacity if there are constant returns to scale (Mohring and Harwitz, 1962).

All of these propositions have some merit, mainly for our understanding of what efficient policies may look like. However, as a positive description of regulatory policies, the normative theory clearly fails (Noll, 1989). Indeed, it was soon recognised that actual policies in regulated industries deviate wildly from those prescribed by welfare economics; and these deviations were too large and too systematic to be explained by occasional mistakes or the ignorance of decisionmakers. In fact, it soon transpired that regulatory policies do not generally seem to serve the consumer interest. In a seminal piece, Stigler and Friedland (1962) found that regulation of electricity markets in the US had not lowered electricity rates. Similarly, Winston (2000) shows that in the US, transit fares have risen by 54% from 1980 to the late 1990s, despite increasing subsidies. Thus, it seems as though regulation may serve other goals than protecting consumers. Hence, the need arose for positive theories that are able to explain the policies we actually observe. This endeavour is at the heart of political economy.

3. POLITICAL ECONOMY OF PUBLIC TRANSPORT; GENERAL MODELS

3.1. Capture theory of regulation

The capture theory, or Chicago theory of regulation, in its simplest form states that, instead of maximising welfare, regulatory policies such as pricing of public transport tend to serve the producers' interests. This argument was first advanced in a coherent framework by Stigler (1971). He argued that politicians value money and votes; they want to get elected, but they may also be interested in bribes, campaign contributions and the like. Accordingly, politicians set policy to maximise some function of these two arguments. Thus, whether consumers or producers "win" in the regulatory game depends on what they can "offer" politicians. Stigler's general insight was that producers tend to win for two reasons; they are better organised than the usually diverse consumer groups and they have higher stakes and therefore push harder for favourable regulation. Consumers are generally affected only marginally by regulation and therefore each consumer has a small stake in the regulatory game. According to the capture theory, subsidies to regulated industries do not serve to set prices at marginal costs but rather increase producer profits at the expense of consumers.

While this line of research has yielded important insights, it is also difficult to reconcile with many empirical regularities, especially in public transport pricing, such as pricing below cost. Later research in this vein has addressed these shortcomings. Peltzman (1976) argued that as long as consumers provide some votes, producers will not receive maximum profits. He also showed that pricing to different consumer groups is dictated by their political weight and not the cost of serving them. This generates an inherent tendency toward cross-subsidisation; if two groups have the same political clout, both should pay the same price regardless of their marginal costs. This may explain, for instance, the widespread support for public transit in regions with low population densities.

Different extensions of the capture theory have been offered. Becker (1983) shows that regulation will be efficient compared to alternative methods of redistributing between the relevant political groups. Laffont and Tirole (1991) include imperfect information and study how different incentive schemes affect the incentives for a regulatory agency to collude with the regulated firm.

Transit subsidies may redistribute not only between different groups of voters or transport users and firms: Winston (2000) and others have argued that an important part of subsidies goes to workers in transit authorities in the form of higher wages and higher returns to suppliers of capital. For instance, a large part of the cost reduction achieved by British bus deregulation came in the form of reduced wages (Nash, 1993).

3.2. Voting models

In the Chicago theory, the focus is on the conflict between consumer and producer interests, but conflicts among different consumer groups are usually considered only in a very broad sense. In voting models, on the other hand, this is the central focus of the analysis. Consider the following setup. A group of individuals who differ by income must decide the pricing policy of public transport. If the transport industry is subject to increasing returns to scale, marginal cost pricing leads to losses for the producer and would require subsidies. Society would then need to pay for this subsidy, for instance, through an income tax. The political support for such subsidies then depends on the progressivity of the income tax and on the incidence of benefits from public transport for heterogeneous consumers.

This is essentially the case considered by Corneo (1997). He shows that individual preferences for public pricing depend on income; given a proportional income tax and quasilinear utility, the higher an individual's income, the lower is his preferred subsidy and tax rate. This is because the demand for public transit is assumed to be income inelastic while the tax share increases with income. A well-known implication of this assumption is that in pair-wise votes over all possible alternatives, the winner will be the pricing policy preferred by the voter with a median income.

Corneo (1997) then shows the following. If median income corresponds to mean income, pricing of the transit authority will correspond to marginal cost pricing, with fixed costs covered by a subsidy. Intuitively, in this case the median voter is also the average voter, which means that maximising his welfare corresponds to maximising society's average welfare. If, however, income is skewed to the right, such that median income is below mean income, prices will be below marginal cost and the implied subsidy correspondingly higher. Here, the median voter benefits more than average from subsidising prices. This kind of model then generates the testable hypothesis that public transit prices should be lower, all else being equal, the lower the ratio of median to mean income.

Corneo (1997) also shows that pricing rules for a setting with many goods (for instance, a transit authority with several modes such as rail and bus) will correspond to a modified Ramsey rule, with the difference between price and marginal cost being inversely proportional to the demand elasticity of the corresponding good weighted by the difference between median and mean income. The intuition is that if the price elasticity of demand is large, departing from marginal cost pricing entails larger welfare costs and hence, in equilibrium, the price to marginal cost ratio is lower the larger the price elasticity. The median to mean income ratio shapes the distributional gain of the median voter from pricing as described above.

3.3. Empirical evidence

It is worthwhile pausing here to see how theory squares with some of the facts of transit pricing. Since the focus is on theory, however, the discussion will be brief.

A first issue is how subsidies redistribute between consumers and producers. According to the capture theory, the share of subsidies going to producers should be relatively high. Indeed, according to studies cited by Winston (2000), as much as 75% of subsidies go to workers in the form of higher wages or suppliers of capital in the form of higher profit (see also Rottemberg, 1985). The remaining 25% go to reducing fares and improving transit quality. This seems consistent with a version of the capture theory that stresses the political strength of producer interests.

Voting models look at how this quarter or so of a subsidy that goes to consumer interests is distributed among heterogeneous consumer groups. According to the simple median voter model above, if the subsidy is financed by linear income taxes and transit demand is income inelastic, the incidence of a subsidy is progressive, i.e. poorer transit users will tend to benefit at the expense of wealthy taxpayers. It is generally believed that transit users are relatively poor, so this would be compatible with the theory. However, the model presented did not account for consumers' mode choice. While bus users – at least in the US – tend to be relatively poor, rail commuters are often relatively wealthy. For instance, Garrett and Taylor (1999) show that more than half of bus riders in Los Angeles earn under $15 000 a year. Typical Southern California commuter rail riders, however, earned about $65 000 a year (see also Pucher and Renne, 2003). While in many European countries transit use is more widespread, data show here, too, that low-income individuals tend to disproportionately use mass transit (Infas and DIW Berlin, 2004).

Hence, subsidies to rail transit may well benefit relatively wealthy households; an important part of the arguments in the following chapters will explain why. Rail transit often serves suburban locations which are predominantly populated by upper middle-income residents. Therefore, it is not unrealistic to assume that the fiscal incidence of at least part of transit subsidies may be regressive, which would seem to contradict the simple median voter story. However, the ensuing analysis will also show that the fiscal incidence of a subsidy (i.e. the effect on an individual's net income position) is not enough to gauge its redistributive effect. General equilibrium effects on urban housing markets may be important and may, in particular, explain why poor residents may support subsidies which seem regressive at first sight.

There is also an explicit regional dimension to subsidies for urban transit. In most countries, transit authorities are operated locally but subsidies often come from national governments. Hence, local transit users are subsidised by non-users. Urban transit users are subsidised by residents of rural regions where mass transit is not available (Rottemberg, 1985).

4. URBAN MODELS: BACKGROUND

The political economic analysis, as described in the previous chapter, has one drawback from the point of view of urban transport. Namely, by postulating aspatial models, it ignores potentially important effects of urban transport policies on urban structure and housing markets. Indeed, since most individuals use public transport to commute to work, ignoring the effects of policies on commuting distances may be misleading. Moreover, in choosing their location and hence commuting distance, individuals trade off commuting costs and housing benefits. Therefore, transport policies which affect commuting costs may have important repercussions on housing markets, and ignoring these may lead to false conclusions.

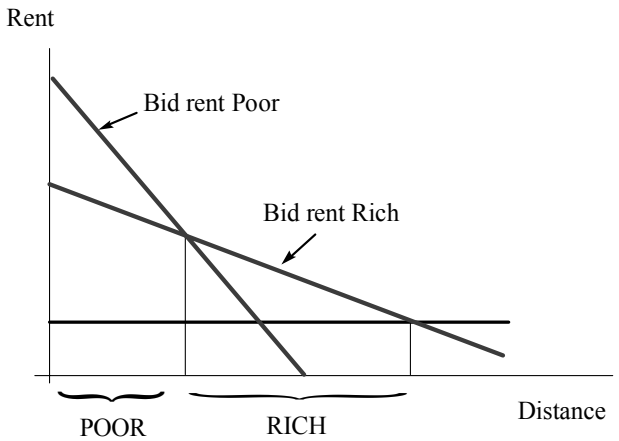
Therefore, we now turn to models which explicitly incorporate urban structure into the analysis of urban transport policies. Before describing these models, however, a brief background is provided which is common to urban economic models.

The models described below are based on the so-called Alonso-von-Thünen model of a monocentric city[4]. These models analyse individuals' housing and location choices in a city. All individuals in the city commute to work in the Central Business District (CBD). Commuting costs are assumed to be linear in the commuting distance. Individuals derive utility from housing and non-housing consumption. Residents are assumed to be mobile within the city. Therefore, an individual must reach the same utility level regardless of his location in the city. Locations further from the CBD imply higher commuting costs; in order for individuals to be willing to move there, housing rents must then fall enough to compensate the individual for this higher commuting cost. This is captured by the fundamental concept of a bid rent function; it shows how much an individual is willing to pay for housing (per square metre) at a particular location. The bid rent function declines with distance from the CBD to compensate for the higher commuting cost (see Figure 1). For instance, in the simple case where all individuals consume one unit of land, bid rent falls with a marginal increase in commuting distance exactly by the marginal commuting costs. When housing consumption is endogenous, bid rent falls by the ratio of marginal commuting costs to individual housing consumption. Intuitively, the higher the marginal commuting costs, the more individuals will want to live close to the centre to economise on commuting costs, and the willingness to pay falls rapidly with distance. Conversely, high housing consumption means that an individual has much to gain from the lower housing rents obtainable far from the CBD.

An important question which will also play a role in the subsequent analysis is how different groups – e.g. different income classes – choose their location in a city. Since land is assumed to go to the highest bidder, the group which has the steeper bid rent function will outbid the other group in the centre while being outbid in the suburbs (see Figure 1). Thus, which group lives in the centre depends on how the slope of a bid rent function changes with income. It turns out that how this plays out depends on the income elasticities of commuting costs and housing consumption. On the one hand, individuals who earn higher wages face higher time costs of commuting and therefore have a preference for living close to the CBD. On the other hand, they also have a larger demand for housing space, which means that they are especially interested in lower housing rents at locations far from the CBD. Depending on whether housing consumption or transport costs increase faster with income, we get different location patterns. If housing consumption is more elastic with respect

to income than marginal transport cost, the poor will live in the central city and the rich in the suburbs. This case is shown in Figure 1. In the converse case, the rich will live in the centre and the poor in the suburbs. In the following subsections, we use this setup to model the effects of urban transport policies on the welfare of rich and poor city residents.

Figure 1. **Equilibrium in a city with two income classes**



Before going on to the next chapters, two remarks are in order. First, the model is able to explain why in some cities, notably in the US, the rich live in the suburbs while, on the other hand, in many European cities (for instance Paris, see Brueckner *et al*., 1999) the rich live in the city centre and the poor in the suburbs.

Second, however, this prediction is valid only if one believes that location choice is driven by the trade-off between commuting costs and housing consumption, as just described. But whether housing or transport costs have a higher income elasticity is basically an empirical question. The result that the rich live in the suburbs only if housing demand is more responsive to income than marginal transport costs has been challenged on empirical grounds (see, e.g., Glaeser *et al*., 2000). In fact, it seems that the income elasticity of housing consumption is less than one, which is (approximately) the income elasticity of transport costs; if transport cost consists largely of time costs (which are proportional to wages), then its income elasticity should be close to one. Why then do the poor tend to live in central cities, at least in the US? Since later analysis will use similar insights, it is worthwhile to look at part of Glaeser *et al*.'s (2000) answer to this question, namely the availability of public transport. Suppose that, in contrast to the basic model, individuals can choose between two transport modes: public transit and automobile. Automobiles entail relatively high fixed costs and low time costs, while the converse holds for public transport; low fixed costs (from an individual rider's perspective) and high time costs. Since the poor have low wage income, they care less about the time costs than the fixed money costs and, therefore, tend to prefer public transit over automobiles; and since transit tends to be available in central cities but not in suburbs where population density is low, the poor will be drawn to the central cities. Glaeser *et al*. (2000) find that this model can explain location patterns in the US.

Let us look at the mode choice problem in a bit more detail. LeRoy and Sonstelie (1983) and Sasaki (1990) have provided detailed analyses of the combined choice of location and transport mode. Since mode choice and location patterns are determined simultaneously, we get quite a few possible patterns. Consider first the individual mode choice problem. An individual with wage w_j, living at distance r from the CBD, who uses mode i, is assumed to incur a transport cost of $F_i+(k_i + t_i w_j)r$. Here, F is a fixed cost which is unrelated to the distance travelled, k is the monetary variable cost and t the inverse of travel speed (i.e. the marginal time cost per kilometre of commuting distance). Since time cost is valued at the individual wage, an individual w_j incurs a time cost of $t_i w_j$ when using mode i. Suppose there are two modes, called bus (B) and automobile (A). The bus is cheaper but slower, that is, we assume that $F_A>F_B$, $k_A>k_B$, $t_A<t_B$. Then an individual living r km from the CBD will use the bus if $F_A+(k_A + t_A\ w_j)r > F_B+(k_B + t_B\ w_j)r$. Since the incentive of using the car comes from saving time costs, an individual is more likely to use the car the higher his wage. Also, for each wage level, there is some critical distance r^*, such that all individuals living at distances $r > r^*$ will use the car and all others the bus.

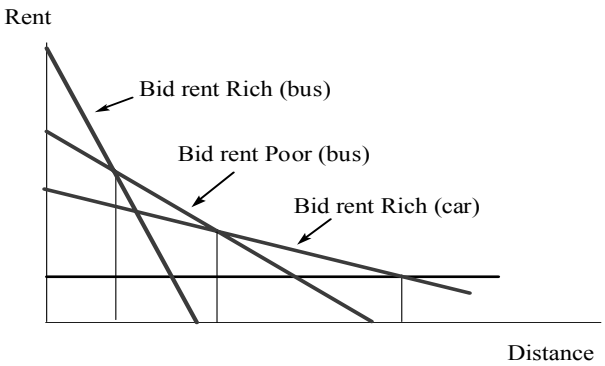
To see how location pattern and mode choice interact, let us consider again the trade-off faced by an individual who considers moving one kilometre away from the CBD. Again, the benefit will be a lower housing rent, while the cost consists of increased commuting costs, which are now a function of the individual's income and the transport mode used. The group that has the higher ratio of marginal commuting costs to housing consumption will live closer to the CBD.

Several possibilities exist. Sasaki (1990) concentrates on the case where the rich live in the suburbs and the poor in the city centre. The following possible equilibria exist:

- Both groups commute by bus;
- The rich commute by car and the poor by bus;
- The rich commute by car, some of the poor by bus and some (those living further from the CBD) by car;
- All the poor commute by bus, the rich who live relatively close to the CBD also commute by bus and those living farthest in the suburbs commute by car.

LeRoy and Sonstelie (1983), on the other hand, argue that if both groups use the same mode, then the rich would live closer to the CBD than the poor; this is because they assume that the income elasticity of housing consumption is less than one. If the costs of commuting by car are low enough for the rich, but not for the poor, to use it, then some rich will commute by car and the poor by bus. In this case, the poor bus commuters will live closer to the CBD than the rich car commuters. An example is shown in Figure 2. Here, some of the rich commute by bus and live close to the CBD. The poor all commute by bus and live between the rich bus commuters and the rich car commuters.

Figure 2. **Equilibrium in a city with two transport modes and two income groups**



According to LeRoy and Sonstelie, this can explain the history of American urban structure; when everyone walked to work, the rich would live close to the centre. The advent of the streetcar (which was not affordable for the poor) in the 1850s and 60s first caused richer individuals to move out of the city centre. The same occurred when cars were first used by the richest portion of society. In this view, when car use became widespread even in the poor segments, re-gentrification occurred as the rich moved back to the city centres.

Glaeser *et al*. (2000) present a small model that reaches similar conclusions. They focus on a city with rich and poor residents and three transport modes: walking, public transit and automobile. They assume zero money costs for walking (the slowest mode). Hence, in a ring close to the CBD, people will walk, and the rich walkers live closer to the CBD than the poor. In the next ring, people use public transit, and farthest from the CBD, people commute by car. By assumption, the rich who commute by car live further from the CBD than the poor who use public transit.

5. TRANSPORT SUBSIDIES

Eventually, the focus of the paper will be on the link between subsidies and the political support for different transport systems, e.g. public transit versus individual transport. To set the stage, however, it is useful to ask how transport subsidies are politically determined, by outlining results from an urban model where subsidies redistribute between rich and poor voters. The discussion here is based on Borck and Wrede (2005). They study a monocentric city model like that presented in the previous chapter. Individuals belong to one of two classes: rich or poor.

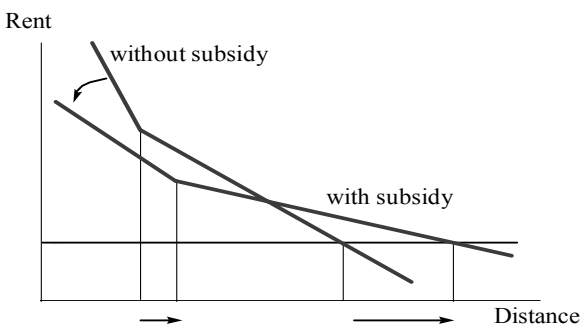
In the benchmark model, it is assumed that the poor live close to the city centre and the rich live in the periphery. The reason behind this result is that both groups face the same commuting cost function (by assumption), but the rich demand more housing space per person because housing demand increases with income.

Commuting is subsidised at a constant rate, and the subsidy is financed by a head tax, i.e. each individual pays the same tax[5]. Note that since the rich have longer commutes than the poor, a subsidy of this type appears to be regressive, i.e. the rich get more than they pay in taxes and are effectively subsidised by the poor. Interestingly, empirical studies tend to confirm this pattern. For instance, Kloas and Kuhfeld (2003) use survey data from Germany. They show that commuting distances are very skewed, and those with the longest commutes have the highest income. Their conclusion is that the commuting subsidy in the German income tax code is regressive.

The question we then ask is: why would the poor majority vote for commuting subsidies, which are so widely observed? The argument turns out to be simple but it hinges on interesting general equilibrium effects in housing markets and residence choices. The key observation is that commuting subsidies lead to sprawl: moving out to the suburbs is made more attractive if commuting is cheap. This conclusion is not as trivial as it seems, since the sprawl-inducing effect of lower transport costs is countered by the sprawl-lessening effect of higher taxes used to finance the subsidy. However, in a model with homogeneous consumers, Brueckner (2005) proves analytically that tax-financed commuting subsidies do indeed lead to urban sprawl.

Since commuting subsidies lower individual net commuting costs, they create incentives for individuals to move out to the suburbs. The individual bid rent functions rotate inward, as shown in Figure 3. Effectively, individuals are willing to pay more for land far from the CBD since commuting long distances has become cheaper. But this implies that competition for land in the city centre is reduced, while competition for land in the suburbs increases. As a result, housing rents will increase in the suburbs and decrease in the city centre. This is shown graphically in Figure 3, where r_1 is the border between rich and poor and r_2 the city border. The figure shows that the city expands spatially. After introduction of the subsidy, the poor occupy a larger part of the city's land. Hence, even if the poor have short commutes, they may willingly subsidise commuting if their housing rents fall sufficiently.

Figure 3. **Effect of commuting subsidy on urban equilibrium**



If both rich and poor voters gain, it would seem that transport subsidies are efficient in the present model. This is, however, not the case (Brueckner, 2005). In fact, without congestion or other market failures, the market equilibrium is efficient and the welfare of city residents, including land rents, is maximised at a subsidy rate of zero. Resolving this puzzle requires the introduction of a group that we have not considered so far: landowners. In effect, part of the cost of the subsidy is borne by absentee landlords in the form of lower land rent. The owners of central city land should

definitely oppose commuting subsidies since their income falls as residents move to the suburbs. Landowners at the city edge benefit from the subsidy, since the flight to the suburbs increases land rent there. It can be shown, however, that aggregate land rents fall; hence, landowners as a group are worse off than without the subsidy. Thus, distinguishing between renters and owners as a group, we can say that a commuting subsidy, in addition to redistributing between short and long commuters, redistributes between renters and landowners, with the latter group bearing part of the burden of the subsidy.

The political support for commuting subsidies then depends on the influence of landowners. In the US, where homeowners have a large say in local politics, one might expect less support for these subsidies than in other parts of the world. However, if landowners live in the city, the results change somewhat and are described below.

Borck and Wrede (2005) go on to extend the model along several lines. The first one is to allow for different commuting costs between groups. As shown above, if the rich have sufficiently higher commuting costs per km (because their time costs of commuting are higher for a given transport mode), then they will live closer to the CBD than the poor[6]. If the poor have longer commutes, will they then automatically benefit from a commuting subsidy? The answer turns out to depend on the exact form of the subsidy. If the subsidy is a flat subsidy per km of commuting, then the poor will indeed benefit from the subsidy (at least in the case of absentee landownership). However, if the subsidy is a fixed percentage of commuting costs, then the rich may benefit more than the poor, since their higher commuting costs are now subsidised more in absolute terms. We will return to this topic in subsection 7.2.

Another extension asks how the distribution of land ownership affects the results. If the city residents themselves own the land on which they live, then a commuting subsidy purely redistributes between rich and poor residents. Costs cannot be passed on to absentee landowners. If landownership were evenly distributed among rich and poor residents, then in the case where the poor live in the centre, they will definitely be hurt by commuting subsidies, while the rich benefit. However, the poor will be more likely to support commuting subsidies the more skewed is the distribution of land, in the sense that the rich own disproportionately more land than the poor. In this more realistic case, the part of the subsidy borne by landowners falls disproportionately on the rich.

Finally, the paper also considers financing commuting subsidies by an income tax. This implies that the rich bear a larger fraction of the tax burden necessary to finance commuting subsidies and, hence, support for subsidies by the poor increases.

6. SYSTEM CHOICE

We now turn to the political choice of a transport system (see Brueckner, 2005; Brueckner and Selod, 2006). Critics in the US have argued that cities invest in inefficiently fast transport systems, in particular, that investment is biased towards highways against mass transit, and that this overinvestment leads to undesirable urban sprawl. City residents can determine the nature of a transport system along two dimensions: speed and money cost. They may opt for a fast but expensive system, or for a slow and cheap system. In general, increasing monetary costs will lower time costs. For instance, a city may heavily invest in roads or rapid rail systems which are fast but expensive, or it may focus more on bus transit which is cheaper but slow. Again, the choice of transport system has redistributive consequences and will therefore be the subject of political conflict.

The basic setup of Brueckner and Selod's (2006) model is as follows. Residents of a city differ by income but have fixed housing consumption. It is assumed that richer individuals have a taste for living in the outskirts. Therefore, if all individuals face the same marginal transport costs, richer individuals will again live further from the CBD than poorer ones.

Transport costs per mile of commuting have two components: time and money costs. The time cost is the inverse of travel speed and is assumed to be proportional to the individual wage: the higher the wage, the higher the opportunity cost of time. Money cost, on the other hand, is independent of income. The trade-off between the two is then assumed to be shaped by the transport system. A faster system such as the automobile, has low time costs but high money costs, and the converse holds for slow systems which are cheap (per person), such as the bus. Individuals can therefore influence their time and money costs through the choice of the transport system. The transport system here is assumed to be chosen from a continuum menu of different time and money costs[7].

From an individual voter's point of view, the optimal transport system minimises the sum of time and money costs. It is readily seen that the higher one's income, the faster and more expensive is the preferred transport system. Since richer individuals have higher time costs but money costs are independent of income, a rich resident has a higher demand for speed than a poor one. Moreover, since the distance of residential location to the CBD increases with income, demand for transport quality increases more than proportionately with income. Intuitively, a higher income resident has a higher time cost, which leads to demand for a faster system for any given location. In addition, richer individuals also face longer commutes than lower income residents, which increases their demand for high-speed systems even more.

In Brueckner and Selod's analysis, city residents vote over the speed and money cost of the transport system. Since the optimal speed varies monotonically with income, the outcome corresponds to the preferred system of the median voter, i.e. the voter with median income. Higher-income individuals prefer a faster system and poorer individuals a slower but less expensive system. Half of the population thus wants a faster and half a slower system than the median voter, but no coalition could gain majority support for their proposal.

Brueckner and Selod (2006) then compare the median voter's optimum with the social optimum, which is defined as the transport system which maximises average utility in the city. Suppose that median income is less than mean income. This is the case with typical right-skewed income distributions. Then the median voter votes for a transport system which is inefficiently slow. The reason is again that demand for speed increases more than proportionately with income. As a result, it can be shown that residents with income below average vote for a system which is slower than that demanded by the average voter. Intuitively, reducing income reduces optimal speed, and this effect is compounded by the effect of residential location – which decreases with income – on the optimal speed of the system.

Is this consistent with the available evidence? Some commentators, at least in the US, have argued that many cities have opted for inefficiently fast systems, and in particular highway systems instead of public transit. Indeed, Brueckner and Selod (2006) in part motivate their paper with this alleged overinvestment. In the case of transit, Small (1992) shows that several US cities have built rapid rail systems, but these are more efficient than slower bus systems only at very high travel densities, which are only realistic in the very largest cities. Since, in the US, the rich typically live further from the CBD than the poor, this seems to be at odds with the conclusion of Brueckner and Selod (2006). Instead of overinvestment in fast and expensive systems, their analysis predicts underinvestment (under the assumption of a right-skewed income distribution). However, one might argue that the political choice in cities is biased towards the rich. For instance, rich individuals participate more in local politics through voting. They also donate more to politicians in the form of campaign contributions. Hence, they might have a larger say in politics than the poor. Then, the equilibrium choice of transport system might not represent that preferred by the median voter but rather that preferred by someone with higher income. This case is briefly analysed by Brueckner (2005) who shows that choice of the transport system by the rich leads to an inefficiently fast system[8].

Interestingly, the location pattern described above may be reversed if the rich live closer to the CBD than the poor. This is the case in many European cities such as Paris (Brueckner *et al*., 1999). In this case, the demand for transport quality (i.e. speed) increases less than proportionately with income: while a higher-income resident at a given location still prefers a faster system, commuting distances for high-income voters are now less than for poorer ones. In this case, demand for travel speed rises less than proportionately with income. This implies that the mean voter's demand lies above the social demand. Therefore, if the income distribution is not too skewed, in the sense that median income is close to mean income, the median voter will vote for an inefficiently fast system, that is, there will be overinvestment. When the distribution is very skewed, however, the total effect is ambiguous and there may be over- as well as underinvestment. It is interesting to note that Brueckner and Selod's analysis predicts underinvestment in the US case where the rich live in the suburbs and overinvestment in the "European" case where the rich live in the city.

7. COMBINING SUBSIDIES AND SYSTEM CHOICE

So far, subsidies and the choice of transport system have been looked at as if the two margins of choice existed in isolation. Yet, it is obvious that subsidising transport will impact the efficiency of different transport modes and, likewise, choosing a certain transport system will have an effect on the desirability of transport subsidies. The literature on the combination of these issues is, however, even smaller than that which looks at the isolated issues. Some of the following conclusions may therefore be speculative.

7.1. Effects of subsidies on system choice

The first observation comes from the analysis in Brueckner (2005). He studies a model largely like the one in Brueckner and Selod (2006) except that there is only one income class. The optimal transport system in a city again trades off higher money costs against lower time costs. Now, if the money costs of travel are subsidised, the implication is that every individual in the city will prefer a faster transport system. This is a natural conclusion, since individuals are not faced with the full monetary costs of transport. Applying this insight to the Brueckner/Selod (2006) model, the following prediction emerges: if the distance of residential location from the CBD increases with income, subsidies would counteract the tendency of underinvestment in the transport system; as we have seen in the previous chapter, in this case the median voter votes for an inefficiently slow and cheap transport system. Hence, subsidising the monetary costs of transport would be helpful, since the median voter would then face lower monetary cost and vote for a faster transport system.

In reaching this conclusion, Brueckner (2005) assumes that voters are myopic, in the sense that they do not consider how system choice affects the taxes paid to finance the subsidy. A richer model would yield somewhat more complicated conclusions. First, a faster system would increase the taxes necessary to finance a given subsidy rate, since the subsidy is applied to a higher monetary cost. Second, the subsidy would lead to sprawl, that is, longer average commutes. Again, this effect would tend to increase the consumers' tax burden. My conjecture is, therefore, that overinvestment would be somewhat attenuated if consumers are foresighted.

Again, in the case where richer individuals live closer to the CBD, the analysis has shown that there may be overinvestment in transport speed already without subsidies. Here, then, transport subsidies would make the political choice of transport system even more inefficient. In fact, transport subsidies are seen by researchers as one of the reasons why some cities apparently build inefficiently fast transport systems, such as rapid rail (Small, 1992).

7.2. Effect of mode choice on transport subsidies

Let us now switch perspective and ask how the introduction of mode choice changes the incentives of subsidising commuting expenses. To tackle this question, we go back to the analysis in Section 3.1. above, where individuals in a city have the choice between two modes, car and bus.

The money costs of using mode i, in the presence of a subsidy with rate s, are now $(1 - s)t_i r$. Assume for now that this subsidy rate applies to both modes.

A first thing to note is that an increase in the subsidy rate will decrease the distance r^* where an individual switches from bus to car usage. Intuitively, the lower time costs of the faster mode now weigh more heavily than its higher money costs, since these are now paid by the individual only in part. Thus, subsidising automobile and bus at the same rate should bias the modal split towards automobile usage, at least as long as we assume residential locations to be fixed. An implication is that this will result in a further increase of necessary subsidies, since the faster and more expensive mode is now used more heavily.

What then are the effects of commuting subsidies? Since there is a multitude of possible equilibria, we cannot deal here with all the possible cases. Instead, a couple of potentially interesting patterns are described.

One facet of this setup is that commuting subsidies now redistribute in more ways than before; in particular, between short- and long-distance commuters, and between users of transport modes with low money costs and those with high money costs. On the assumption that both modes are subsidised at the same rate, automobile users are now subsidised by bus riders. Potentially, since the rich are more likely to commute by car, this aspect makes commuting subsidies more regressive. However, the incidence of a subsidy again depends on the combined choice of transport mode and residential location, so that the net effect is complicated by the many possible equilibria.

Suppose that the poor live in the city and the rich in the suburbs and everyone commutes by bus. We can then apply the analysis of Borck and Wrede (2005) directly. Disregarding the effect on housing rents, a commuting subsidy then redistributes from poor to rich. Continuing to assume that the poor live in the centre, this regressivity is exacerbated if the rich commute by car. Since the car is assumed to have higher monetary but lower time costs, the subsidy now redistributes from the poor to the rich on account of two aspects: because the rich have longer commutes and because they choose the more expensive mode. As shown before though, housing rents in the city centre will fall, so that in the end the poor, too, may benefit from such a subsidy[9].

In part, the analysis of mode choice in urban models was motivated by the observation that the single-mode framework has difficulties in explaining why the rich live in the suburbs, since the income elasticity of land consumption seems to be much lower than one. Therefore, an interesting pattern is that where the rich live closer to the centre than the poor, when both commute by the same mode. How would this change the analysis? Things now get much more complicated since, as shown before, many equilibrium patterns are possible. Let us examine one particular equilibrium; Suppose that without a subsidy, the group closest to the city centre is rich and commutes by bus. Then follows a zone of poor bus commuters, and finally, the suburbs are populated by the rich who commute by car. Then a commuting subsidy redistributes from the bus users with short commutes to the car drivers with long commutes. However, by assumption, the rich must be as well off when commuting by bus as when commuting by car. This implies that the burden on the rich bus commuters must be compensated by lower housing rents in the centre[10]. In the case of absentee landownership, one can show, at least for simple examples, that the rich as a group definitely benefit from the introduction of a commuting subsidy. In purely fiscal terms, the poor are net contributors to the subsidy scheme. However, they may also benefit in the form of lower housing rents. When land is entirely owned by the city residents in equal proportions, the poor will be made worse off by the subsidy, although there are rich residents with shorter commutes.

A natural question to ask is how the analysis is affected by assuming that the two modes are subsidised at different rates. Consider again the first case above, where the poor live in the centre and commute by bus while the rich live in the suburbs and commute by car. An interesting result is that – assuming again absentee landowners – the poor benefit from subsidies on both modes while the rich benefit only from subsidies to automobile users. The reason for this asymmetry again lies in the housing market effects. Subsidies for automobiles increase incentives for the rich car users to suburbanise even further. This eases housing market competition in the centre and therefore benefits the poor. On the other hand, subsidising buses makes the poor want to move out of the centre. This in turn leads to further suburbanisation and longer commutes for the rich. It also increases competition for land in the suburbs and raises land rents for the rich. This argument supports the view that transport subsidies on fast modes may also benefit those who do not even use these modes[11].

8. CONCLUSIONS: POLITICAL ECONOMY OF URBAN TRANSIT REFORM

The paper has surveyed political economy models of urban transit, focusing on subsidies and transport system choice. There are two general lessons from this work. First, since the redistributive consequences of transport policies form the basis for their political support, it is important to analyse these in detail before proposing policy reforms on the grounds of efficiency aspects. Second, however, in order to understand these redistributive effects, it is not enough to analyse their effects on individuals' net income positions. General equilibrium effects may be important and, in the particular case of urban transit, the effects on commuting patterns and housing markets will be relevant.

In general, whether rich or poor city residents gain most from particular policies turns out to depend on their residential location, which affects commuting distances, and on the distribution of land ownership. Cross-country differences in residential location patterns and land distribution may therefore partially explain the observed differences in regulatory policies for urban transit.

The redistributive consequences of urban transport policies are sometimes surprising. For example, it appears that transport subsidies in many instances may benefit the rich who have long commutes and use fast, expensive transport modes. Taken at face value, this finding may indicate that transport policies are biased towards the rich, with "perverse" distributional consequences. However, as the paper has shown, sometimes these distributional effects may turn around once general equilibrium effects are taken into account. In particular, policies such as commuting subsidies or inefficient transport investment choices often reduce land rents, which hurts landowners who are presumably richer (as a group) than average. In summary, this line of research has yielded some interesting insights. Yet because of the complexity of the models, the analysis of political institutions has been particularly simplistic. Almost no mention has been made of interest groups such as the transport industry or politicians' own incentives. Therefore, further research will inevitably delve deeper into the political economy of urban transit.

With these caveats in mind, what are the implications for the political economy of transit reform? The elimination of subsidies following privatisation or deregulation of public transit will

generally lead to higher fares. For instance, despite potential competition, British bus deregulation led to fare increases of about 9% in the first years after deregulation and up to 39% in metropolitan areas (Nash, 1993). The first thought is that this fare increase benefits the general taxpaying public at the expense of transit users. If transit users tend to be relatively poor, this implies adverse redistributive effects. In order to win support for this kind of measure, politicians (at least those who do not cater only to upper-middle-income classes) would need to compensate those who are affected.

A further implication of the analysis presented here is that housing markets would be affected. In the simple case where the poor live in the centre and use buses, cutting subsidies for buses should lead the poor to seek to move closer to the centre in order to economise on transport costs[12]. As a result, housing rents in the city centre should increase. This should hurt the poor city residents, benefit the rich suburbanites, for whom competition for land decreases, and benefit landowners as a group, since total land rents should rise. Finally, among landowners, those owning land in the centre should benefit at the expense of those earning land in the suburbs, and landowners as a group should benefit since total land rents would be predicted to rise.

NOTES

1. In a similar vein, Winston (2000) argues that local officials overspend on urban transport projects financed by state or federal grants.

2. As a partial excuse, since some of the theory is fairly new, empirical analysis has not yet caught on.

3. If there are empty seats in a train compartment or bus coach, the marginal cost of admitting an additional user is zero.

4. Good references to this type of model include Brueckner (1987) and Fujita (1989). The Alonso-Muth-Mills extends this model by incorporating housing production.

5. The paper also studies the case of income tax financing. The results then change quantitatively, but the thrust of the argument is the same.

6. Note that we have to assume here that the sum of money and time costs divided by housing consumption is larger for the rich than for the poor.

7. Technically, let the money cost be k. Then time cost (the inverse of travel speed) is assumed to be $t=f(k)$, with $f'<0, f''>0$.

8. This conclusion is reached by assuming that consumers have Leontief preferences over consumption and housing, i.e. that housing and non-housing consumption are perfect complements.

9. Borck and Wrede (2005) use numerical simulations to show that this may actually happen.

10. In fact, since the city border is fixed for given population and land rent at the border tied down by the fixed agricultural rent, in this case housing rent must fall over the entire range of the city.

11. The analysis here parallels Sasaki's (1990) analysis of the effects of transport cost changes in a two-mode model.

12. If the modal split is endogenous, some of the poor people living close to the CBD should switch from transit to walking, which would become a more attractive alternative in the wake of increased transit fares. Some other poor residents who live further from the CBD should switch from bus to car. In sum, for given residences, the modal share of the bus would decrease and that of walking and car use increase.

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CONTRACTING FOR PUBLIC TRANSIT SERVICES IN THE US: EVALUATING THE TRADEOFFS

A synthesis of research done at the University of California

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SUMMARY

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1. INTRODUCTION

When considering public transit, travellers typically judge whether it serves desired destinations in a timely manner and at a reasonable cost – often in comparison to travelling by private vehicle. How public transit agencies choose to operate their services – their networks, service frequency, and fare structures – to compete with private vehicles, and provide mobility for those without them, is the subject of this synthesis. Specifically, this synthesis examines the "make" or "buy" decision in public transit: should government agencies operate (make) transit service directly, or does it save money to contract with private firms (buy) to operate transit service? The latter option is often called "contracting out" or, less accurately, "privatisation".

Whether to make or buy transit service has fuelled highly charged political debates that frequently cleave along partisan lines. Liberals often favour direct public provision of government services, and fear that contracting with private firms for service usually hurts labour. Conservatives tend to favour competitive procurement of goods and services, and assert that contracting for transit service is almost always more efficient than direct government provision. However, the issues at stake are far more subtle and complex than these competing perspectives, which are often depicted simplistically at public meetings and by the media.

This synthesis aims to bring both nuance and rigour to bear on what can be noisy ideological debates over the costs and benefits of contracting out for transit service. It summarizes a series of recent studies conducted by researchers at the University of California[1]. The focus of this report is on bus transit, which carries more passengers than any other transit mode (i.e. subway, trolley, van, etc.), operates on fixed routes and schedules, and in mixed traffic on local streets and freeways[2].

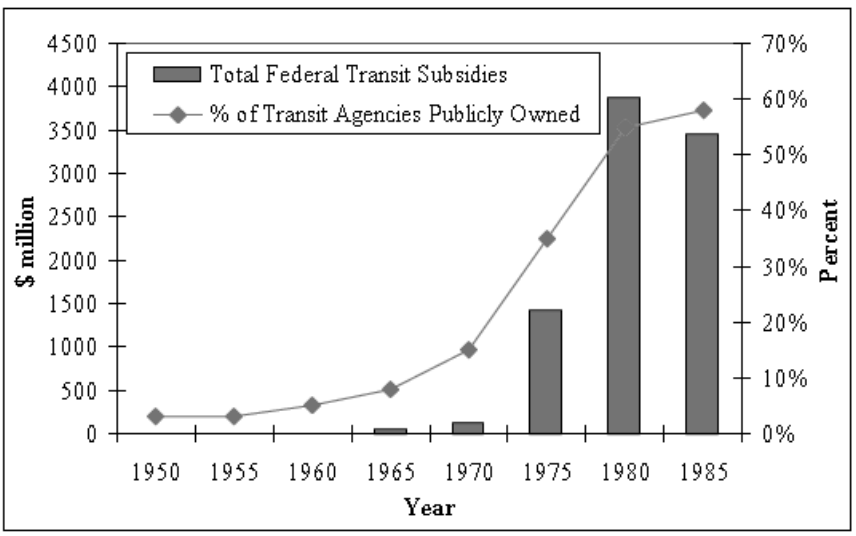
In the United States, the term "contracting out" is generally used when a public transit agency procures the services of a private firm through a competitive bid process. The contracted service may be for a portion of the system, such as a bus route, or system-wide. The transit agency typically maintains ownership of the service and authority over setting policies, such as fares and schedules. This system contrasts with full privatisation efforts, such as those in the United Kingdom, where private firms own and operate public transit service (Iseki, 2004, 3-8). Private contracting is used also for transit maintenance and transportation infrastructure provision (mainly road and rail construction and street maintenance). Similar to transit service contracting, private infrastructure provision has generated controversy and debate over perceived benefits and challenges.

Parts 1 and 2 of this synthesis present the background on public transit provision over time, with a focus on today's context. Part 3 analyzes and interprets key findings from a series of University of California studies of transit contracting. Part 4 considers the reasons contracting for transit operations has been chosen in practice, as well as its effects on the travelling public, transit operators and transit workers. Part 5 offers general guidelines for situations in which contracting has proven most promising and when it is less useful. Finally, Part 6 concludes with more specific recommendations.

2. TRANSIT HISTORY IN BRIEF: AN EVOLVING TALE OF PUBLIC AND PRIVATE SERVICES

The private provision of transit services in the United States has a far longer legacy than many might imagine. With but a handful of exceptions, private for-profit companies provided transit service from the mid-19th Century to the mid-20th, initially with horses and cable cars, and later with streetcars, subways and buses. Rapid growth in automobile use, especially after the First World War, combined to both lure disproportionate shares of shopping and recreational trips away from public transit and to congest the streets on which streetcars and buses operated. The public's increasing appetite for automobile travel, among other reasons, fuelled major declines in transit patronage and associated fare revenues. As a result, private companies began cutting service, delaying track and vehicle maintenance, and in many places ceasing operations altogether. In response, local governments in many cities stepped in to fill the void by taking over bankrupt, and often decrepit, transit systems. In some cases, cities and counties operated service through their transportation divisions, and in others regional transit agencies were established. While local government leaders in older, larger cities had long recognised the importance of public transit service to metropolitan life, it wasn't until the 1960s that the federal government began to assist in the subsidy of public transit (see Figure 1) (Iseki, 2004, 11-25).

Figure 1. **Trends in Contracting Transit Services and Federal Funding**



Source: Iseki (2004), 25.

From modest beginnings in the 1960s, federal subsidy of local transit systems (mostly by underwriting capital expenditures, but increasingly to support operations as well) mushroomed in the 1970s and 1980s. While the extent and frequency of public transit services increased during this period, transit service costs grew even faster, outpacing the then high rates of inflation. Concern with rapidly increasing subsidy obligations led the Reagan Administration and some members of Congress to call for public transit authorities to put more services out to bid for private companies to run, in an effort to save money. The rationale was that private entities could offer services at a far lower cost because: 1) competition would be generated among prospective bidders, and 2) the high costs of unionised public sector labour could be reduced by both paying lower wage and benefit packages and by easing work rule restrictions. In response, many public transit systems did turn to contracting out all or at least part of their services to private companies. In California, 68% of the 65 agencies included in the National Transit Database[3] contract some fixed-route service; total expenditures for this contracted service was USD 227 million in 2002 (Iseki *et al*., 2006, 1). Nationally, over one-third of all NTD reporting agencies in 2001 contracted for some services; total expenditures on these contract services was approximately USD 1.4 billion (Iseki, 2004, 45).

3. WHAT MOTIVATES TRANSIT SERVICE CONTRACTING TODAY?

We now turn to the issue of transit service provision today. First, we explore the ways that service has been contracted out, as well as some motivations for doing so. Then, we examine the consistencies and contradictions between these stated motivations and the research results from several University of California studies.

Public transit operators contract for service in a myriad of ways. Some contract for all of their service from private companies, while others only contract out a portion of service. Still others do not contract for service at all. As a result, private contract service provision is not simply an "either/or" option. What explains why public transit systems contract for all, some or none of their service? Iseki *et al.* (2006) found that transit agency size and age frequently affect the amount of service contracted out. They found that new, smaller agencies covering just a city or part of a county are more likely to contract out all services, while larger, older agencies are more likely to contract out only a portion of service. This is because: 1) older agencies often have long histories of public provision of services by unionised public employees; and 2) political battles would likely ensue if such systems were to move toward contracting with private companies for service.

As a result of these general patterns in contracting, some common perceptions of the costs and benefits of contracting have gradually emerged. Most common is a focus on costs: "*The primary goals of contracting out public transit are to reduce operating costs and to improve efficiency* (Kim, 2005, 178)." Under the rubric of costs savings, contracting is touted by proponents as having three principal effects:

- *Takes advantage of labour cost differences* between the public and private sectors, in which the hourly rate of private employees may be less than the unionised labour of a public agency. Labour costs in transit are typically 70% of total costs, and a reduction in labour costs can have significant cost implications for the bottom line (Iseki, 2004).

- *Generate competition* between private bidders for services and engender the "threat of competition" to public employee unions who may be more willing to accept changes to driver compensation packages if contracting services are under consideration (Kim, 2005, 14-15, 84-85; Iseki, 2004; TRB, 2001). Alternatively, competition may occur when a regional authority requests its public agency to partake in a competitive bid process against private firms to operate services.

- *Increase larger transit agency efficiencies* when less efficient services are contracted out. Such a service might include a newly established long distance suburb-to-downtown bus line. This type of service typically operates during the morning and evening for commuters travelling to work and often has few midday riders. In this case, it is often suggested that the service should be contracted out to a private firm who could hire drivers to work "split shifts" to cover the morning and evening commutes, a type of work scheduling arrangement which may be prohibited by a public agency's existing labour union contract. (A split shift driver would work four hours in the morning and then four hours in the late afternoon without overtime compensation, rather than a "straight shift" of eight consecutive hours.)

Beyond these three principal goals, another often cited is that contracting out can provide additional *flexibility in how services are provided*, particularly when a transit agency would like to test out a new service for a limited amount of time to determine its viability before hiring new public employees for it (Iseki *et al*., 2006). Contracting out also has been viewed as advantageous when new services need to be established quickly, on the assumption that private firms can mobilise faster than a public agency to implement them (Iseki *et al*., 2006).

4. UNDERSTANDING THE GOALS OF AND MOTIVATIONS FOR CONTRACTING

Has contracting for fixed-route bus service delivered on promised cost savings and increased operational efficiencies? This section reports on some surprising discoveries about such service provision, after beginning with a brief review of research methods and data used to study the issue.

4.1. Research methods and data

The research described in this report endeavoured to employ rigorous social science techniques to analyze both quantitative and qualitative data, including frequency distributions (to analyze the extent of contracting out and other transit agency/service characteristics) and multiple regression analyses (to assess the relative relationship and significance of key variables). One study used a case study approach to examine a range of public and private transit operators, and the effects of contracting out on labour compensation among other issues (Kim, 2005). Another study interviewed management-level representatives at thirteen transit agencies in California to evaluate their service provision decisions and strategies (Iseki *et al.,* 2006). The quantitative data were largely culled from the National Transit Database, which provides extensive annual information on transit agencies and services and is maintained by the Federal Transit Administration, which is part of the United States

Department of Transportation. Additional data on unionisation rates, political/institutional and economic/financial factors, and geographic areas also were gathered from other sources, such as the federal Bureaus of Census and Labour Statistics and the American Chamber of Commerce Research Association.

4.2. Effects of contracting out on transit service provision

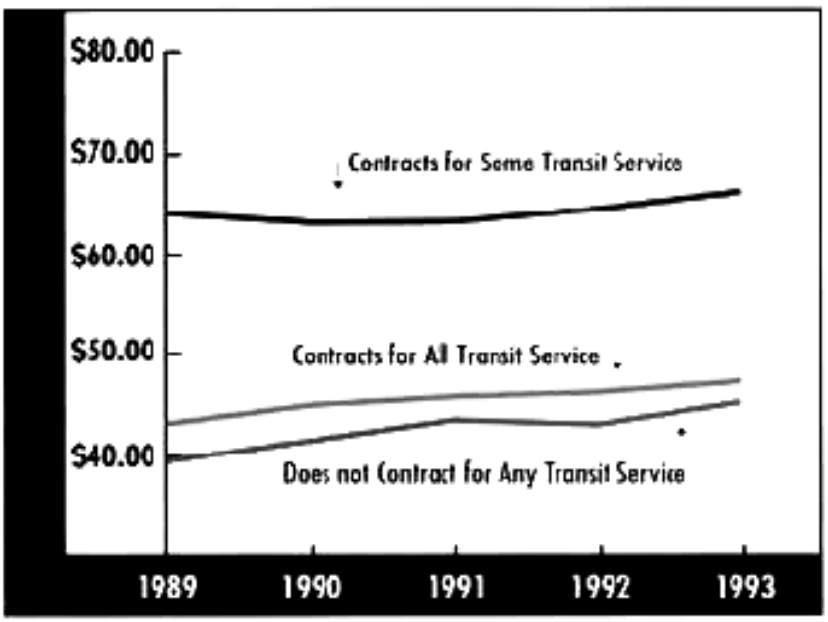
This section will first consider the impact of contracting out with respect to claims made about its potential to improve service efficiencies. Then, it will examine the impact of such provision on the compensation levels of workers who provide the service.

4.2.1 Impacts on Efficiency

The major efficiency gains claimed by vocal privatisation supporters are improvements in cost efficiency – measured, for example, by comparing costs per service hour among service providers. While useful, such comparisons don't tell the whole story – vehicle and labour productivity are important measures as well. Agency characteristics and service levels importantly affect cost savings. In particular, it is important to distinguish among agencies that contract for all, some, or no service, and to be clear on whether total costs or contract-only costs are being compared (Iseki, 2004; McCullough *et al*., 1997).

McCullough, Taylor, and Wachs (1997) determined that vehicle productivity and labour utilisation were better measures of the efficiency improvements that could be realised with contracting than common cost-efficiency measures like cost per service hour. "Vehicle productivity" refers to how intensively transit vehicles are patronised and the miles they log travelling from place to place without passengers, known as "deadheading." The miles travelled from the garage to the start of a route, between the end of service on one route to the beginning of service on another, and back to the garage at the end of a shift are all examples of deadheading. Vehicle utilisation is also affected by service area characteristics, such as where buses must traverse long distances in sparsely populated areas or where a transit agency must cover a large, expansive service area with minimum levels of service. According to McCullough, *et al.* (1997, 22), "Often it is the provision of service to difficult areas (and) restrictive work rules that contribute most directly to increased operating costs." Their study examined 142 bus operators nationally between 1989 and 1993 and found that that agencies that did *not* contract out any service had the *lowest* operating costs, followed by fully contracting agencies. Curiously, agencies that contracted out a portion of service had the highest cost per revenue hour. The difference between agencies that did not contract any service and those that fully contracted out was USD 5.64 per hour in 1990 (see Figure 2). Why were the costs at agencies that contracted for some of their service so much higher? The authors hypothesised that a self-selection bias may have influenced these results, because transit operators with very high costs would be likely begin contracting for some of their service in an effort to control high costs. In other words, contracting for some service did not cause high costs; rather high costs motivated contracting.

Figure 2. **Operating Costs by Type of Transit Agency**



Source: Figure 1 in McCullough, Taylor and Wachs, *Access*, 1997, 25.

Building on McCullough *et al.*'s full, partial, and no contracting framework, Iseki (2004) found that contracting for transit service, on average, yielded modest cost savings – more savings than argued by many critics of contracting, but far less than savings of 40% or more touted by contracting proponents. In this study, Iseki examined 400 agencies nationally over a nine year period, from 1992 to 2002. Given average vehicle operating costs per hour of USD 53.06, he found:

- Partial contracting savings averaged USD 4.09 per vehicle hour over directly operated service (a 7.8% cost reduction);

- Full contracting savings averaged a modest USD 2.89 per vehicle hour over directly operated service (a 5.5% cost reduction).

Employing different methods, Nicosia (2002) found that contracting may lead to a 15-19% reduction in system operating costs. Nicosia also found that public agencies are more likely to contract in areas with higher public sector unionisation rates, as are larger agencies that have higher average costs mainly due to higher wage rates. In noting that Nicosia estimated larger contracting cost savings than his study, Iseki noted that Nicosia's analysis did not include several factors thought to importantly influence transit costs, such as (1) the number of extra vehicles needed to provide peak commute service (measured as the "peak-to-base ratio"), (2) vehicle utilisation efficiency (measured as the "pay-to-platform ratio"), and labour productivity (measured as paid worker hours to transit service hours) (Iseki, 2004). Nicosia was, however, with the first to account for selection bias; that is, transit agencies with good reason to do so are more likely to pursue contracting, while agencies efficiently delivering service directly are less likely to contract. We cannot conclude, in other words, that because contracting has worked well for some transit agencies, it will necessarily work well for most or all agencies.

In addition to the self-selection issue, Nicosia also found that contracting had a negative effect on transit service quality and service; in her sample of approximately 320 transit agencies, she found that contracted service had higher rates (by 70%) of vehicle collisions, and more vehicle breakdowns (by 36%).

4.2.2 Impacts of potential efficiencies on labour

Although much debate and research on transit contracting has centred on questions of efficiency, an underlying issue is how contracting affects transit workers. These workers provide day-to-day services to the travelling public, and include bus drivers, schedulers, maintenance crews, service managers, and others out in the field. The main questions raised generally are:

- When services have been contracted out, how are private workers compensated in comparison to public unionised workers?

- If savings have occurred, have these been generated primarily through reductions in private sector wages and benefits packages?

To address these questions, Kim (2005) undertook the first comprehensive study of the influence of service contracting on transit workers' wage and benefit packages. Labour utilisation and cost efficiency also were considered by Kim in her case studies of twelve U.S. transit operators during the period of 1995 to 2001.

Worker Compensation

With respect to how labour is compensated, Kim states,

> *"Overall, private contractors were paid 52% less [than comparable public employees] in driver compensation, while their hourly operating costs were 43% less. In sum, it appears that cost savings from contracting were achieved at the expense of labour, but not necessarily with an increase in genuine productivity* (Kim, 2005, p. 2)."

For hourly rates, Kim found that drivers at private bus operators were paid between USD 10 and USD 11 per hour, which was USD 6 to USD 8 less per hour than drivers at public agencies in 2001. This difference in hourly rates translated into USD 10 000 to USD 12 000 annual earnings less per full-time worker. Private sector drivers also received approximately USD 12 000 less in average annual benefit packages. Finally, with respect to paid absences, such as holidays and vacations, private sector drivers received compensation for only 15 days annually; whereas, public agency drivers received it for 52 days. Overall, Kim found that, in comparison to their public counterparts, private drivers' hourly rates are 38% lower, annual earnings 34% lower, and benefits 58% less.

Transit Operator Productivity and Practices

In addition to compensation packages, Kim also evaluated transit operator productivity and practices; in particular she analyzed the extent to which they used part-time drivers and whether they incurred additional expenses resulting from contracting, such as contract monitoring and compliance.

Kim found that the private sector transit providers in the study incurred higher costs on several important items, namely overtime compensation, insurance fees, and driver training programs. With respect to overtime, the typical private sector driver worked 100 to 200 hours more annually than

public agency drivers, though often for less total compensation. Private operators also incurred higher costs for insurance (such as worker's compensation and liability) and driver training programs, because they tended to have higher driver turnover rates and poorer safety records.

Another long debated transit contracting question is whether private operators have more flexible work rules and employ more part time drivers, for example, to cover additional service during peak times or to eliminate the "split shift" problem previously discussed. Surprisingly, Kim found that part-time drivers constituted only 2% of the private drivers, compared to 11% in the public sector[4]. This finding – of fewer part-time drivers among contract operators – observes Kim, "*is the opposite of the transit-contracting advocates' belief that private operators can be more flexible due to fewer restrictions on their use of part-time employees* (Kim, 2005, pp. 114-115)."

Kim also found that four out of five private contractors examined actually had higher costs than their public counterparts due to work rules – another result that differs from conventional wisdom[5]. The higher spending among private contract operators is due mainly to overtime compensation and non-operating paid work time (for example, stand-by times and new driver training time). Concludes Kim, *"*(T)*he critical implication* (is) *that private bus operators do not enjoy more flexible work rules for drivers, and they are not inherently more efficient* (Kim, 2005, p. 114)."

Further, the private contractors she examined were found by Kim to be more inefficient with respect to non-labour-related expenses, such as vehicles, fuel, maintenance, insurance fees, administrative staff, overtime and training. As a result, the majority of private operators had higher non-labour operating costs than public agencies. Thus, in contrast to privatisation proponents who have derided public transit agencies as inefficient in their use of labour and capital, Kim found that private-sector cost advantages were due primarily to lower wage and benefit rates, and better utilisation of workers and vehicles. As a result, some public agencies examined by Kim made better use of labour and equipment and, as a result, were as efficient as private operators, even when saddled with substantially more expensive compensation packages.

Policy Implication: These studies on efficiency, labour and work practices collectively suggest that contracting out transit service is not always as efficient as privatisation supporters have purported it to be. In fact, some public agencies are more efficient in their use of workers and vehicles than their private counterparts. Cost savings with contracting appear to accrue primarily from lower driver salaries and benefits, which are negatively related to some measures of transit service quality.

5. REASONS FOR CONTRACTING IN PRACTICE AND ITS EFFECTS

Why do some transit agencies pursue contracting, while others do not? The research to date suggests that transit agencies have tailored contracting out to meet their specific needs and goals. These include:

1) *Accommodating agency size and resources*: Transit agency size strongly influences the likelihood of contracting out service. Smaller agencies are more likely to fully contract out services because they do not have in-house expertise readily available and/or want to avoid negotiations with labour unions. Larger operators tend to contract out only a portion of service, and a small percentage (roughly 8%) at that (Iseki, 2004).

2) *Gaining benefits from lower private sector wages*: Agencies in areas where there is a wage gap between public and private sectors have sought to take advantage of these savings by contracting out (Iseki, 2004; Nicosia 2002; Richmond, 2001; TRB, 2001).

3) *Improving vehicle utilisation*: Contracting has been used for operating special peak/commuter services as well as demonstration and temporary services, when vehicles and publicly employed drivers are already fully committed to providing service. Contracting has also often been used on inefficient lines, such as long-haul commuter lines or low-ridership lines where small vehicles may be appropriate (Iseki *et al*., 2006; TRB, 2001).

4) *Increasing labour productivity through adjustments to work rules*: Some public operators hope to gain efficiencies in work rules and related compensation expenses (such as reduction in overtime compensation for split shifts; removal of part-time worker restrictions; time to reach the highest wage rate; and the use of smaller vehicles, operated by drivers who are not qualified to drive regular buses but who may drive small vehicles) (Iseki *et al*., 2006). While Kim finds that not all private operators have more flexible work rules, particularly related to part-time drivers, and they may pay more in overtime, selective use of service contracting may increase *overall* (combined public and private) vehicle and labour utilisation.

Given these motivations to contract for transit service, the studies summarized here paint a sometimes jumbled picture of the outcomes:

- *Cost efficiency*: Contracting has not been as cost efficient as privatisation supporters have claimed; however, the "threat of competition" may increase in-house efficiency (Kim, 2005).

- *Wage/compensation packages*: Private transit labour consistently earns lower wages and earns fewer benefits in comparison to comparable public sector employees (Kim, 2005).

- *Utilisation of vehicles*: Contracting may improve overall vehicle utilisation rates, particularly for large transit agencies that partially contract service. However, transit

agencies also can make operational changes, such as interlining, routing adjustments or relocation of vehicle maintenance and storage facilities, to reduce situations in which buses are operating without passengers (called "non-revenue" service). Changes to work rules can increase labour productivity, such as allowing part-time drivers, reducing overtime compensation for split shifts, and increasing the length of employment time for drivers to reach the highest wage rate (McCullough *et al*., 1997; Iseki, 2004).

- *Labour quality and productivity*: An axiom of labour economics is that lower levels of compensation for a given occupation are associated with higher levels of employee turnover, and the studies of transit service contracting reviewed here bear this out. In transit contracting, this can lead to higher training and insurance costs (Kim, 2005).

- *Service quality*: Most of the previous research on transit contracting has focused on costs and not on service quality. But evidence from the research summarized here suggests service quality may be lower (as measured in terms of crashes and on-road service calls) among low-cost contract operators (Kim, 2005; Nicosia, 2002).

Policy Implication: When transit agencies contract for service, a balancing act occurs between cost efficiency and productivity, driver compensation and the quality of service. The research reported on here finds that the effects of contracting vary depending on how well private drivers are compensated, which can, in turn, affect quality of service. As a result, some transit providers specify in their contracts minimum compensation levels to attract and retain qualified drivers and mechanics. Not all contracting agencies set such standards, but most report that compensation packages are considered in evaluating bids from private firms to operate service (Iseki *et al.*, 2006).

6. GUIDELINES FOR TRANSIT SERVICE CONTRACTING

Given the research reported on here, we offer guidelines below for public officials considering transit service contracting.

6.1. When contracting works well

Transit service contracting has proved most successful when (1) publicly operated service is relatively costly or (2) new or different types of transit services are under consideration.

1. *Improving inefficient services*, such as lines that may be subject to elimination due to high operating costs and/or low ridership (Iseki *et al*., 2006). Even the possibility of contracting may induce increased efficiency among unionised public employees directly providing service and who are interested in discouraging expansion of contract service.

2. *Implementing new special services*, such as peak-period commuter bus lines. New service has proved easier to contract out because it typically does not involve displacing existing unionised workers (Iseki *et al*., 2006).

3. *Testing new lines*, which provides transit agencies with the flexibility to assess service and make adjustments before committing to additional in-house labour to operate the service (Iseki *et al*., 2006).

4. *Launching new lines, expanded service or an entire agency*, when a public agency does not have in-house transit resources or expertise. This can be particularly useful for new or smaller agencies. In the case of contracting all service, contracting may support efforts to minimise the addition of new public staff, avoid unionisation of public employees, or engage in ongoing negotiations with unions.

6.2. When contracting may not work

Contracting for transit services has proved less useful in the following situations:

1. When agencies contract out to *take advantage of the wage gap* between private and public sectors by permitting substantially lower wages and benefits for private sector drivers. This in turn may diminish driver and service quality and increase driver turnover, insurance rates and driver training expenses (Kim, 2005; Nicosia, 2002).

2. When agencies *overlook the longer-term costs of contracting in search of short-term cost reductions*. For example, soliciting and evaluating bids, negotiating contracts, monitoring contracts, and enforcing penalties for non-compliance are all examples of "transactions costs" associated with contracting. According to Sclar (2000), government agencies often overlook estimating costs due to contracting. Such costs must be fully considered to accurately estimate the savings (or costs) of contracting.

3. When *existing and well-utilised, regular in-house bus service* is transferred to the private sector, particularly if that service is already being efficiently delivered by public sector employees. Past research indicates that labour groups will likely oppose such conversion because these services are traditionally their members' core employment and livelihood. In this scenario, it may be more advantageous for an agency to negotiate changes to work rules in order to maximise vehicle and driver utilisation and reduce costs (Iseki *et al*., 2006).

4. When there is an *inadequate number of potential private contractors to bid on service contracts*, particularly if part of the purpose of contracting in these situations is to generate competition among bidders.

6.3. Other considerations

After evaluating these scenarios, if an agency elects to contract some or all service, we recommend that the agency should consider:

- ✓ providing guidelines or setting *minimum compensation levels* related to hourly rates and/or fringe benefits for private sector employees (Kim, 2005; Iseki *et al.*, 2006);
- ✓ examining private contractors' *part-time employee policies*, particularly to see whether these positions are encouraged and how their compensation packages are structured;

- ✓ developing measures *to evaluate contractor performance and service quality*, and making arrangements to regularly monitor these measures (TRB, 2001);

- ✓ cultivating a *competitive bidding environment* to reduce the possibility of one contractor monopolising service provision (McCullough *et al*., 1997);

- ✓ maintaining *open and amicable communication* between the public agency and contractor to facilitate service improvements if needed (TRB, 2001).

Finally, if an agency elects not to contract out service, the following strategies may be useful to improve service provision, whether implemented individually or as a comprehensive package:

- ✓ Seek *changes to labour agreements* related to work rules and compensation, such as the allowance for split shifts without excessive overtime penalties; interlining; part-time labour; other overtime compensation reductions; and changes in salary scales (including the addition of extra pay grades to reach senior level) (Iseki *et al*., 2006);

- ✓ Adjust *vehicle routing and scheduling* to reduce the amount of time vehicles are in non-revenue service, as well as using more efficient vehicles, such as smaller buses and vans, for services whose ridership levels do not require the standard, larger bus;

- ✓ *Relocate vehicle storage and maintenance facilities and layover locations* to bring facilities closer to actual service if feasible and not too cost-prohibitive.

7. RECOMMENDATIONS

Contracting for transit service is one of many options public agencies have to improve service and cost efficiency; other options may be more appropriate in certain contexts. So how can governments facilitate enhancements to transit service provision while ensuring quality work environments? We recommend the following:

First, transit planning requires tailoring services based on individual agency characteristics and needs, as well as political and equity considerations. As a result, statewide (in the US) or national (in Europe) legislation or policies *requiring* the contracting out of transit services (as has been done in Colorado and Massachusetts) is *not* recommended. There is simply no evidence to support the assertion that contracting for service will always be more cost-effective. Nor does the research support the conclusion that states or nations should promulgate legislation prohibiting or hindering transit agencies from contracting for service, if local conditions warrant such a move.

Second, information on contracting best practices should be developed and distributed to increase awareness of the advantages, challenges and obstacles to effective service contracting. These materials would include: fact sheets; case studies, written in straightforward language, featuring best practices of agencies that contract out transit service, as well as those that do not; examples of model work rule agreements and minimum employee compensation policies, as well as contracts with private transit contractors; and a contact list of accessible practitioners and others involved in innovative transit service provision. In the US, we recommend that states collaborate

with the United States Department of Transportation through the Federal Transit Administration, the Transportation Research Board's National Transit Cooperative Research Program and/or the American Public Transit Association, to host workshops and provide additional examples.

Third, states (in the US) and national governments (in Europe) should consider developing a "seed" planning fund program for public transit providers to pursue public processes to investigate transit service provision enhancements. The program's purpose would be to develop short- and long-term transit service strategies and plans. These funds would provide the extra incentive to transit providers to conduct additional planning beyond their regularly scheduled planning activities, such as their short-range transit plans. These planning efforts would identify and examine the full range of service options, including contracting out as well as changes in vehicle utilisation (such as routing and scheduling) and work rules.

Grant recipients would consist of mainly public transit service providers; however, regional transportation agencies might also be eligible if they were interested in developing guidelines and incentives, and identifying areas of opportunity for service efficiencies and co-ordination. As part of the planning effort, grant recipients would be expected to develop an implementation plan as well as monitoring, oversight and evaluation plans.

To encourage broad participation, program funds may be used to cover facilitation costs for discussion sessions between key stakeholders, such as transit agency board members and staff and representatives from the public, labour and the private/non-profit sectors. Lastly, it is very important that sponsoring agencies' overall monitoring and evaluation plans assess the short and long-term impacts of the seed funding program. The purpose of the evaluation would be to advise the sponsoring agencies regarding transit successes and failures with respect to the provision of innovations in transit service, to measure progress and problems and to recommend modifications to the program as needed.

Fourth, thoughtful investigation of this important public policy issue should be continued. Additional research is recommended as follows:

- Assessments of efficient, high-quality transit providers to highlight actions and strategies they have pursued to achieve such noteworthy service. An effort should be made to include a wide range of providers who operate in urban, suburban and rural contexts.

- Analysis of the equity implications of contracting out and other cost efficiency/ productivity measures. In other words, who benefits when there are cost savings? Are these savings used to improve operations, provide more service, increase driver compensation, maintain tax/fare levels, or for other purposes? (Iseki, 2004; Kim, 2005).

- Documentation and analysis of labour, transit user and private sector perspectives on transit service provision. Most interview-based research to date has been with transit agencies and few, if any, interviews have been conducted with representatives of labour, the private sector, or transit users. Future research should include these constituencies to provide a more comprehensive range of perspectives.

- Comparative assessment of the relative influence of various service provision strategies (contracting out, part-time labour, changes in compensation packages or work rules, service adjustments, location of vehicle storage and maintenance facilities, etc.) on transit efficiency and productivity. Much research tends to focus on the impact of contracting out

on cost-efficiency in isolation. Additional analysis is needed that compares individual strategies or packages of strategies.

- Analysis of capital cost savings or efficiencies, if any. The research to date has largely focused on operating costs and has not undertaken in-depth analyses of whether contracting out may be useful to reduce capital costs.

NOTES

1. These analyses were funded through the University of California's California Policy Research Center, University of California Transportation Center, and the Center for Labor and Employment.

2. However, it should be noted that much transit contracting has been used to provide on-demand "dial-a-ride" services, often known as "paratransit".

3. The National Transit Database, or NTD, is a rich source of operating and financial data on all of the US public transit systems that receive some form of direct federal subsidy.

4. Due to the small sample size of Kim's case studies, these differences are not statistically significant.

5. Although, again, this finding is not statistically significant, due to the small sample size of this study.

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PRIVATISATION, REGULATION AND COMPETITION: A THIRTY-YEAR RETROSPECTIVE ON TRANSIT EFFICIENCY

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SUMMARY

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1. INTRODUCTION

The past few decades have seen transit patronage decrease in all Western countries, including Europe and the United States, lagging far behind the substantial growth in mobility that has occurred during the same period. Among the more important factors offered by many authors to explain the observed reductions in public transit have been the rising levels of real income and decreasing relative costs of private travel. Combined, these factors have led to significant increases in automobile ownership and population shifts from central cities to suburbs, both of which reduce the demand for public transit. An important implication of the changing land-use patterns is the need for public transit to adapt their operations – including routes, service frequency, work rules and fare structures – to meet the changing needs of their customers and to provide more efficient transit services. Yet, throughout the past thirty years, public transit systems have either been reluctant or unable to significantly alter their operations.

In an effort to address operational shortcomings and reduce operating deficits, increase productivity and improve the quality of services, the public transit sector has been moving away from public ownership and operation and towards private sector participation (in the form of a variety of privatisation and/or deregulation policies). Most researchers supporting the notion of urban transit privatisation (and deregulation) argue that government is ineffective and counterproductive in responding to citizens' needs. This can be attributed to the inherent inefficiency of government services, the often uncontrollable growth of the public sector, and the reduced personal initiatives of individuals and organisations (Berechman, 1993). Overall, because it is more sensitive to economic incentives and more responsive to changing market conditions, the private sector is expected to produce a given level of service more efficiently than the public sector (Viscusi *et al.,* 1995). However, while it is theoretically possible to show that private production of transit services has the potential to be profitable and welfare-improving (Viton, 1982; Dogson and Katsoulakos, 1988), major objections against privatisation stem from various equity concerns (e.g. inequality, injustice and social segregation, and adverse income distribution).

In practice, private operation of urban transit services has been transformed from an innovative idea to almost the norm across the World, largely following what were viewed as the positive – at least from a financial perspective – results of the UK "experiment"[2]. Although practitioners have embraced privatisation projects, economic theory does not provide such a clear case in favour of this governance mode. To this end, the abundance of research work and accumulating experience with alternative models of transit's exposure to market forces have reported largely contradictory findings that appear to depend on a significant number of factors exogenous to the privatisation process itself. This essay examines three issues:

1. Empirical evidence of the effects on transit efficiency from introducing competitive forces;

2. Sources of possible efficiency gains;

3. Other factors besides public-private ownership and operation that may also influence the effect of privatisation on transit efficiency.

The paper is arranged into two main parts. The first, including sections on privatisation theory and objectives, organisational regimes in transit, and transit performance and efficiency measurement, offers a background discussion on fundamental notions surrounding transit privatisation. The second part, including sections summarising international experience from transit privatisation and discussions on implications from privatisation, offers an insight into practical experience from privatisation efforts as well as a comprehensive discussion on the effects of such efforts on transit system efficiency.

2. PRIVATISING TRANSIT

2.1. Privatisation rationale and theory

Private transit enterprises gave way to public ownership and operation internationally in the 1960s, as private firms increasingly experienced financial problems in meeting the transport needs of the communities. Among the most important factors contributing to the financial despair of private firms and the transition from private to public ownership were higher incomes, which increased the demand for automobile ownership, state and federal government efforts to substantially increase highway capacity, and rising suburbanisation of the population (Smerk, 1974 and 1979; Saltzman, 1979). Moreover, rather than allowing private firms to solve their financial problems by reducing the extent and frequency of service, policymakers supported public ownership and operation. Losses were to be covered through subsidisation; scale-economy arguments were used to justify capital cost subsidies, while operating cost subsidies enabled cities to use mass transit to meet various social concerns.

Transit subsidisation has been at the heart of public transit support for many years and is as much an economic as it is an ethical, political and ideological issue[3]. A fundamental economic rationale for transit's subsidisation is to align its operation with social considerations, yielding three important arguments in favour of subsidisation. First, transit can be considered as an indirect form of positive externalities: essentially, when car users are not charged for the full effect of the negative externalities that arise from their car use (congestion, pollution, and so on), subsidies for bus and other public transport services can encourage travellers to make social-conscious mode choices[4]. Second is income redistribution to underprivileged citizen groups: the argument supports real income transfers in the form of transit services, rather than cash, to groups in society that are largely dependent (captive riders) on transit service and greatly benefit from the provision of subsidies (groups such as elderly citizens and lower-income families)[5]. Third, transit is largely considered in the economics literature as a decreasing cost industry, since public transport companies operate at less than capacity and marginal costs – for an additional passenger – are low. Therefore, if prices were set equal to marginal cost it would result in losses, since marginal cost would be less than the average cost for services[6]. On the ideological side, public transportation is considered a "public good", serving the mobility needs of population groups that are unable to afford or unable to operate private automobiles. It was expected, for example, that public transit would play an important role in preserving and revitalising cities, satisfying the transport needs of the less privileged and creating a better urban environment (Altshuler, 1981). In essence, transit is frequently perceived as being a natural monopoly producing socially beneficial service, implying that it should be financed from the public sector regardless of economic performance[7].

However, despite both economic and social arguments in favour of subsidisation, when privatisation and deregulation of bus services came into focus in the mid-1980s, the performance and quality of service of publicly owned and operated transit systems around the World had continued to be poor and subsidies continued to expand disproportionately to their stated goals. In the US, for example, operating subsidies from all levels of government (local, state and Federal) rose from $318 million in 1970 to $9.27 billion in 1990; a thirty-fold increase in twenty years (Pucher, 1995). Additionally, as reported in Berechman (1993), subsidies comprise – in all countries and on average – 50% of total operating revenue. In some countries, including the US, Greece, The Netherlands and South Africa, bus subsidisation exceeds 60% of total revenue, indicating that subsidies surpass passenger revenues by a factor of 1.5 to 2.5[8,9,10]. To this end, various authors contend that subsidies have encouraged productivity declines, lack of innovation and initiative, and financial mismanagement of transit properties. Many studies, using a wide variety of data and methodologies, have examined the effects of government financial assistance on the performance of transit systems (see, for example, Pucher *et al.,* 1983; Cervero, 1984; Pickrell, 1985; Bly and Oldfield, 1986; Obeng *et al.,* 1994; Karlaftis and McCarthy, 1997). While the specific results vary among the studies, the conclusions overwhelmingly support the notion that there are clear links between increases in subsidies and reductions in performance and productivity[11].

In addition to the finding of the degrading effects of subsidies on transit performance, come large budgetary deficits faced by many countries in recent years, necessitating fiscal constraints that lead to a significant reduction in transit subsidies[12]. To deal with the reality of both subsidies' effects on transit performance and severe fiscal constraints, several authors have suggested three possible solutions:

1) Alter subsidy programmes to reward those systems that raise productivity, increase ridership or enhance the quality of their services (Fielding, 1987);

2) Shift subsidy responsibility to local governments that have stronger incentives for monitoring transit operations and, accordingly, greater potential for generating efficiency gains in transit systems (Shughart and Kimenyi, 1991; Pucher, 1995); and

3) Examine private alternatives to public ownership and operations (Gwilliam *et al.,* 1985a; Gwilliam *et al.,* 1985b; Beesley and Glaister, 1985a; Beesley and Glaister, 1985b). While the former two initiatives do not involve an almost ideological and social revolution, the latter indeed does: the limits to a state's involvement in the provision of economic activities is a question rooted in the very issue of the economic role of the state. The literature on the subject is, to say the least, vast and different countries and societies take a different approach to this issue depending on their historical development and institutions.

The fundamental argument in favour of privatisation asserts that markets, competition and private ownership and operation are essential for an efficient economy, largely affected by neo-classical economic theories and Adam Smith's concept of the "invisible hand". In the *Wealth of Nations*, Smith (1776) asserted that private ownership improves economic performance: competition and the profit motive – coupled with only a limited role for the government – would lead individuals to maximize social well-being while pursuing their own self interest, as if by an *invisible hand*. The logic that privatisation will directly lead to improvements in efficiency has been the subject of considerable academic and political debate. Privatisation proponents argue that improved management will create operational efficiency and encourage adaptability to market needs and innovation. Opponents, on the other hand, suggest that the profit motive will lead to increased public costs (through, for example, the exploitation of the consumer, employees and the environment). The key issue, therefore, is in the existence of a trade-off between economic efficiency and social welfare; that is, although private

objectives may be less desirable, they will be pursued with greater economic efficiency[13]. Of course, discussion on privatisation has come a long way from Smith's theories and from ensuing sterile Marxian analyses on social control, to the general acceptance from governments of both the left and the right for reinventing governance. Governments around the World are experimenting with the sale of government enterprises that had been traditionally considered as natural monopolies, and contracting with nongovernmental organisations for the supply of services long provided exclusively by the public sector. In its strictest sense, privatisation suggests the sale of a state-owned firm to the private sector[14]; however, as discussed in this essay's third section, privatisation need not involve the sale of government assets and enterprises altogether. It can be achieved by deregulation to remove entry restrictions into a market, by enabling the private sector to supply a traditionally publicly provided service, or by contracting out certain functions[15].

Privatisation is grounded in the belief that governments are ineffective and counter-productive in responding to citizens' needs because (Lundqvist, 1989; Berechman, 1993):

- they are inherently inefficient and costly;
- they reduce personal initiative;
- they tend to grow uncontrollably; and
- the costs of public sector production can be greater than the benefits, particularly when market failure is imminent.

The opposing view suggests that the social costs of privatisation are high, particularly as they impact equality, income distribution, social injustice, community structure and political power (Le Grand and Robinson, 1984).

2.2. Privatisation objectives and arguments

Regardless of various opposing views regarding privatisation and its theoretical underpinnings, transit privatisation and/or deregulation was initially motivated by governmental inability either to sustain heavy subsidisation in light of heavy fiscal deficits or revitalize an industry constricted and hampered by heavy regulation. Privatisation was primarily motivated by the expected economic benefit to be derived from improved efficiency and overall performance, and by the political desire to reduce government financial and administrative support for what is an extremely expensive sector of the economy. As suggested by Gomez-Ibanez and Meyer (1993), the essential motivation for transit privatisation is, besides the presumed higher efficiency of the private sector, that a private provider may be more customer-oriented and cost-conscious since passenger revenues determine profit. Further, they indicate that public provision of transit services is inherently restricted in its ability to operate productively because of its inflexible institutional structure (a summary list of arguments for and against privatisation appears in Table 1).

From an economic perspective, as Kay and Thompson (1991) argue, market forces and competition can exist in both natural and non-natural monopoly markets with low sunk costs for market entry; this translates into two strong arguments in favour of expecting a competitive transit market[16]. First, despite numerous research efforts investigating transit firm production technologies, most empirical investigations have been unable to consistently identify economies of scale with respect to transit system size. Indeed, many researchers have reported findings of diseconomies of scale which imply that, for example, a city can have different parts of its system operated by separate companies at a lower unit cost of output[17,18]. Second, there is a reported lack of sunk costs, suggesting a highly contestable market[19]. However, three conditions appear in the transit market that may inhibit

competition; first, the literature reports economies of density at the route level, particularly on low frequency services, which would explain the absence of competition for weekend, evening and remote area services[20]. Second, the "Mohring" (1972) effect suggests that, as brand loyalty is introduced through the sale of weekly or monthly "passes", firms offering a higher proportion of service on a given market will be able to internalise some of the economies of passenger density – which result when increased service reduces average waiting times – as a competitive advantage. Third, as Nash (1988) argues, passengers are interested in enjoying integrated mobility over the entire transport network, and when a dominant firm sells a network-wide pass restricted to its own services the firm gains competitive advantage and inhibits passenger mobility.

Table 1. **Main arguments in support of, and against, transit privatisation**

	Deregulation	
Argument	**In support**	**Against**
Competition	Will result in the provision of services more responsive to public needs.	Will result in the break-up of the transit system, diminishing its image, reducing transit's role in transportation planning, promote the car's dominant role and inhibit network accessibility. Complex process; private service providers must be monitored to ensure quality and appropriate levels of service.
Non-union labour	Will result in considerable operating cost reductions spreading across operators. Will result in increased flexibility in the use of labour.	Will lower operating and safety standards. Will result in lower wages, fewer employee benefits, decreased job protection and lower employment quality. Net effect will be offset by increased unemployment and high severance pays.
Operating costs	Will be lower, allowing increased service frequency and service quality, attracting new passengers.	Much lower than expected; elimination of route cross-subsidisation will require even higher subsidies, and cost reductions on main routes will be lower when considering the entire network.
Profit motive	Will stimulate technical, marketing and operational innovations.	Will increase service on main routes only, leading to deteriorated service for lower income groups.
Fare prices	Will result in lower fares by eliminating cross subsidies, lowering operating costs and increasing competition.	Will result in fare control elimination (and pricing at profit maximising levels) thus increasing fares particularly for monopoly routes.
Service frequency	More frequent and diversified services.	Increases will appear on main routes only. Increased frequency on main routes will be offset by the lack of transit network integration.

As a final point, it is widely recognized that deregulation and privatisation cannot be viewed separately from political and local conditions. As such, special attention must be given to transit labour unions, particularly since labour costs – wages and fringe benefits – account for more than 70% of total system expenditures and are highly inelastic (Karlaftis and McCarthy, 2001). Transit labour unions have, historically and around the World, enjoyed immense bargaining leverage, clearly possessing *monopsonistic* power in the supply of services; this has resulted in labour enjoying significant monopolistic rents (Berechman, 1993). For example, in the US, The Netherlands and Israel, average transit employee income is about 30% higher than similar occupations in other sectors, while employee compensation is 70% higher than average employees (Berechman, 1993). Further, as Savage (1999) showed, relative earnings for transit employees increased rapidly after subsidies were established, and an analysis of US data by Berechman (1993) indicates that while transit employee salaries increased by 6.3% in the 1985-1989 period, fringe benefits increased at 8.9% annually[21,22]. These conditions directly result in having any policy aimed at reducing the economic rents enjoyed by workers to be vigorously opposed by the unions that consider these rents as regular income.

3. ORGANISATIONAL REGIMES IN TRANSIT

3.1. Classifying regimes

In the past few years, in light of privatisation's heightening importance in the transit market, there have been a number of efforts to classify transit regimes in the literature since, as Andersen (1992) indicates, differences in jurisdictional tradition and administrative structure between countries, transit's role in society and transportation policies are key for proposed classifications. For the US, Perry and Babitsky (1986) categorise schemes based on two essential elements – ownership of assets and management and operational responsibility – and identify four basic regimes[23]: i) systems owned and managed by a private firm; ii) systems owned and managed by a government agency; iii) systems owned and managed by a special authority; and iv) systems owned by a governmental agency or a special authority and managed by a private firm. Focusing solely on the private sector's involvement in the public transport market, Andersen (1992) suggests a three-tier regime:

1. Need-based systems where long-term limited monopolies with no competition exist (the operator has a monopoly for a route or network for an unlimited time period);

2. Contract–based arbitration or competitive tendering where the operator obtains the monopoly for a route or a network for a fixed time period after competition; and,

3. Competitive-based free entry in, and exit from, the market (with some tendering for "socially beneficial" routes).

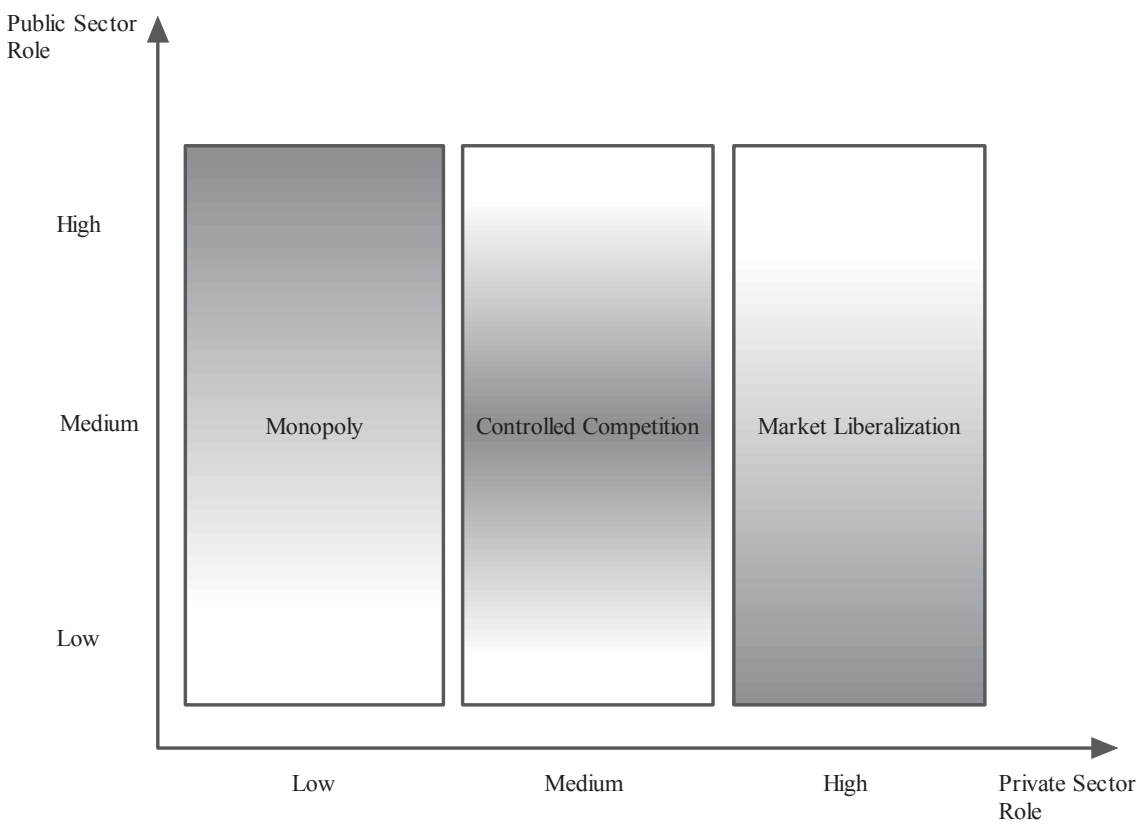
Balancing Andersen's heavily private focus, Van de Velde (1999) developed a classification scheme by differentiating between "authority initiative regimes", where public authorities have the legal monopoly for initiating and allowing operators to enter the market, and "market initiative regimes", where transport services are based on free market entry through a process of regulatory checks[24]. Authority initiative regimes can be further grouped into concession regimes, where the public sector selects the firm to operate the transit network, and public ownership regimes where the

public sector owns the transit system's infrastructure and rolling stock and either operates the system (public management) or selects a private firm to operate it (delegate management)[25].

The two ends of the ideological as well as the operational spectrum in public transit are public monopolies and market liberalisation. The former refers to the ownership and operation of an urban transit system by the public sector; market liberalisation – open market – allows for the provision of public transport services by any interested party (private or public) as long as the service standards set by higher authorities (antitrust standards, environmental and safety regulations) are met. We note that even in cases of public monopolies the private sector may have an external role through outsourcing (for example, by supplying rolling stock, having maintenance and cleaning contracts and so on). In cases of market liberalisation, the public sector necessarily assumes an important regulatory role in setting economic, safety and environmental rules, but may also participate as a contestant in the provision of services[26].

Between public monopoly and market liberalisation lie hybrid regimes that are market structures where the private and public sector share responsibility for delivering transit services (Estache and Gomez-Lobo, 2005); these regimes are frequently identified as "controlled competition" or "contracting" regimes. In essence, partnerships are formed between the private and public sectors for transferring management and/or operations to the private sector, using the private sector's rolling stock, outsourcing of selected services and so on (Figure 1 summarizes the role and intensity for the private and public sectors in the three basic organisational regimes; public monopoly, controlled competition and liberalisation).

Figure 1. **Intensity of public and private sector involvement under various organisational regimes**



3.2. Regime characteristics

The role and level of participation of the public and private sectors in a regime is reflected through a set of five important characteristics:

1. Ownership of assets;
2. Private sector's market entrance;
3. Public sector's regulatory role;
4. Responsibility for system management; and
5. Subsidisation (Berechman, 1993; and De Borger and Kerstens, 2000; we summarize each regime's characteristics in Table 2).

Table 2. **Main characteristics of basic organisational schemes**

	Organisational Regime		
	Public monopoly	**Controlled competition**	**Market liberalisation**
Ownership	Public	Public or private	Multiple players
Entrance in the market	No	Competition for the market	Competition in the market
Regulation	Full	Multiple level regulation – partial deregulation	Deregulation
Management/Operations	Public	Public or private	Private
Subsidisation	Always	In many cases	In some cases

Public transport assets include infrastructure and rolling stock and, while the rolling stock may be the property of either the public or the private sector, the public sector usually owns expensive, difficult-to-construct infrastructure assets, such as large depots and urban rail infrastructure. In an open market, private contestants own their assets; a public authority may also enter the transit market as a contestant using publicly owned assets. Under controlled competition, and depending upon the specific regime adopted, the public sector may retain ownership of its assets, transfer ownership to the private sector or allow the private sector to use their own assets.

Market entrance is a key issue for identifying the private sector's role and participation in an organisational regime; private players may compete *in* the market or *for* the market (Nash and Jansson, 2002); competition *in* the market implies that more than one private firm provide (competitive) services on the same routes while competition *for* the market suggests that a single private firm undertakes the monopolistic provision of public transport services following competitive tendering procedures. A typical example of competition in the market is bus services in major UK cities (White, 1995) and much of the developing world (Gakenheimer, 1999), while competition for the market is extensively used both in the US (TRB, 2001) and elsewhere (Van de Velde, 2005). Competition in the market is the norm in market liberalisation regimes since only a free market would allow competition on the same routes; on the other hand, controlled competition regimes imply competition for the market (a contractor exclusively undertakes a service after competing for entering the market).[27]

Regulatory environments reflect the public sector's willingness and ability to intervene and set policies in the operation of public transport and the implementation of organisational regimes. Berechman (1993) discusses principal forms of regulation in transit: quantity regulation, fare and

revenue regulation and "entry and exit" regulation. Quantity regulation refers to outputs provided by the public transport service and its network structure, while fare and revenue regulation controls the level of fares; these regulatory forms act as tools for achieving social equity of provided services. Entry and exit regulation defines the rules for the private sector to participate in the transit market and aims at sustaining the status and viability of organisational regimes. Regulatory environments vary from strong regulatory to partial and complete deregulation[28]. Deregulation is, by definition, a basic ingredient of market liberalisation; private firms can make their own decisions regarding the service they provide as long as they comply with the law. Under controlled competition, regulation has a control and an efficiency role; control is used to ensure that service provision is at acceptable levels, at fair prices and of high quality, while the efficiency role aims at lowering operating costs and increasing productivity (Berechman, 1993; de Borger and Kerstens, 2000). Estace and Gómez-Lobo (2005) suggest that under controlled competition regimes a clear and systematic regulatory role must exist to ensure public sector benefits and increased competition benefits; the authors indicate that in controlled competition regimes there is always a high risk of regulatory failure.

Management can be the responsibility of either the public or the private sector: depending upon the organisational regime the public sector may undertake management of the system and allow for operations to be handled by the private party (as is the case in most controlled competition regimes). Under complete deregulation, the private sector has full control over system management and operations (Petkantchin, 2004). Finally, subsidisation is a tool for financially supporting services of public interest such as urban transit. Despite subsidisation being identified with purely public operations, it may be an important tool for ensuring service to low-density areas, keeping fares low. It is widely applied to economically strengthen transit systems under public monopoly or competitive control regimes and for stipulating minimum acceptable levels of service, thus protecting vulnerable customers (Ubbels *et al.,* 2000).

3.3. Controlled competition regimes

A fundamental difference between controlled competition regimes and market liberalisation is that, in the former case, there is no change in ownership but rather a temporary transfer of rights for the provision of transit services. Controlled competition regimes are agreements between the public and private sector that protect public interests and provide adequate incentives for a private operator to undertake a service. Controlled competition regimes can be categorized into three generic types: *competitive contracting, franchising* and *licensing* (details and examples of controlled competition regimes appear in Table 3). Under competitive contracting, private firms undertake transport services after tendering procedures. Under a franchising agreement, the franchisee is granted an exclusive right to provide transport services as a result of some form of competition. The major difference between the two schemes is that, under competitive contracting, the contracting authority is responsible for compensating the contractor for his services, while under franchising the franchisee is paid directly by the customers (Iseki, 2004). Therefore, under franchising, the private operator has increased responsibilities in the provision of services but enjoys the freedom to adjust services to respond to market needs. Finally, licensing refers to a non-exclusive right to operate.

Table 3. **Controlled competition regimes**

Generic category	Type	Description	Examples
Competitive contracting	Gross service contracting	A public authority procures transit services to an operator, without the operator taking any revenue risks. The operator is only responsible for production risks and his compensation is related to production.[29]	Buses in Curitiba (Brazil), and Copenhagen (Denmark).
	Net cost service contracting	Similar to gross service contracting. The operator bears both production and revenue risks and is compensated according to anticipated production and revenues.	Buses in London
	Management contracting	The operational assets are owned by the authority and the operator is responsible for the management of operations. The authority usually bears both production and revenue risks, although there may be performance responsibilities for the operator in terms of production cost, quality of service and overall financial performance. [30]	Buses in France and in the US
Franchising	Franchising	The franchisee is granted an exclusive right to provide services, usually as a result of a competition. It gives more freedom to the operator in planning and adjusting services to fit the needs of the market. The public authority specifies the desired transport product and bears any consequent cost responsibilities.	Light and urban rail in London and Manchester, buses in Nairobi (Kenya) and Singapore.
	Concessions	Similar to franchising but the public authority retains no financial responsibility and is limited to setting basic service requirements.	Metro in Kuala Lumpur (Malaysia) and Bangkok (Thailand).
Licensing	Quality licensing	A service is allowed to be operated by anyone receiving a licence and complies with its standards. This type is close to a market liberalisation regime.	Buses in Mexico City (Mexico) and Rio de Janeiro (Brazil).

4. TRANSIT PERFORMANCE

4.1. Measuring transit performance: a multidimensional issue

Measuring and assessing performance is a well-recognised issue in the business literature. Tracking performance and evaluating progress toward achieving goals are important tools in implementing effective business strategy, service provision and service quality. In tracking performance, it is important to be consistent and clear with respect to both a corporation's strategy and its mission. And while frequently the standard measure of a firm's overall performance is profitability, this is not an appropriate strategy for gauging the performance of transit systems – or, more generally,

of any firm producing a "public" good or service – whose goals should be certainly broader and more socially oriented than a profit-seeking firm[31].

Similar to all other firms, the need for governmental agencies, local authorities and individual transit systems to assess performance and to compare with that of their peers, has been well established in both the literature and practice. Assessment of system performance may help, for example, in determining models of successful operation, thereby providing performance targets for inputs and outputs and identifying benchmark operating practices. However, because a clear-cut, market-oriented profit-and-loss guide to performance is hardly applicable to the transit industry, focus has shifted to various aspects and measures that capture the multi-dimensional, and socially driven, nature of transit operations. Fielding's (1987) widely adopted framework for transit performance measurement uses service inputs (labour, capital and fuel), service output (vehicle-miles, seat-miles, vehicle-hours) and service consumption (passenger boardings, passenger miles, operating expenses) to measure transit's three important dimensions: cost efficiency (utilisation of inputs in producing outputs); service effectiveness (utilisation of outputs in accomplishing goals, e.g. passenger boardings); and cost effectiveness (utilisation of inputs in accomplishing goals). While this framework has been a standard reference in the transit literature, the need for evaluating transit system performance is ongoing and complex, stemming from the multiplicity of goals to be concurrently considered. Within the broader context of the overall transportation and social system in which transit operates, its performance is also leveraged toward achieving mobility and environmental improvements, land-use policies and local financial commitments (Sheth *et al.,* 2006). Despite these overall concerns, *economic efficiency* is ultimately the most important goal by which transit system performance is assessed.

4.2. Transit efficiency: definition and measurement

4.2.1 Defining efficiency

The term "(economic) efficiency" refers to the comparison between the real – or observed – values of output(s) and input(s) with the optimal values of input(s) and output(s) used in a production process. Economic efficiency requires that producers of a good or of a service make the best use of the resources available to them; when, for example, a bus repair facility employs five mechanics when four could have done the same job in the same amount of time, then this is classified as inefficient use of resources. In essence, when an economy is inefficiently organised, goods and services are sacrificed that could have been produced had labour or capital been used differently; in economic terms, efficient use of resources equates to economic welfare maximisation (or maximising average standard of living).

Equating economic efficiency with welfare maximisation certainly broadens the scope beyond, for example, reducing vehicle-miles on empty buses; it also concerns *what* services should be offered in addition to *how* they should be produced. To capture these aspects of efficiency, economics further distinguishes between *technical* and *allocative* efficiency. Technical efficiency captures the degree to which, for example, bus operators attain maximum output (vehicle-miles or passenger boardings) with given inputs (labour, fuel, capital), or the minimum level of input that can be used to produce a given level of output[32]. Allocative efficiency captures the degree to which input mix is used to produce a given level of output at minimum possible cost[33].

4.2.2 Measuring efficiency

As previously mentioned, lacking a clear-cut market-oriented guide to performance, research was focused on various quantitative measures to be used in evaluating the extent to which transit systems achieved their stated goals. The most commonly used efficiency measures in practice are Performance Indicators (PI), which are supposed to capture the various objectives in transit system operations. Fielding *et al.* (1978), Gilbert and Dajani (1975) and Tomazinis (1977), offer an extensive list of indicators to evaluate the basic aspects of transit efficiency and, subsequent to these efforts, many authors used these indicators to analyse transit performance and productivity (Fielding *et al.,* 1978; Meyer and Gomez-Ibanez, 1981; Pio, 1980). A problem with these efforts, however, is that individual performance measures yield widely inconsistent results (Benjamin and Obeng, 1990; Stokes, 1979), implying that a single indicator, or a smaller set of reliable indicators, could consistently capture performance. Anderson and Fielding (1982), Fielding *et al.* (1985) and Karlaftis and McCarthy (1997) used factor analysis to reduce over fifty PIs to a smaller set of measures that summarise the separate dimensions of performance. In a 1988 study, Talley argued that deficit per passenger, or passenger per deficit dollar, should be used as the single measure for transit efficiency evaluation.

However, despite the efforts in reducing PIs to smaller subsets of measures, economic efficiency is best captured through formal approaches to obtaining the production frontier; efforts in this direction have employed two basic estimation approaches: parametric and non-parametric (Kerstens, 1996). In both cases, technical efficiency is obtained by estimating an individual transit firm's deviation from the frontier. However, parametric approaches require an *a priori* specification of a functional form for the production technology and of a distribution for technical efficiency, while non-parametric approaches determine the frontier by "enveloping" it with piecewise linear functions or hyperplanes (linear programming is used for estimating the envelope and the method is encountered in the literature as Data Envelopment Analysis)[34].

5. TRANSIT PRIVATISATION IN PRACTICE

Worldwide, organisational regime reforms in public transport have been seen as a tool for enhancing efficiency in the transit industry; a fundamental question is whether the long-held hypothesis of the positive effects of privatisation on transit efficiency holds true in practice. We present here evidence and literature on the effects of privatisation on the efficiency of public transport systems from around the World.

5.1. United Kingdom

The UK has been a pioneer in transit system liberalisation since the *White Paper on Buses* and the ensuing Transport Act of 1985[35]. Bus services were completely deregulated around the country, with the exception of London where a controlled competition regime was introduced[36]; since the mid-1990s most bus services around the UK have been in the hands of the private sector (White and Farrington, 1998). Because of its extensive as well as pioneering privatisation policies, the number of research studies dealing with the UK's bus and rail deregulation is extensive.

Evans (1988) discussed an experimental four-year implementation of bus deregulation in the city of Hereford before the initiation of the 1985 Transport Act. Findings, partly based on previous analyses, indicated an increase in frequencies, often by 100%, and an average decrease in operating costs by 16.5% for the period between 1981 and 1987. Gwilliam (1989) indicated that deregulation in the UK bus system appeared to reduce costs, while White (1990) examined deregulation in bus systems of the UK's metropolitan areas. He reported an increase in productivity by 11% and a decrease in total operating costs by 23.6% for the period between 1985-89; however, he observed a decrease in ridership by 16.2%. For London, his findings indicated an increase in passenger trips by 5.6% and in productivity by 4.4%, while total operating costs declined by 10.5%. A study by Heseltin and Silcock (1990) focused on cost reductions resulting from bus deregulation in the seven larger metropolitan areas of the UK. Their analyses indicated that bus systems in these areas achieved a cost reduction of 19-31% through improvements in productivity. Banister and Pickup (1990) studied the changes in bus system cost and service quality for London and seven other metropolitan areas, for the two-year period following the 1985 deregulation, with 25% of London's network under competitive tendering and 14% of the other area networks under full liberalization. Results showed that costs for the seven metropolitan areas had decreased by 20-25%, a result of lower wages and of productivity increases[37]. Banister and Pickup (1990) also provided indications on ridership, suggesting that passenger journeys decreased by 16.2% in the areas outside London while in London an increase of 10.2% was observed.

In a 1993 study by Gómez-Ibanez and Meyer, it was noted that the UK's privatisation efforts produced results too complicated for conclusions to be drawn on the overall impacts of privatisation. Despite this, they presented evidence of the cost efficiency of the liberalised regime, indicating that subsidies and expenses on fuel had been reduced, and a drop of more than 30% in operating costs and lower labour costs had also been observed. Also in 1993, Savage discussed the effects of privatisation and market liberalisation for most of the UK's local bus systems operating under controlled competition regimes. He reported that, after privatisation, operating costs and cross-subsidisation had decreased, while innovative operations had been adopted. However, he mentioned that demand had declined as a result of service changes and lack of network integration and that services had been concentrated to the most popular routes. For London, Savage's conclusions suggest that while operating costs were not as low as in the free market, demand had not declined, resulting in favourable cost-benefit ratios (a view also shared by White, 1990). London bus tendering was also discussed by Kennedy (1995), who presented evidence that costs had dropped by 18% while substantial efficiency gains had also been achieved. In 1996, Colson used results from market experiments conducted by private UK bus operators to illustrate that privatisation benefited transit users and led to market growth in the cities of Bristol, Oxford, Derbyshire, Nottinghamshire, Yorkshire, Lancashire and in Scotland. In two studies by White (1995) and (1997), results on productivity and operating cost changes in the UK regions, from 1985 to 1997, were presented. At a national level, productivity had increased by 29.7% while operating unit costs were reduced by 46.3%; in metropolitan areas, these figures were 20.9% and 48.9% while in London they were 25.3% and 45.4%, respectively. On the other hand, ridership had declined – nationally – by 22.8%, in metropolitan areas by 39.7%, while in London it increased by 7.8%. White and Farrington (1998) reported results from Scotland and found a 17% decrease in ridership from 1986 to 1996, although productivity had increased by 30% and operating costs had fallen by 47%.

Cowie and Asenova (1999) examined the effects of privatisation in the UK bus industry using data from all major UK bus companies. Their comprehensive analyses indicated private firms as being technically and organisationally more efficient than public companies. However, the public transport industry, as a whole, was found to be relatively inefficient. In 1999, Cowie found a relatively high level of technical efficiency in the Scottish bus market, implying more intensive competition than in

England. Finally, in a review of the UK's bus deregulation experience, Nolan (1999) presented evidence showing a 30% decrease in operating costs, 19% of which could be attributed to productivity and efficiency improvements, while also reporting a service quality decline in most transit systems.

5.2. Europe

A number of European countries have adopted competitive contracting procedures for assigning public transport services over the last twenty years. The European Directive 1191/69/EU (later modified by 1893/91/EU) generated an obligation for Member countries to tender public transport services. The Scandinavian countries were among the first to follow the UK and reform their organisational regimes (Alexandersson *et al.,* 1998). In 1992, Andersen presented evidence from franchising bus services in Norway, Sweden and Denmark; competitive tendering, introduced in Sweden in 1989, led to cost savings of 8%-15%. Alexandersson *et al.* (1998) studied the effects of introducing competition in local bus services in Sweden from 1987 to 1993 and estimated a total reduction of 13.4% in total costs, while Jørgenson *et al.* (1995) reported that private and public bus operators in Norway do not show cost efficiency differentials.

Kerstens (1996) discussed the technical efficiency of private bus operators in France and his findings indicated that private ownership had a positive, yet not very strong, effect on productivity, along with risk-sharing and contract duration. Matsoukis (1996) assessed a short attempt to privatise the Athens urban bus system in Greece, through a controlled competition regime, and his findings indicated a significant increase in ridership (of about 15%) and productivity and an impressive 40% reduction in total costs. De Rues and Nombela (1997) analysed public and private transit operator performance in Spain and indicated that public firms had, on average, 42% higher costs than private firms; they also estimated that privatisation of public operators would lead to cost savings of 8%-23% without any decrease in labour costs. In a more recent study, Pina and Torres (2001) compared the efficiency of public and privately managed transit companies in Spain and concluded that there was no significant difference in technical efficiency between private and public management.

Filippini and Cambini (2003) examined the effects of ownership on the cost of bus service provision for a number of public, private and mixed-operation bus companies in Switzerland, and reported that private participation in a bus company enhances cost efficiency. A study by Farsi *et al.* (2006) evaluated cost and scale efficiencies in Switzerland's regulated private rural bus companies, and attributed observed inefficiencies to firm-specific characteristics. Based on Italian data, Cambini and Filippini (2003) noted that, for small and medium-sized Italian cities, competitive contracting could be a cost-efficient option for public transit. In a general overview of the effects of contracting public transport services in The Netherlands, Hermans and Stoelinga (2005), indicated increases in service levels, service quality and customer satisfaction. Ridership did not substantially change, while cost efficiency also remained constant, but for increased services.

Results of the MARETOPE project (EU, 2003) for public transport systems in Europe, using data from 21 cities between 1990 and 2000, suggested several findings regarding the efficiency of regime reforms in European transit:

- Public ownership had a negative effect on labour productivity, while the existence of competition had a positive effect;
- Significantly lower unit costs were observed in cities where the operator bore production and/or revenue risks;
- Technical efficiency was found to be higher in contracted (controlled competition) systems;

- In cities where transit systems were publicly owned with tendered services, service density was higher.

In general, the MARETOPE project concluded that cities with competitive tendering in transit had enjoyed the largest positive increase in public transport efficiency. Transport efficiency results for various cities suggested that cities where controlled competition regimes had already been established (such as Malmo, Helsingborg, Copenhagen and Stockholm in Scandinavia) were those with the maximum increase in social welfare. On the other hand, in cities like Athens and Budapest, where reform either did not include controlled competition or had not been initiated, transport efficiency was also high. In other cities where competitive regimes were either applied or under implementation (Berne, Lyons, Poznan, Trieste) welfare was found to decrease. Other efficiency gains presented in the project showed reduction of service supply in Scandinavian countries; large increases in service supply in Oxford (UK); and an increase and consequent decrease in service supply in Leeds following deregulation[38]; an increase in supplied services in London by 25%; a large decline in service supply in the cities of Poznan and Budapest that possibly reflected wider political changes in the transition period; and a small increase in service supply in cities that were in the process of reforming public transport regimes.

5.3. United States

In the US, more than 500 public agencies are supported by the Federal Transit Administration (FTA) in providing public transport services, including the country's large transit systems and some of the smaller ones (TRB, 2001)[39]. Among them, over 50% contract part of their services and, although the literature shows that privatisation and contracting of public transport services had been discussed since the early 1980s, it was the 1998 Transportation Equity Act for the 21st Century (TEA-21) that called upon examining novel methods for contracting public transport services (TRB, 2001).

Interestingly, in 1976, Parshigian argued that operating costs for publicly owned transit systems in the US increased faster compared to privately owned systems. Studies by Pucher (1982) and Pucher *et al.* (1983) reported that private transit firms were found to be more cost-efficient when compared to public transit authorities; however, this was accomplished by substantially increasing fares and reducing services (Pucher *et al.,* 1983). In 1983, Anderson argued that transit system ownership does not influence efficiency, while Teal (1985) and Teal and Giuliano (1986) demonstrated average cost savings of 39% in six cases of contracted bus systems and of 43% in five other cases respectively. Perry and Babitsky (1986) examined transit systems under different regimes (categorised as publicly owned and managed systems, publicly owned and privately managed systems and privately owned and managed systems) and concluded that privately owned and operated transit systems were more cost-efficient and productive, while partnerships between public authorities and private firms did not seem to be more efficient and effective than publicly owned and managed systems. After an extensive survey of 800 transit agencies, Teal (1988) reported that 35% contracted their services to private firms and found that contracting reduced costs by 10%-50%. Sclar *et al.* (1989) disputed cost savings attributed to contracting transit services and, using transit systems from New Orleans, New Jersey and New York as examples, claimed that private operators overstated savings and had increased operating costs.

The FHWA estimated that contracting transit services could produce cost savings of 25%-30% (Bladikas *et al.,* 1992), while Peskin *et al.* (1992) presented cost savings of 26%-31% after the Denver Regional Transportation District bus system contracted out part of its operations (to private firms). However, Sclar (1994) argued that, in the case of the Denver transit system, operating costs for the new regime exceeded those of the old, publicly operated system. A study by O'Leary (1993) revealed

substantial cost savings of 24% to 43% for a bus system in Los Angeles County (Foothill transit) where a competitive contracting regime was applied.

Karlaftis *et al.* (1997) compared monthly cost efficiency indicators for the Indianapolis bus transport system and found that, after contracting all bus routes to private operators, cost efficiency increased by 15% over a five-year period. McCullough *et al.* (1998) examined transit services provided by contractors, from a dataset of 142 operators receiving Section 9 operating grants, in accordance with Section 15 of the 1964 Urban Mass Transportation Act, and indicated that private operators were not always more efficient than public authorities, but that they did not fail to produce promised transport outputs as sometimes claimed. In 1998, Downs compared private and public local bus services in New York and indicated differences in cost efficiency but did not attribute them to the characteristics of the private versus the public sector; rather, he mentioned higher labour costs and decision-making decentralisation as the primary factors for public bus services being of lower cost efficiency. In his study, Reja (1999) argued that cost efficiency gains in competitive contracting may be cancelled because of additional transaction costs in competitive contracting[40]. Karlaftis and McCarthy (1999) examined the effects of privatising the Indianapolis transit system through route contracting to private firms and reported an annual reduction in the system's operating cost by 2.5%, a finding they tested for, and attributed to, reductions in labour costs.

In 2001, Nicosia examined 300 US transit firms with competitive contracting regimes, estimated cost savings to be about 14% and indicated that transit agencies tended to contract services to achieve lower labour costs. In 2001, TRB conducted a large survey of bus service contracting by interviewing managers who were asked their opinions on contracting; most frequent answers on benefits included savings in operating costs, increased cost-efficiency and ability to expand, while problems indicated were related to limited control, personnel issues and customer service. In general though, more than half of the managers responded that their expectations from contracting were fully met. Iseki (2003) and (2004) criticised methods and findings from previous studies examining the efficiency of contracting and indicated cost efficiency improvement between 5.5% and 7.8% for authorities who contract services to private firms rather than the much higher findings reported by previous studies. Finally, a study by Simmons *et al.* (2003) focused on the effects of public and private management, by examining 212 transit systems and indicated that private management was more efficient than public management, while public management was more effective in service provisions.

5.4. Australia and New Zealand

Organisational reforms in public transport have been a development in Australia and New Zealand since the early 1990s. Competitive tendering was introduced in a number of transit systems in Australia, while deregulation was introduced in New Zealand (Alexandersson, 1992; Wallis, 2005).

Since 1987, Hensher, using data from public and private Australian public transport providers, drew evidence that private firms performed more efficiently compared to public ones. As an example, he stated that in Sydney an efficiency gain of up to 10% could have been reached if the private sector undertook the city's public part of the transit system. A number of studies assessing the effects of organisational reform in Australia were published recently. Stanley and Hensher (2005) studied the cases of the rail and tram privatisation in Melbourne and reported financial failure, service quality deterioration and low service growth, no difference in customer satisfaction but increased ridership (4.4% for the rail system and 6.2% for the tram system). Mees (2005) also discussed the franchising model applied to the rail and tram systems in Melbourne and reported no improvements in ridership and service provision, coupled with financial problems that led to additional costs for the State through necessary subsidisation that exceeded savings from privatisation. Interestingly, the author attributed

many of these financial problems to the contracting scheme employed and suggested that, had a different concession scheme been used, privatisation could have been successful.

In 2005, Wallis presented ridership effects from contracting bus services in Adelaide, Melbourne, Perth (in Australia) and in New Zealand. An average increase in ridership of 8% for Adelaide and of 26% in Perth was observed within a three-year period, while services in Perth were increased by 32% and in Adelaide by 15%. Total and average costs decreased by 33% and 38% respectively in the Adelaide system, average costs declined in Perth by 22%, while total costs remained constant despite the large increase in services. In Melbourne, the author reported that while an initial boost in service expansion and enhancement was achieved, there were few additional improvements in provided services and a minimal change in ridership; on the other hand, as the author mentions, in New Zealand ridership increased in cases of service expansion.

Efficiency impacts following the 1991 regime change in the New Zealand transit industry were provided by the Australian Industry Commission (1994); according to this study, regime reform resulted in reducing average costs by 30%, while productivity increased and services were improved. Bollard and Pickford (1998) studied the transformation of the New Zealand organisational regime and indicated increases in efficiency and service quality.

5.5 Other regions

5.5.1 Latin America

In a comprehensive study by Halcrow Fox (2000), the effects of organisational regimes for transit agencies in Latin American cities were presented. In Buenos Aires, concession of metro and rail in the mid-1990s led to an increase in ridership and productivity (for metro lines 75% and for rail 64% for the 1994-98 period), while quality of services improved; however, an increase in fares was observed. State-owned bus transit in Rio de Janeiro experienced significant financial problems until 1995 when its assets were sold and routes let to private companies. In the years that followed, there was no need for subsidisation of the private firms. Contracting of bus services in Santiago began in 1991 and resulted in reducing the size and age of the bus fleet, decreasing travel times and improving service quality; however, service quantity and ridership were reduced. In their 2005 study, Estache and Gómez-Lobo provided information on the effects of regime changes in Santiago and Bogotá. In Santiago, liberalisation improved waiting times and distances to bus stops but also led to a 100% increase in fares which, in conjunction with environmental and congestion externalities, led to changing free market operations to a controlled competition regime. Under the contracting regime, fare escalation was reversed without degrading the system's performance; moreover, governmental regulation aided in improving service quality but economic inefficiencies and safety considerations still remain. In Bogotá, a competitive tendering regime was implemented during the 1990s for the bus network serving the city centre and Estache and Gómez-Lobo (2005) reported increases in average speeds by 50%, reductions in travel times by 32% and large safety improvements, while fare increases were minimal (6%).

5.5.2 Asia

In a 1992 study, Chang and Kao evaluated the efficiency of one public and five private bus firms in Taipei, Taiwan. They found that, following liberalisation of the urban transit market in 1969, the public bus firm (Taipei Municipal Bus) increased its technical efficiency while, at the same time, private companies proved to be technically more efficient. Gwilliam (2005) presented an evaluation of organisational regime reforms in Bishkek (Kyrgyzstan), Bangkok (Thailand) and Sri Lanka. In all

three cases, attempts to allow for private competition in the provision of public transport services were relatively unsuccessful, possibly because of poor reform planning, strong belief in monopolistic practices in the public sector and strong political opposition.

5.5.3 Africa

In Accra, Ghana, the system of privately-owned minibuses is regulated by the Government; fares are kept low but frequencies are reported as inadequate and so are reports for maintenance and for safety levels (Halcrow-Fox, 2000). The 1993 liberalisation of minibuses in Harare, Zimbabwe led to a measured 17% increase in ridership and a 50% reduction in average waiting times during 1994. The results of bus network competitive tendering in South Africa, initiated in 2001, were discussed by Walters (2005), who reported an 18% increase in ridership, a 12.2% increase in bus load factors, a reduction in manpower and labour costs, increased revenues and a decrease in fleet age.

Table 4. **Studies on transit privatisation**

Study	Data[1]	Region	Regime Comparison to Public/ Reform	Cost Efficiency[2]	Productivity	Ridership	Service Quality	Fares
United Kingdom								
Evans (1988) (1981-1987)	TS	Heleford	Market Liberalization	↑	↑	↑	↑	↑
White (1990), (1997), Heseltin and Silcock (1990), Banister and Pickup (1990), Gomez - Ibanez (1993), Savage (1993), Colson (1996)	CS	Nationwide	Market Liberalization	↑	↑	↓	↑	↑
Asanova and Cowie (1999)	CS	Nationwide	Private Ownership	↑				
White (1990), (1997), Banister and Pickup (1990), Kennedy (1995)	TS	London	Controlled Competition	↑	↑	↑	↑	↑
Colson (1996), Whte and Farington (1998), Cowie (1999)	TS	Scotland	Market Liberalization	↑	↑	↑	↑	↑
Nolan (1999)		Nationwide	Market Liberalization	↑	↑	↑	↑	↑
Europe								
Andersen (1992)	TS	Sweden	Controlled Competition	↑	↑	↓		↑
Jongerson et al. (1995)	CS	Norway	Controlled Competition	X				
Kerstens (1996)	CS	France	Controlled Competition	↑	↑			
Matsoukis (1996)	TS	Greece	Controlled Competition	↑	↑	↑	↑	
De Rues and Nobela (1997)	CS	Spain	Controlled Competition	↑	↑		↑	
Pina and Torres (2001)	CS	Spain	Controlled Competition	X				
Filipinni and Cambini (2003a), (2003b)	CS	Switzerland, Italy	Controlled Competition	↑				
Hermans and Stoelinga (2005)		Netherlands	Controlled Competition	↑	↑		↑	
United States of America								
Pucher (1982), Pucher et al. (1983)	CS	Nationwide	Private Ownership	↑	↓		↓	↑
Parshigian (1976), Teal (1985), Teal and Giuliano (1986), Teal (1988)	CS	Nationwide	Private Ownership	↑				
Perry and Babitsky (1986)	CS	Nationwide	Controlled Competition	↑	↑			
Sclar et al. (1989)	TS	New Orleans, New Jersey, New York	Private Ownership	↓				
Peskin et al (1992)	TS	Denver	Private Ownership	↑				
Sclar (1994)	TS	Denver	Private Ownership	↓				
O' Leary (1993)	TS	Los Angeles County	Controlled Competition	↑				
Karlaftis et al (1997), Karlaftis and McCarthy (1999)	TS	Indianapolis	Controlled Competition	↑				
Downs (1998)	CS	New York	Private Ownership	↑				
McCullough et al (1998), Reja (1999)	CS	Nationwide	Private Ownership	X				
Nicosia (2001), Simmons (2001). Iseki (2004)	CS	Nationwide	Controlled Competition	↑				
Australia and New Zealand								
Hensher (1987)	CS	Nationwide	Private Ownership	↑				
Stanley and Hensher (2005), Mees (2005)	TS	Melbourne	Controlled Competition			X	↓	↑
Wallis (2005)	TS	Adelaide, Perth	Controlled Competition	↑	↑	↑	↑	
Travers Morgan (1997), Bolard and Pickford (1998)	TS	New Zealand	Market Liberalization	↑			↑	
Other Countries								
Estache and Gomez-Lobo (2005)	TS	Santiago	Liberalization	↓	↑	↓	↓	↑
Estache and Gomez-Lobo (2005)	TS	Santiago	Controlled Competition	↓	↑	↑	↑	↓
Estache and Gomez-Lobo (2005)	TS	Bogota	Controlled Competition	↑	↑		↑	↑
Chang and Kao (1992)	TS	Taipei	Market Liberalization	↑				
Walters (2005)	TS	South Africa	Controlled Competition	↑	↑	↑	↑	

Notes: [1] TS Time Series Studies, CS Cross Sectional; [2] X No differences

6. IMPLICATIONS OF TRANSIT PRIVATISATION

6.1. Summary of findings

The majority of empirical studies on privatisation in public transit are consistent with the theoretical argument that the private sector lowers costs and produces a more efficient allocation of resources in comparison with the public sector[41]. Both in the only *bona fide*, complete deregulation type (market liberalisation) reform in urban transit in the UK and in various competitive regimes – be they controlled competition, franchising or licensing – around the World, most of the actual results conform to predictions from theoretical analyses, at least in the direction of reducing costs and increasing efficiency if not in the magnitude of these effects. But, a key question of interest to researchers, practitioners, union leaders and members, politicians and the public is: how are these efficiency gains achieved? Research overwhelmingly supports that gains from privatisation are primarily due to a more efficient use of labour. As previously discussed, public transit is labour-intensive, accounting for 70%-80% of operating costs, and privatised firms generally pay lower wages and fringe benefits; in addition, privatised operations enjoy more flexible work rules relative to publicly-run systems[42].

Research attributes labour-related transit system cost reductions to direct and indirect effects (Talley, 1998). The *direct effects* are cost savings obtained from lower wages and benefits paid by private operators – to either union members or non-union employees – by substituting regular buses with mini-buses, whose drivers are paid lower rates or by union concession in working practices[43]. While private operators pay, on average, lower wages and offer fewer benefits, changes in working practices have also made a significant impact on system costs and particularly labour productivity[44]. Long-standing public sector practices, regarding crew scheduling, overtime pay and "spare" staff to cover for daily absence, were costly in terms of wages and productivity and costly to administer. For example, in the UK public transit systems, drivers were paid based on a guaranteed day of 7 hours 48 minutes, while any additional work was paid at enhanced overtime rates, resulting in earnings of almost 50% higher than the basic rate, while only 70% of paid time was actually spent behind the wheel (30% of the time was allotted to signing in and out, lunch breaks and travel time to and from the nearest canteen). Further, 8% additional staff were required to cover for holidays and weekends and 18% for daily absences, substantially adding to operating costs. In the US, some privatised transit systems pay overtime after twelve hours, drivers can be used in maintenance and other activities during off-peak periods (Giuliano and Teal, 1985), while privatised firms are not bound by Section 13c of the Urban Mass Transportation Act of 1964 and its amendments, which protect transit workers from job loss by requiring up to six years of severance pay.

Reported reductions in real unit labour costs and increases in labour productivity have both been the result of union concessions and lowered demands. This *indirect cost savings effect* is a result of the perceived union "threat" effect; unions, facing threats by both actual competition for their jobs when employed by a private firm and potential competition when employed by a public firm whose services will be privatised, respond by moderating their demands (Talley, 1998)[45]. Interestingly, despite

obvious erosion in working practices and lower wage rates, reported strikes in periods after privatisation have been greatly reduced because, at least in part, of multilateral political support for privatisation efforts and unemployment worries.

Efficiency, albeit possibly the most important and widely examined measure for gauging privatisation's effects on transit services, is only part of what the industry should be judged by. It is well established that transit service provision cannot, and should not, be solely judged on efficiency improvements or cost-cutting results[46]. Transit's social role and importance in transportation and urban planning is eminent in improving welfare, addressing social equity and reducing externalities. As such, it is also important to examine the effects of privatisation on other transit operational parameters. First, there is ample evidence that, in most cases, transit fares increased quite substantially following privatisation (in some cases, fares were doubled). Whether this increase was a mere result of privatisation, of the reduction of subsidy levels, or of an effort to raise fares to their (welfare-maximising) optimal marginal cost levels, has not been addressed in the literature. Second, privatisation's effects on ridership are ambiguous, with some cities reporting increases and some decreases; however, this investigation has to be expanded to include corridor demand (whether ridership increased on some routes and decreased on others) and, of course, price elasticities of demand to relate fare increases with changes in demand. Third, results on service characteristics also vary. For example, some research suggests that public operators offer more services on low-density routes and higher peak-to-base ratios (which generally entails a need for larger fleets, more drivers and higher overtime pay, hence decreasing efficiency). Finally, investigations regarding effects on innovation have shown that while in Britain privatisation affected all three innovation capabilities, i.e. infrastructure (lag of investment), vehicles (decrease in average vehicle age and size) and service operations (new marketing and fare policies), in The Netherlands innovations in infrastructure and vehicles was low (Ongkitikul and Geerlings, 2006).

6.2. Influencing factors

Besides the findings largely supportive of privatisation's positive effects on transit costs and efficiency, as well as the lack of evidence that efficiency gains are technologically based – there are, after all, only limited technological options for public transit – the author argues that the private-public operations debate should be differentiated from other factors also influencing the magnitude, and possibly even the direction of privatisation's effects on transit efficiency. There are three primary factors that weigh-in heavily on the effects of privatisation on the efficiency debate that must be considered when interpreting findings: i) market structure and competition; ii) contract development and tendering system; and iii) empirical assessment methodology.

One of privatisation's main targets is to introduce *competition* to transit markets and, through this, increase system efficiency, improve service, and avoid monopolistic practices. Some research suggests that, rather than by ownership in and by itself, efficiency is promoted by the interaction of ownership and competition (Kay and Thompson, 1986). While the magnitude of results varies, as it is rather complicated to assess the effects of competition on efficiency, the literature suggests that competition has led to efficiency improvements but not to increased service coverage. Despite the findings that competition forces systems to improve efficiency, what remains unanswered is whether privatisation leads to competition or whether monopolistic market structures persist due to the lack of new firm entry[47]. To this end, there are two important issues that negatively influence the degree of competition in the transit market. The first concerns entry-deterrence strategies used by incumbent firms to keep new ones from entering the market (possibly by exploiting infrastructure capabilities, fare reductions and flooding the market with additional and duplicative departures). The second issue

is frequent mergers which effectively create an oligopolistic market with a tendency for creating a (private) monopoly with limited on-road competition[48].

The level of competition and related efficiency gains strongly depend on the *contract development and tendering system*. The role of the tendering process is to maintain a non-monopolistic market structure in transit markets and safeguard operators from deterring actions toward, or predatory pricing from, new entrants. In general, research results indicate that competitive contracting can lead to significant gains in efficiency but not in effectiveness; franchising increases effectiveness but efficiency directly depends on competition levels; while licensing may lead to over-supply hence reducing system effectiveness. However, as Mees (2005) discusses for the Melbourne Tram Services, incumbent operators may be in a position to exert huge influence in negotiations for contract renewal resulting in a classical "moral hazard" problem[49]. An important determinant of the private sector's successful offering of a service is contract design; this is a reflection of the reality that all projects/services are inherently risky. Risks involve unavoidable contract incompleteness, uncertain service demand (ridership) and uncertain cost estimates which the government must *ex ante* decide on how to allocate to the parties involved in the contract (the principal-agent problem). The goal of an effective contract is for the principal (the government or local authority) to allocate the agent (transit operator) risk efficiently (who, for example, bears the burden of failed ridership predictions?), while providing appropriate performance incentives (reduction in service costs, quality of service, on-time percentage and so on). In general, three conditions must be satisfied for successful tendering:

i) award criteria should be clear and fair, specifying desired frequency, fare scale, type of vehicles to be used and so on;

ii) there have to be inspectors to monitor operations and ensure that firms fulfil contract obligations as specified; and

iii) the tendering authority must be impartial, avoid favouring incumbent firms, and tender routes early to ensure transparency.

Despite significant research in assessing private versus public transit system operation, the debate remains strongly influenced by the approach used to evaluate the results (the *empirical assessment methodology*). The four most important, primarily research-related, factors that have influenced findings to date and which may, if not carefully addressed, influence policy decisions are as follows.

1) *The dynamic nature of privatisation*. The question most frequently addressed in privatisation studies is the comparison of public versus privately offered services, a primarily static question that is answered by comparing transit systems over a given period of time. However, privatisation is by definition a change and has to be addressed dynamically by looking at a firm's evolution and transition between its public and private stages. Arguments regarding the dynamic nature of privatisation include both the view that a system's efficiency may not emerge immediately after privatisation but an increasing trend may evolve as private managers overcome organisational inertia, as well as the opposing view that costs may drop significantly following privatisation but may demonstrate an increasing trend thereafter. As such, observed effects in the literature are contingent upon the time period examined.

2) *Modelling and data incompatibility across studies*. Research studies seem to "compete" for the most exotic and esoteric methodology used for efficiency assessment while employing data from different (usually single agency) systems. This affects both the ability to understand whether alternative specifications yield different policy recommendations (to correct this would require that different methodologies be tested on the same data) and

inhibits the ability (when single agency data are used) to generalise findings, particularly as transport network characteristics are completely incompatible between cities (travel speeds, congestion levels, demand profiles, peak-to-base ratios and so on). Further, consultancy studies are frequently plagued by different cost-accounting methods and cost allocation models used as well as commissioning bias[50].

3. *The agency selection problem*. This could happen when an already ailing system is nationalised (out of lack of private operator interest) and its lower efficiency is not a result of public operation *per se*, or when governments elect to privatise transit systems that are already efficient or are in a state of increasing efficiency.

4. Finally, despite all the research effort in assessing the efficiency effects of privatisation and the widely accepted view that it is a complex phenomenon with many factors influencing its outcome, methodologically it is difficult, even impossible, to jointly include these factors and account for their interrelations. As such, results are frequently bound by unavoidable modelling misspecification problems[51].

7. CONCLUSIONS

The past few decades have seen transit demand decrease in many countries, lagging far behind the substantial growth in mobility that has occurred during the same period. Important factors that have influenced reductions in public transit have been the rising levels of real income and decreasing relative costs of private travel. These factors have led to significant increases in automobile ownership and population shifts from central cities to suburbs, both of which reduce the demand for public transit. In an effort to reduce operating deficits, increase productivity and improve the quality of services, the public transit sector around the World has been moving away from public ownership and operation and towards some form of privatisation. The notion of urban transit privatisation (and deregulation) is based on the belief that the government is ineffective and counterproductive in responding to citizens' needs. This can be attributed to the inherent inefficiency of government services, the often uncontrollable growth of the public sector, and the reduced personal initiative of individuals and organisations. Overall, because it is more sensitive to economic incentives and more responsive to changing market conditions, the private sector is expected to produce a given level of service more efficiently than the public sector. This essay has reviewed thirty years of intense theoretical and empirical research on the effects of privatisation on transit's economic efficiency, and further argues that the private versus public operations debate should consider other factors that influence the effects of privatisation on economic efficiency, such as the degree of competition in the market, the tendering system and contract design and the methodology and criteria used to compare private and public service provision.

The vast majority of empirical studies on privatisation consistently find that the private sector lowers costs, increases operational efficiency and produces a more efficient allocation of resources in comparison with the public sector. Research further overwhelmingly supports the fact that gains from privatisation are primarily due to a more efficient use of labour: this is the direct result of two phenomena. First, are direct cost savings obtained by lower wages, and benefits paid by private operators. These savings enjoyed union concession regarding working practices (for example, unions

accepted to relax long-standing public sector practices, regarding inefficient crew scheduling, high overtime pay and "spare" staff to cover for daily absence, that were costly in terms of wages and productivity). Second, are indirect cost savings as a result of the perceived union "threat" effect; unions, facing threats to their jobs, responded by moderating their demands. Interestingly, despite possible erosion in working practices and lower wage rates, reported strikes in periods after privatisation have been greatly reduced, largely because of multilateral political support for privatisation and fears of unemployment.

Although efficiency is the most widely examined measure for gauging privatisation's effects on transit services, because of transit's important social role it is necessary to also examine effects on a variety of other service characteristics. Research results suggest:

i) There is ample evidence that, in most cases, transit fares increased quite substantially following privatisation (whether this increase was a mere result of privatisation, of the reduction of subsidy levels, or of an effort to raise fares to their optimal marginal cost levels has not been addressed in the literature);

ii) Privatisation's effects on ridership are ambiguous, with some cities reporting increases and some decreases;

iii) Results on service characteristics vary; for example, research suggests that public operators offer more services on low-density routes and higher peak-to-base ratios (generally entailing larger fleets, more drivers and higher overtime pay, all of which decrease efficiency); and iv) results regarding effects on innovation have shown that privatisation clearly enhances innovation.

The literature offers evidence, and largely supports the notion that privatisation policies have played a decisive role in allowing for competition in the transit market and for improving efficiency and lowering operating costs. However, whether the composite effects of privatisation on efficiency, ridership, fare increases and levels of service are welfare improving is a question largely remaining unanswered. There still remain open questions regarding service provision, particularly with regard to service to lower-density areas, reductions in peak capacity and the institution of time- and distance-based fare policies; further, questions and arguments regarding optimal privatisation and deregulation policies, contract issues, labour union objections and political consent have to be strongly considered. As a final note, it is important when arguing for the costs and benefits of privatisation to agree on what the main objectives of a reform should be and on the criteria to be used in assessing effects.

NOTES

1. Department of Transportation Planning and Engineering, School of Civil Engineering, National Technical University of Athens, Athens, Greece; e-mail: mgk@central.ntua.gr; URL: http://users.civil.ntua.gr/mgk

2. Whether the UK model - following the Transport Act of 1985 - actually led to improved efficiency, quality of services and social welfare, has been the subject of a considerable amount of both theoretical and empirical research and of heated political debate [although the literature on Britain's bus privatization is voluminous: Savage (1993), Banister and White (1997) and Cowie and Asenova (1999) provide in-depth discussions and analyses]. Britain's privatization and subsequently the Reagan Administration's well-known desire to diminish government's role in transit funding and introducing competitive forces in transit is also – but with much caution – shared by the EU through Directive 1191/69/EU (later modified by Directive 1893/91/EU), generating an obligation for member countries to tender public transport services. Van de Velde (2001) offers a detailed review on the regulatory evolution of public transport in Europe.

3. Black (1995), Gwilliam (1999) and Ubbels *et al.,* (2003) provide extensive discussions on the economic justification for transit subsidization.

4. The externalities argument is a "second best consideration"; since road use is not fairly and efficiently priced, the argument stands for subsidising its substitute.

5. Related to this is the argument that public transportation operations extensively cross-subsidize; profits from popular routes are used to subsidize less lucrative routes to continue public service provision.

6. Price setting of fares equaling marginal cost – for any service – is the economic rule for most efficient resource allocation and social welfare maximization.

7. As Berechman (1993) suggests, this is a view strongly supported by powerful coalitions of transit employees, transit managers and regulatory authorities.

8. These numbers imply that for, say, 65% subsidization a transit system's revenues from fares cover only 35% of total system costs (this%age is frequently referred to as farebox recovery or cost recovery ratio and is estimated as passenger revenues divided by total operating costs).

9. The discussion here involves operating subsidies, for long the main focus of transit financing. Capital subsidies, aimed at supporting capital investments such as infrastructure development and rolling stock renewal, are also important sources of financing, particularly in urban rail projects.

10. A related issue, that of optimal subsidy amount, has attracted the interest of researchers, including Nash's (1978) work on optimal operational pricing rules and Else's (1992) work on subsidization policy.

11. This result holds despite the second-best argument, as Proost *et al.* (1999) discuss.

12. Sweden, Norway, Finland and Ireland, traditionally high-subsidy countries, provide clear indications of this trend.

13. This trade-off has some very interesting practical implications: as Jones *et al.* (1990) and Bos (1986) discuss, private shareholders will frequently vote to maximize profits while public shareholders will vote to maximize welfare. To address this, Beesley (1997) argues for strong regulatory policies to ensure net social gains from privatization.

14. The economics literature has extensively examined the differences between state-owned and private firms and what the economic implications may be. Villalonga (2000) provides an excellent discussion on the public-private firm comparison based on three prevailing theories: i) Agency/Property Rights Theory; ii) Public Choice; and iii) Organizational theories. Berechman (1993) briefly discusses these theories in the transit industry.

15. From a policy perspective it is interesting to note that, as McFetridge (1989) suggests in his discussion of hollow corporations, there are concerns that corporations with extensive outsourcing may not be able to accumulate skills, knowledge and intangible capital internally, and thus become hollow.

16. The transit privatization and deregulation debate largely revolves around the concepts of competition and contestability. Contestable markets, as described by Baumol (1982) in his seminal work, are a generalization of the perfectly competitive markets under constant or diminishing returns-to-scale conditions and the absence of externalities. In essence, as Dogson and Katsoulacos (1989, p. 4) summarize: "*the theory of contestable markets predicts that the threats of entry and of competition will lead firms in the industry to setting prices which are equal to average costs, and acting so as to produce their output at maximum technical efficiency and hence at minimum cost for the output levels produced*." According to contestable market theory, under deregulation, the mere threat of entry is effective in forcing the transit firm already operating in the market to avoid monopolistic practices; in transit services, "contestable" refers to a market served by a single transit system that does not charge monopolistic prices for fear of attracting entry. Excellent discussions on the contestability of transit markets are provided by Berechman *et al.* (1992), Berechman (1993) and Langridge and Sealey (2000).

17. Because of the immense practical implications that economies of scale, density and product scope – jointly referred to as network economies – have on transit operations and deregulation policies, the literature on this topic is extensive and spans more than thirty years of active research. A solid mathematical, yet straightforward, explanation of these economies is given in Berechman (1993) and a summary of research findings in Karlaftis and McCarthy (1999) and Karlaftis (2003).

18. Berechman's (1993, p. 123-125) review of the literature – up to the early 1990s – verifies the existence of a U-shaped average cost curve (per vehicle-mile), suggesting that an optimal scale of operations is exhibited by systems with about 300-400 buses, while systems with over 400 buses are faced with decreasing returns to scale.

19. Low sunk costs imply that any investment necessary for entering a market can be fully recouped on exiting. Savage (1993) suggests that most competition, at least in the UK, has occurred between companies with already established infrastructure, while smaller entrants were firms with an available operating base, frequently maintaining rolling stock at road freight vehicle

repair bases. Keeping sunk costs low is also a strong argument in favour of separating ownership from rolling stock use.

20. Economies of density suggest that a transit firm's average cost of operating a route decreases rapidly with increasing passengers up to the point where an additional bus is needed, and then "jumps" by the additional buses' fixed cost amount; this is a result of the relatively high fixed costs for operating an additional bus.

21. The author suggests that transit management primarily concedes to transit unions through fringe benefits rather than salaries.

22. This finding, coupled with labour's high share of operating expenses, suggests that even a small decrease in salaries and benefits will amount to a sizeable decrease in total operating costs for transit systems.

23. This classification focuses on the role of the public and private sectors within a public transport system, without examining the manner in which the private sector enters the market or the cases of complete service liberalization.

24. In this classification, Van de Velde considers both public- and private-sector roles from three important perspectives: i) market entrance; ii) ownership; and iii) management.

25. Recently, Macário (2003) suggested three levels for the transit market's structural evolution: i) closed market; ii) controlled competition; and iii) deregulation.

26. An example of a public operator in The Netherlands competing for transit market services is described in Van de Velde and Pruijmboom (2003) for The Netherlands and Karlaftis and McCarthy (1999) for Indianapolis.

27. Contestants may be either private or public firms (Van de Velde and Pruijmboom, 2003).

28. Under complete deregulation, the public sector withdraws from any dominant role in making decisions or constraining decisions made by the private sector; nevertheless, the private sector must be in compliance with economic, environmental and safety standards set by law.

29. Production risks are associated with service cost, and revenue risks with service demand.

30. The operator is compensated regardless of the level of costs or revenues (Cambini and Filipinni, 2003).

31. The public economics literature has dealt extensively with performance definition and measurement in local government services [see, for example, Downing and Bierhanzl (1998) and Hayes and Chang (1990)].

32. The selection of inputs and, particularly, output(s) in evaluating transit performance is a key concern in empirical research, since it significantly affects results and ensuing policy recommendations. A very interesting and informative discussion on input/output selection is provided by De Borger and Kerstens (2005).

33. In economics, technical efficiency is achieved by producing at the production frontier and inefficiency when production occurs in the interior of the production possibility set. Allocative efficiency refers to the exact position of a firm on the production frontier at which the "most desirable" position depends on the goals pursued. Consider, for example, a transit system whose goal is to minimize operating cost at given input prices (labour, fuel, capital); if the system achieves this target, it is technically efficient but may be allocatively inefficient if it minimizes cost with the suboptimal input mix (suboptimal ratio of drivers per bus or fuel consumption; if, for example, price of fuel increases and holding fixed the level of all other factors, operators may schedule so buses stay idle for longer periods to conserve fuel for runs with higher load factors).

34. Findings on transit efficiency from both estimation approaches are abundant; for non-parametric approaches, Karlaftis (2004) and Sheth *et al.* (2006) provide extensive reviews, while for frontier studies De Borger *et al.* (2002) discuss estimation issues and findings.

35. A summary of studies and findings discussed in this section appears in Table 4.

36. In London since 1985, bus services were gradually tendered. In 1994 and 1995, public bus operators were sold to the private sector.

37. For the same time period, the London Planning Advisory Committee (1989) suggested that the London bus system enjoyed cost savings of 15%.

38. This was a possible result of the transit industry's consolidation.

39. Small public transport systems in the USA are usually publicly owned (Vuchic, 2005).

40. Additional transactional costs refer to the costs incurred both by the operators in preparing bids and by the agencies involved in putting together complicated documents for the bidding process.

41. In this section, the word "privatization" is used liberally to encompass all regulatory regimes described in section 3, with the exception, of course, of the fully public regime.

42. There are reports, Heseltine and Silcock (1990) for example, that tightening of maintenance procedures are also likely to result in non-labour cost savings, while changes in fleet characteristics may result in substantial maintenance cost reductions and a decreased need for sustaining heavy maintenance facilities.

43. The extensive use of mini-buses instead of regular buses by private operators is a popular practice in the UK and elsewhere, with many – both positive and negative – side effects [for an extensive discussion on the transportation, safety and operating differences between regular and mini-buses, see Vuchic (2005)]. Heseltine and Silcock (1990) suggest that mini-buses have increased the need for drivers with "lower" licence requirements, creating significant opportunities for younger drivers and women (without prior bus-driving experience).

44. Wage differentials between private and public operators vary widely by operator, city and country: in the UK and the US this difference is, on average, 15%.

45. This union "threat" effect reported by Talley (1998) is different than the frequently reported effect where non-union employers raise non-union wages to reduce the risk of work force unionization.

46. White (1990) offers an interesting Cost-Benefit Analysis for the UK, including a multitude of effects, and reports a net annual gain in Metropolitan areas but a net annual loss in other areas.

47. This argument is closely related to transit market contestability: if transit markets are contestable then, even in the monopoly cases, anticipated potential competitor threats will prohibit monopolistic rents to be charged. Contestability of transit markets is still a hotly-debated issue [Langridge and Sealey (2000); de Borger and Kerstens (2005)].

48. This is frequently described as a shift from on-road competition (competition *in* the market) to boardroom competition (competition *for* the market). In the UK, mergers have occurred both by the acquisition of firms in direct competition with the purchaser or by agglomeration of separately privatized, yet previously government-owned, firms (Savage 1993).

49. In the Melbourne Tram services case, the incumbent operators, unrestrained both by the threat of competition and by a public takeover, would seek to minimize obligations and maximize subsidies; the overseeing public authority would have a strong incentive to accept the terms, to avoid admitting to failure of the services (Mees, 2005). This constitutes a "moral hazard" since both "players" have an incentive to collude against another party (in this case, the public interest).

50. An example of commissioning bias was the case of Foothill Transit in Los Angeles. Ernst and Young, commissioned by privatization advocates, reported over 40% cost savings in the post-privatization period, while Coopers and Lybrand, commissioned by privatization opponents, reported almost no cost savings (Iseki, 2003).

51. Modeling misspecification and the frequently resulting biased (parameter) estimation problem has very important implications for policy recommendations, even though it has been widely ignored in the privatization literature (Washington *et al.,* 2003 offer a quantitative discussion on misspecification problems and estimation biases).

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TOWARDS A REFORM OF URBAN TRANSIT SYSTEMS: TOPICS FOR ACTION

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SUMMARY

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1. INTRODUCTION

The concept of "urban living" encompasses a number of interrelated dimensions, among which: population size and density; spatial, economic and social organisation; the variety of functions and institutional interactions; the social values of the population or degree of "civility" (often also referred to as "urbanism"), etc. In addition, the spread of inter-urban connectivity, that is to say, the growing conurbation effect[1] over the past few decades, has made it necessary to redefine the concept in order to emphasize interactions and functional relations instead of geo-morphological criteria. As reported by Hall (1969, pp. 408-435) and Hart (2003, pp. 102-123), much of the movement that a few decades ago was considered at the regional level is now viewed in terms of growth in urban agglomerations which, in some cases, can even cross national boundaries, as in the case of urban areas between Belgium and The Netherlands or between France, Germany and Switzerland.

Indeed, some authors have defined the city in terms of a functional community area, a self-contained labour and social market area characterised by high frequencies of interaction (Frey and Speare, 1995, pp. 139-190[2]; Hawley, 1971, pp. 149-150). The concept of interaction and interrelation is present in the definition of systems applied to many different sciences, ranging from biology to management science, but in the field of urbanism, and consequently urban mobility, these concepts assume an interdisciplinary nature.

We define the urban mobility system as an enabler of the urban system (Macário, 2005), that is to say, a sub-system possessing great autonomy in terms of organisation but also exhibiting close symbiotic relations with the other sub-systems of urban life (i.e. land-use, environment, telecommunications, security, education, etc.) as well as the main upper system. This leads to cause-effect relationships between their performances and, as a result, influences their evolutionary capacities. Urban Transit, the central subject of this paper, is a sub-system of the urban mobility system.

The aim of this paper is to present the complexity of urban transit systems that frame the action of regulatory and organisational bodies, while fulfilling the basic conditions that will foster the stable engagement of private entities in urban transit. The following sections present the disaggregated components of this complex system and highlight its interactions, in order to provide an insight into the areas where action should be directed with a view to a possible reform of urban transit systems.

2. POLICY AND MANAGEMENT PROBLEMS: HISTORICAL BACKGROUND

The evolution of society over the past few decades has brought about profound changes in urban living conditions, with rising residential dispersion, longer home-to-work distances and increasingly complex mobility patterns. In tandem with these changes, growth in private car ownership levels is a common trend almost everywhere, as a result of both a more diversified supply of vehicles and easier access to financing through mechanisms such as leasing contracts or other types of credit incentive.

Despite awareness of concerns over sustainability, the fact is that for most cities and countries sustainable mobility strategies remain fairly illusory. As urban space is a limited resource, the more private cars circulate inside the cities the lower the overall level of accessibility (measured in travel time) for all road users. Consequently, quality, in terms of the travel times and frequencies that inland public transport undertakings are able to offer, decreases in direct relation with the overall level of accessibility. This development has created three problems which are a major cause of concern for urban transport policy and which may be seen as the Achilles' heel of any Urban Mobility System (UMS)[3]:

- Major congestion problems in urban areas;
- The large amount of public money needed to operate urban transit systems;
- Urban transit companies are losing market share and accumulating deficits, often because they are providing a public service and are unable to release funds to re-invest in improvements to the service provided.

The combination of these factors has clearly helped change the urban transit environment. In the first instance, both the general public and politicians now have a different perception of the importance of urban mobility, which is now seen as one of the basic needs of citizens and therefore a political priority. On the other hand, there has been growing awareness over the years that one of the key factors in solving the above-mentioned problems is to shift a share of mobility from private car use to transit modes, thereby relieving congestion in cities while at the same time increasing revenues to transit modes and making them less dependent on subsidies. However, there is also growing evidence that this shift of market share can only be achieved by making public transport modes more attractive and responsive to citizens' needs, that is to say, more customer-orientated and better suited to their purpose.

Furthermore, it is worth pointing out that general access to information and higher levels of education have become increasingly widespread in society, transforming citizens into much more demanding clients. To cope with these changes, urban transit companies were forced to seek a solution to their problems in quality improvements, and significant investments have been made over the past few decades. However, none of these developments has solved the main problems faced by urban transit systems in recent years, namely:

- the downward trend in the market share of transit systems is not being reversed;
- congestion and financing problems are becoming increasingly acute;
- citizens' needs are not being adequately met by the current supply of UPT and private car use.

This lack of success called for an in-depth analysis of the reasons for which tools that had long proved their worth in other sectors were apparently doomed to failure with regard to all aspects of urban mobility supply (EC, 1998, pp. 18).

As cities grow and consumption demands become more complex, mobility becomes an essential factor in other economic and social activities and thereby impacts society as a whole, resulting in mobility being perceived as a public service. Traditionally, State interventions in the public transport sector have been partly justified on the grounds of fairness, i.e. in interventions aimed at ensuring that the transport network was available to all citizens and that no one was excluded because of price considerations. In Europe, this concept of public service, which is still valid today, has prompted the authorities to increase the financing of urban transport through the use of concessionary fares and subsidies to cover companies' shortfalls in revenue. The main factors leading to this essentially political approach were the desire to offset the shortfall in revenue caused by a loss of patronage in favour of increased private car use and a regulatory framework which prevented operators from charging competitive prices.

It is clear today that this practice was not an efficient way to intervene and allocate public funds once the point had been reached where all users in most locations were able to benefit from the same (subsidised) fares regardless of their income levels, with the exception of concessionary fares for elderly people, etc. Moreover, significant externalities were generated by X-inefficiency in the companies that benefited from this generous flow of subsidies. There is now growing awareness that to achieve a sustainable balance between private and public means of transport, pricing policies must be able to send the right signals to encourage users to change their behaviour, which in turn will provide the system with reliable feedback on the needs for further investment and expansion of transport facilities.

The outcome of this scenario is that the past decade saw many initiatives in these domains[4] with the following three main objectives: increase productive efficiency; reduce the gap between the price paid by users and the real costs of providing the service; reduce the needs for public expenditure in the sector by introducing new ways to involve private finance. Many pricing and financing schemes emerged throughout Europe during those years, although only some of them have successfully survived the implementation process. These implementation difficulties often arise from the difficulty of identifying winners and losers and consequently devising effective schemes and accompanying measures to transfer the gains of the former into compensation to the latter. Besides fairness within comparable groups, there is also the need to consider the longitudinal nature of equity, i.e. the ubiquitous aim of ensuring that there is no reduction in previously available benefits (entitlements), which is one of the major problems in modern societies[5].

The success of pricing and financing schemes in urban mobility systems is also highly dependent on the regulatory and organisational framework of the system and in its potential to co-ordinate between different policies that impact on mobility demand patterns (e.g. land use, environment, etc.), as well as between the push-and-pull measures developed by different agents of the system, i.e. authorities and transit operators. It is often overlooked that one of the less visible causes of the external costs generated by transport is the location of economic and social activities that create mobility needs. Furthermore, it is also the role of transport pricing policy to help control

these external costs, and this can only be achieved by the combined use of market-based incentives and control regulations. The former should persuade users to adapt their behaviour in accordance with policy aims, while the latter is mostly meant to curb practices that fuel growth in external costs.

Lastly, it is worth emphasizing at this stage that pricing and financing policies recommend the use of different mechanisms simultaneously, as demonstrated by Vieira (2005, pp. 116), i.e. single measures are seldom fully effective if applied in isolation. The risks involved in the implementation of each measure, the synergistic potential of measures, as well as the assurance that the different measures involved in one policy package do not produce contradictory effects, are important issues that have to be included in the concerns of decision-makers when choosing the most appropriate policies for their local policy envelope. Moreover, the degree to which decision-makers depend upon interactions with the envelope within which measures and instruments are implemented is so high that there have been several cases in recent years where policies have been unsuccessful as a result of failure to analyse the conditions under which measures could be transferred from one envelope to another[6].

3. THE COMPLEX STRUCTURE OF URBAN MOBILITY SYSTEMS

The complex institutional environment that shapes urban mobility systems can be disaggregated into three planning and control levels (EC, TIS *et al*., 1997, pp. 26), or decision-making levels, namely:

- The *strategic* level, where mobility policy objectives and means are defined in accordance with the needs of citizens. The corresponding decision process should be performed by political entities;

- The *tactical* level, where the mobility system is designed and the respective policies are formulated in a way that translates strategic goals into operational specifications which will ensure the effectiveness and coherence of the system. Depending on various parameters, the functions that this level entails can be performed by different public or private agents and contracts can also be allocated through competitive procedures;

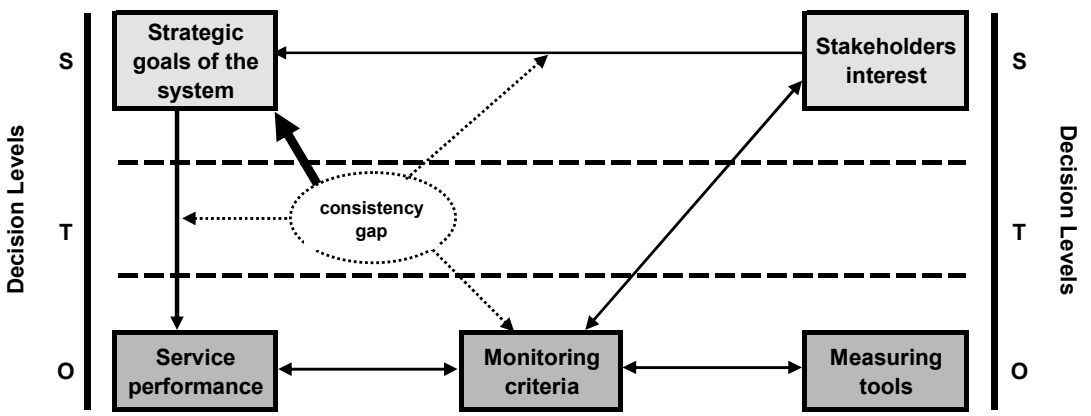
- The *operational* level, where transport services are produced and consumed. Depending on the regulatory option, public transport services can be performed directly by the transport authority, in which case it is also responsible for designing the system, or contracted out to an operator (private or public) by direct negotiation or through a tendering procedure. It should be noted that individual self-production modes and all infrastructure are also a component of the mobility system.

Nevertheless, in the real world the division into these three levels is not so clear-cut as described above. For most European cities (urban areas or conurbations served by the same transport system), the boundaries between these levels are very often blurred, overlaps between the strategic and tactical levels are common and the strategic options taken are opaque (or even non-existent). In fact, it may be observed that strategic planning is largely absent in urban mobility

systems. Consequently, a consistency gap is often found at the different interacting boundaries of sub-systems. As illustrated in Figure 1, this gap arises either between the definition of strategic options and the tactical planning to achieve those goals or between this set of strategic objectives and tactical formulations and the monitoring system of operations that should provide feedback for path adjustment, together with a proper understanding of stakeholders' needs. Bridging this gap means ensuring greater consistency between stakeholders' needs, the strategic objectives of the mobility system (defining what to achieve), tactical formulations (how to achieve it) and the monitoring processes and outcomes (how have we performed and what do we need to adjust?).

The lack of a clear and well-structured regulatory and organisational framework is a determining factor that may hinder the successful definition and implementation of a coherent mobility system, particularly if effective interaction between the different parts of the system is not properly ensured through a sound institutional configuration.

Figure 1. **Decision levels - conceptual diagram**



Source: Macário, 1998.

The definition of objectives, and guidelines to achieve them, is a function performed at the strategic level of the mobility system. A consensual strategic goal is to achieve a configuration for the mobility system capable of addressing concerns in the following domains, originally defined by (Ciuffini, 1965, pp. 73) and adapted below:

- Transport domain: an adequate balance should be struck between modes and means of transport so that all car-owners foregoing use of their cars have good-quality alternatives available, free of any sort of social, geographical or sectoral discrimination;

- Environmental domain: the configuration of the urban mobility system should result in a total sum of pollution below the endurance level;

- Economic domain: the system should offer good "value for money", induce an adaptive behaviour in users and be able to create new financial resources to support investment;

- Social domain: the system should ensure that citizens are provided with a transport system adequate to their needs and that no exclusion through price, or any other criteria, will be imposed on the basis of economic or financial goals.

Trade-offs between these four domains are governed by the socio-economic and cultural reality of each specific environment (urban area or envelope), and by the political options arising from the interaction between local, regional and national levels of intervention. It is therefore a function of the strategic level to ensure that the objectives it sets provide an adequate response to UMS stakeholders' requirements, given the existence of two categories of interests: those of individual stakeholders and those of society, which are usually best expressed in terms of public service and welfare, respectively.

European policies aimed at improving the efficiency and effectiveness of the transport system are driving an overhaul of the regulatory and organisational framework for this sector (revision of Regulation 1191/69, proposed in July 2000 and subsequently strongly influenced by the Altmark ruling in July 2003) by introducing a competitive tendering process and challenging long-established monopolies to reorganise themselves.

Alongside these developments, some of the main agents of these changes (authorities and operators) decided to start by focusing on the regulatory and organisational situation in their cities (EC, 2001, pp. 75), while others, following the general management trend, decided to adopt a global approach to take advantage of their broad experience and initiated operations in several cities in Europe and beyond. Despite this wave of entrepreneurship, the process of change is being hindered by the conflict of interests between the original statutory interests and missions of the institutions involved, which are challenged by the process of change, and the aims and ambitions of the individual decision-makers running those institutions.

In addition, the higher the number of levels of government and the wider the diversity of the agents involved, the greater the costs of co-ordination and the complexity of the task faced in ensuring consistency and coherence of action. Trade-offs will therefore have to be considered between the dimensions and diversities of the organisations involved in the system. These interactive mechanisms affect both organisations (or agents) and urban policies, and it is this dynamic that provides the flexibility the system needs to adapt to new demand patterns, the creativity needed to design new services in order to increase patronage, and lastly organisational change to adapt agents to the changing environment, while maintaining congruency and consistency in their working methods, processes and organisational models.

Moreover, irrespective of the regulatory and organisational regime, all urban mobility systems need to have their quality performance monitored. However, if the aim is to assess quality performance then we must be aware that in an UMS, as in any open system, the essential managerial characteristic lies in the interaction between its component parts. Consequently, it does not follow that improving the performance of individual components, while necessary and even positive, will necessarily improve overall performance. An essential factor for system performance is how well the different parts of the system fit together, which is directly related to the interaction between the main enablers and processes identified in the urban mobility system. This means that control through co-ordination[7] is required at all decision-making levels, based on existing interlinkages and their impact on the way trans-organisational processes (i.e. processes managed across different intervening organisations or agents) have to be managed, both in a steady-state regime and in a changing context.

In view of the systemic framework in which urban transit systems are developed, we can draw the conclusion that the success of a given urban transit system depends on how well it fits into the overall urban mobility system. In the case of urban transit systems, it is the regulatory and organisational framework that provides the legal and institutional background configurations in which markets develop, and market supervision goes beyond anti-trust measures since there are many rules imposed by authorities that limit the action of operating companies, such as those relating to network stability (even in the UK) and administrative price setting.

Over the past few decades, we have observed significant structural changes in the market for urban transit services, with a steady tendency to shift away from production based on public capital monopolies to a limited competition situation in which competitive pressure is ensured through contracts and other instruments. In most countries, the reform process transformed markets in which typically one local operator enjoyed a monopoly into a more competitive environment in which global companies were able either to operate directly (as in the UK) or to enter the market by acquiring stakes in local operators. These changes raise a number of questions, usually dealt with in papers on industrial organisation, which need to be addressed upstream of the decision regarding which regulatory regime should be selected for a given service in a given city, as they set the scene for what private players may consider to be a market worth taking a risk for:

- What is the optimal size of a market so that the network can be divided in a way that minimises costs?

- Does the market produce a socially optimal number of services adequate to consumer's preferences and diversity?

- Are companies dynamically efficient, that is to say, are they investing enough resources to develop new technologies for current and future generations?

4. UNDERSTANDING SYSTEMIC INTERACTIONS

4.1. Territorial definition of urban mobility systems

Nowadays, as urban areas grow in both size and shape and spread into peri-urban areas, forcing mobility network configurations to lose their original radial shape and extending city boundaries, the need to broaden the scope of intervention of the mobility authority to all communities with a direct stake in the mobility system is becoming increasingly obvious.

Although the rationale behind functional enlargement of the reach of urban mobility systems is readily comprehensible, defining the specific territorial limits, or the respective financial autonomies of the organising authorities, still remain difficult problems to solve, given the diversity of current legal, administrative and financial frameworks in Europe, and despite the conceptual harmonisation by Eurostat, which defined urban areas and central areas for statistical purposes but not in relation to mobility needs.

For many years, developed societies have chosen to organise the administration of these domains hierarchically from state level down to that of private ownership. The higher level only intervenes in the land-use and spatial domains of the lower level if there are property rights involved; otherwise, geographically defined boundaries match those of administrative jurisdictions.

As also mentioned by Hägerstrand and Clark (1998, pp. 23), the boundaries between all these domains were typically defined on the basis of social agreements and, by an almost implicit logic, higher-level institutions have integrative roles while those of lower-level institutions are sectoral. Despite the robustness of this logic, today this type of organisation must contend with a cross-cutting element, namely, urban mobility systems. In fact, such systems reflect citizens' needs and, as such, the logistical base which every society requires in order to function properly. However, the territorial integration of such systems often goes beyond the institutional limits defined by the traditional rationale of integrative versus sectoral roles, and there is no dedicated institution which can ensure a proper match between the functional and operational boundaries of systems and the corresponding legal and administrative jurisdictions within the urban governance structure.

As observed in our set of cities (Macário, 2005) and reported by several other research projects (*inter alia*, the SESAME research project and COST 332 research action – both promoted by the European Commission and covering EU countries – and the 2003 World Bank report), these boundaries are a major constraint in the formulation of pricing and financing policies for the mobility system as well as in the concentration of policies towards land use, the environment and fiscal incentives. The main reason for this constraint is the need to satisfy two levels of concertation: intergovernmental (i.e. between adjacent urban communities or between urban and suburban communities) and intra-governmental (i.e. between policy sectors such as land use, the environment, energy, employment, etc., usually under different institutional authorities). These shortcomings point to a general problem with the jurisdictional structure of governance institutions in regard to spatial-related policies, i.e. traditional administrative boundaries are now dysfunctional and are disrupting the continuity of the decision-making process.

Macário (2005) defined the boundary of a system as the limit to the area in which the decision-taking process within a system has the power to make things happen, which also involves choice of scope and aggregation levels. Although we consider this definition to be correct from the point of view of system dynamics, we admit that it is an abstract and subjective way to provide a structured territorial definition of the urban mobility system. The system boundary is indeed "fluid", given its dependence both on the observer's judgement of what constitutes the system and on two types of constraint in terms of legal and technological competencies, namely, the actors' territorial and spatial competencies, on the one hand, and their technical capabilities on the other. Besides, in reality what we have is two sets of decision-makers, one positioned on the supply side which, even within a good organisational framework, only rarely addresses the decision at system level, and the other on the demand side which is characterised by hundreds of disorganised decisions.

As recognised by Viegas (2002, pp. 1-2), the definition of the contemporary city is ambiguous and complex. It is ambiguous because it rests on the notion of "belonging" to a given territory, people or even institution. It is complex because the expansion of the city into peri-urban areas introduces variety into spatial relationships, with each citizen very often relating to two separate urban areas or having stronger links to other cities than the ones where he formally (i.e. administratively) resides. Nonetheless, the urban mobility system must be defined territorially in order to be able to circumscribe the boundaries within which the power of institutions in charge of its governance is defined. Three issues must be taken into account in order to obtain an efficient territorial definition: the systemic reality; the need to compare and transfer solutions; and the

financial manageability of the system. The concept of system in itself is required to ensure that the relevant analysis considers the observed reality as part of a set to which the whole must be referred.

As we stated at the beginning of this paper, urban mobility systems are organised within a higher system, namely the respective urban agglomeration, according to their land-use patterns and the respective jurisdictions of their political-administrative institutions. Since the size of an urban agglomeration is an outcome of its economic organisation and the opportunities for social relations, we may conclude that there is a relation between the size of an urban area and the factors influencing the need for mobility. Consequently, for mobility management purposes, the basic concept should be the urban region or basin served by the same mobility system. However, the administrative organisation of most countries takes no account of this concept, which precludes the effective management of any financial process due to the lack of institutions with a jurisdictional capacity adjusted to the territorial integration of mobility services in general, and urban transit in particular.

These arguments support the conclusion that the static concept of institutional territory is necessary but clearly insufficient to deal with the dynamics of modern societies. A relational territorial dimension is needed to deal with the network-like dynamics of urban communities. In short, the territorial definition of the urban mobility system requires the use of variable institutional geometry so that the interaction between land use and mobility can be effectively achieved. Institutional design should thus be guided by a network logic, providing service-related (and associated decision-making) continuity in the administrative and jurisdictional setting of the institution holding responsibility for the territorial management of urban mobility.

4.2. Collective interest

There has been much discussion about the different forms and degree of public intervention in the markets. Irrespective of the opinions expressed regarding direct state intervention in the provision of services or products, public policy is generally recognised as needed to guide, correct and influence market behaviours, primarily due to the following general market requisites:

- The claim that market mechanisms lead to efficient use of resources is based on the condition that competitive factors and product markets actually exist. This logic entails the implicit assumptions that market entry is easy and that both consumers and producers have full market knowledge. These conditions fall within the policy-business interaction area, but can only be secured by policy regulation;

- Similar assurance is required whenever decreasing cost patterns allow scope for inefficient competition;

- A regulatory and legal structure is needed to protect and enforce the contractual arrangements and exchanges required by market operations. This structure can only be secured by political institutions;

- Even if all the above conditions are met, there are still problems arising from “externalities” caused by the production and consumption of some goods and services, and requiring compensatory mechanisms that can only be activated through public sector action;

- In addition, there are other social and economic objectives, such as employment, rate of economic growth, etc., which cannot be ensured by market systems and, again, public policy is required to intervene in securing these objectives.

Four government branches could be designed to meet these needs, each consisting of various agencies, departments or activities (depending on the structure of the government), charged with maintaining certain social and economic conditions. These branches are to be understood as serving different functions, namely: allocation; distribution; stabilisation; and lastly, concertation, co-ordination and conflict management between the previous functions (Musgrave and Musgrave, 1984, pp. 3-18). Although these divisions do not match the current patterns of government organisation, it is desirable to take account of the thrust of these functions when configuring the policy institution network.

The allocation branch is responsible for ensuring that price mechanisms respect the principles of competition and for preventing excessive increases in market powers. This branch is therefore responsible for identifying and correcting efficiency deviations. The distribution branch is responsible for ensuring equitable distribution of market share through taxation, and often through adjustments in property rights. Within this stream of action, levies and regulations are applied with two objectives: the first is to correct the distribution of wealth by providing equal opportunities; and the second is to withhold revenues that will later be used as financing sources to secure provision of public goods and services. Taxation techniques offer a wide range of solutions with different effects but will not be discussed here as they relate more to policy analysis than to the subject of this paper.

The stabilisation branch is meant to solve some of the additional problems left from market mechanisms, such as balanced employment, steady growth rates, etc. It is worth noting that this branch acts always in synchronised partnership with all the others. In association with the allocation branch, it maintains the general efficiency of a market economy. In association with the distribution branch, a transfer function is developed where social needs are taken into account and priorities are assigned with respect to other competing claims. In this respect, attention must be paid not only to active claims from different sectors of economic and social activity but also to time-related effects of the policies implemented and, in particular, issues of intergenerational justice, which is a key concern of sustainability.

Lastly, it is through policy concertation and co-ordination actions planned by different economic sectors that priorities are defined and the concept of public service is made operational for different sectors. Despite the autonomy of these sectors, each country tends to adopt a common philosophical approach to the concept of public service which cuts across all economic sectors. In this respect, we can observe two main political approaches to the public service aspect of the transport sector (Hensher and Macário, 2002, pp. 351), namely, the so-called "Napoleonic Code" approach and the "Anglo-Saxon" approach.

Under the "Napoleonic Code" approach, best exemplified by France, the transport sector is seen as an input to a wider socio-economic and political framework, which therefore requires strong state intervention and thus the full application of the public service obligation, usually in the form of an obligation to operate, to carry passengers and goods, and to meet charging requirements.

In all countries observed where this approach is adopted (NEA *et al.*, 1998, pp. 97), it was possible to conclude in general terms that these obligations were taken to mean the obligation to provide a service expected to meet set standards in terms of continuity, regularity and capacity, the obligation to carry passengers and, in some cases, goods (e.g. transport to islands, as in the case of the Portuguese archipelagos of the Azores and Madeira, or the Spanish archipelago of the Canaries),

and the obligation to meet pre-defined limitations regarding fares, sometimes with price levels set by the Government. The basic rationale behind this approach is that public service obligations guarantee the satisfaction of the population's mobility needs that otherwise would not be properly met by the market.

The Anglo-Saxon approach, best represented by the UK, adopts an opposing stance, namely that transport is no different to any other sector in the economy and should therefore be provided as efficiently as possible. Consequently, private participation and commercial approaches are the dominant orientation and markets are considered to be a better way of obtaining an efficient transport system than government intervention. In practical terms, most countries use a mix of these two approaches, and there are several different ways in which the public service concept can be applied to the transport sector.

4.3. Symbiotic characteristics in agents' decision-making processes

As stated by North (1991, pp. 6), a *"major role of institutions in a society is to reduce uncertainty by establishing a stable (not necessarily efficient) structure to human interaction.*" However, this interaction structure also gives rise to constraints in the relations between actors, largely in the form of codes of conduct, norms for social and institutional behaviour and conventions.

Interaction and exchange between institutions are based on different sorts of social or economic agreements which provide the framework that enables organised (or pre-codified) and stable interaction, given the interests of the parties. The principal-agent theory lies at the core of the process to structure this interactive behaviour of agents, although it is worth discussing other complementary formulations. It is also known that collective wealth-maximising behaviour usually requires close co-operation between players in cases where they possess good levels of information about other players' past performances and the number of players is relatively small. Whenever rivalry between agents is absent, the more interaction exists between players the more prone they are to co-operative behaviour, as each player gains knowledge about the others through repeated interaction and player's perceptions of the uncertainty of the behaviour of others are reduced. If rivalry exists, then good levels of information are used to better understand the strategies pursued by the other so that predatory strategies can be more effective. Co-operation therefore seems to be a strategic game of knowledge since each individual is expected not only to know the preferences of others but also to be aware of how much the others know of his own preferences.

Institutions can thus be attracted to co-operation, either when a positive benefit will accrue for both parties or in one of two other ways – as explained by some authors who have explored the potential of principal-agent theory applied to punishment incentives (Milgrom, North and Weingast, 1990, pp. 23) – i.e. through a communication mechanism that enables a party to know when punishment is needed, and through the provision of incentives for individuals who can carry out punishment when called upon to do so. The critical question seems to be who should be in charge of this enforcement. North (1981, pp. 58), states that, while the transaction costs of voluntary agreements would be enormous, there are important economies of scale in policing and enforcing agreements by a *"polity that acts as a third party and uses coercion to enforce agreements*".

However, in a diversified context such as the one in which urban mobility systems find themselves, largely characterised by problems of organised complexity, it is not certain whether such an entity could be set up solely by third parties without any state involvement, or whether it should be set up by a public body at a level above that of the economic and social agents with a

direct stake in the mobility system, and so acting as a sort of buffer between the urban mobility system and the surrounding environment where mobility needs arise. As North also points out, uncertainty may also arise over the ability of state entities to act as impartial third parties and to ensure that players are all treated fairly. This is particularly relevant in the case of public services, since citizens, although highly sensitive to the stability and performance of such services, at the same time play a role as voters, i.e. that of the principal in the relationship with state institutions.

The existence of a system implies that agents are functionally related and so any change in an agent will affect all the other agents in the same network of interdependency to a significant extent, this being the symbiotic condition of the system. Concertation[8] means putting elements together in an appropriate manner, i.e. bringing together the parts of a whole in some kind of order that is not necessarily a hierarchical formal structure. Accordingly, we define concertation as a combination of a number of elements, actions and processes. According to the definition proposed by Simon (Simon, 1997, pp. 116-139)[9], three essential actions are needed to ensure a successful concertation process:

- Obtain information on goals and respective cause-effect relationships;
- Devise and communicate a plan of action for the parties, making the resulting effect clear to all;
- Ensure that the plan is accepted by the parties, which is only possible through a "community of purposes" or, as Barnard (1971, pp. 27) put it, a "community of interest".

4.4. Regulatory frameworks and market access regimes

Satisfying mobility needs in an urban area involves the provision of several different complementary services constituting a chain capable of ensuring the safe and fluid movement of citizens between several possible origins and destinations. This means that mobility represents the outcome of an interlinked effort encompassing pedestrian movements, private vehicle movements and transit and individual transport movements. That is to say, the supply side of the mobility system encompasses mobility services provided directly or indirectly by the State, by the market as well as those for own account, for all of which there is a need to ensure the adequate infrastructure. The balance between the utilisation (or consumption) of these different means of transport represents a key element in the sustainability of urban areas and of economic feasibility of transit systems, and as such must be subject to careful thought.

From the four networks that form the urban mobility system – walking, cycling, private motorised transport and urban transit, with associated infrastructure – the transit network is one of the components of the system where market-access regimes are an instrument providing linkage between agents as well as an area where regulatory issues gain prominence. Another area where market access issues may be raised is access to infrastructure (e.g. restrictions on the circulation of some vehicles on certain roads), although here the constraints on market access are not related to competition or market contestability.

Depending on the regulatory option, urban transit can be provided directly by the transport authority, contracted out to an operator (private or public) by direct negotiation or through a tendering procedure, or directly in the market by an operator in a deregulated regime. The system design (i.e. planning) is also a service in its own right and can be outsourced with or without tendering, although it is usually seen as a separate market from the provision of transport services.

In the ISOTOPE research project, a global classification of regulatory and organisational frameworks for public transport was consolidated and then further refined in the MARETOPE project. Figure 2 below is based on the findings and formulations of these research projects and illustrates the global classification of such regimes with regard to the supply of urban transit services. The main distinction is provided by the entrepreneurship variable, that is to say, the dichotomy between authority-initiated and market-initiated regimes. In the former, authorities have the exclusive right to initiate services and any direct attempt at market entry is deemed to be illegal according to the legal framework governing the way services are permitted to be provided. Consequently, all services on the supply side are the outcome of a planning initiative by the authorities, which is the current situation[10] with urban transit in France, Belgium and Portugal. In market-initiated regimes, the supply of services is based on the spontaneous market entry of operators, which is the outcome of a normal market process, subject to some regulatory evaluations at the moment of entry, such as the technical, legal and economic ability to perform the operation, based on legally pre-established principles and criteria. This is the current situation in the United Kingdom, Germany and The Netherlands, although each of these countries has opted for different categories and processes for verifying the professional and social capability of service provision. While the authorities are still entitled to develop planning functions in such cases, operators are legally allowed to enter the market with new services as long as the relevant criteria for acceptance (by the authority) are fulfilled.

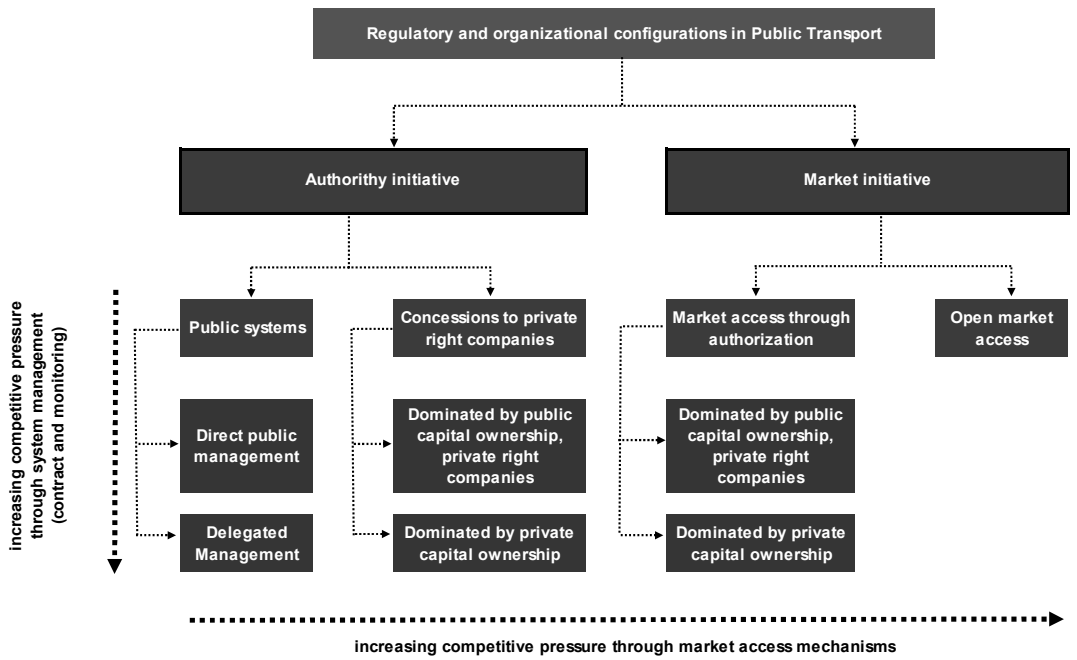
In both cases, with the exception of the pure open market regime, it is possible to maintain competitive tendering for some or all services, since, as Van de Velde (1999, pp. 150) stresses, competitive tendering is merely a selection mechanism in the context of outsourcing. Indeed, it is simply a method of production organisation available to any service supplier whatever the regulatory regime or organisational form used[11]. Therefore, the alternative regimes to consider are public production systems, limited access (also known as controlled competition) and open entry (subject only to demonstration of professional capability), as represented in Figure 2.

The sequence presented below also represents a spectrum of market openness, in which the competitive pressure to enter the market rises as we move from public control regimes to open entry ones. However, market access is not the only way of imposing competitive pressure, as this can also be achieved in all regimes through contracts and monitoring arrangements. In this respect, we also observe that, when moving from public to private ownership, the competitive pressure increases in response to these management tools.

Within authority-initiated regimes, a distinction can be drawn between two types of regime: publicly owned regimes and concessions to a private or public company. Publicly owned regimes can be further divided into two types: public management regimes where vehicles and other facilities are directly run by the public administration – commonly found in small cities such as Carcassone in France and Barreiro in Portugal – and delegated management regimes. In the latter case, the authority makes the assets available to a private operator company to whom management of the network is delegated through contractual arrangements. These can vary substantially according to the way in which commercial and operational risks are shared and to the degrees of freedom that can be accorded in service design. As we have observed in the ISOTOPE, QUATTRO

and MARETOPE research projects, France is the country where most of these types of contract have been identified.

Figure 2. **Regulatory and organisational configurations**



Source: Adapted from van de Velde, 1999, pp. 149.

The alternative category for authority-initiated systems is the concession. Here, the authority selects a private company to operate public transport services along a route, within an area or as part of a network and the concessionaire is normally responsible for the vehicles and facilities, either through direct ownership or through a leasing agreement. Depending on the legal framework in place, this company is selected directly (no longer allowed in the European Union, but practised elsewhere) through negotiations after a short listing procedure, or through competitive tendering.

Market-initiated regimes are largely divided into two categories: open-entry regimes in which so-called on-street competition exists, of which the best example is the urban transport in the United Kingdom outside London (very often incorrectly referred to as "deregulated regimes") and restricted authorisation regimes[12], in which licensed operators are given the right to apply for an authorisation to exploit a certain service with some degree of exclusivity. This can vary enormously from one country to the other, and even within the same country from one city to another or between services of different types, although in all of them the operator is, for the duration of the authorisation, at least partly protected from competition. One of the main drawbacks of this regime, which has been pointed out by some authors (e.g. Van de Velde, 1999, pp. 151), is the risk that this protection, if extensively applied, will eliminate market contestability and foster regulatory capture.

Open-entry regimes have, in turn, been associated with some degradation of service quality, despite their efficiency advantage (TIS, 1998, pp. 194). The need to address this problem was at the

root of the development of quality partnerships in the United Kingdom. Through these agreements, seen as "light touch regulation" (Carr, 1997, pp. 6), a number of rules committing both authorities and operators can be established, such as: provisions for service co-ordination, integrated ticketing, obligations to use vehicles accessible to the handicapped, bus priority lanes, etc. However, these agreements have also been condemned by the advocates of free competition, given their potential to raise barriers to new entrants whenever the quality partnership is restricted to existing operators. Indeed, there is a risk of collusion if the partnership is permitted to remain closed to new entrants.

The organisational forms and respective regulatory regimes described above represent the purely conceptual options currently available. In practical terms, what we find in the real world are mostly intermediate forms and a number of different co-existing regimes for the multiple services provided within an area or network. All regimes and forms present advantages and disadvantages and there is no universal "best solution". Market-initiated regimes allow the operator to play an active part in service design, providing a stimulus for improvement to the service and consequently a greater willingness to share the planning and revenue risks with the authorities. The revenue risks primarily concern patronage and fares, and the former is highly influenced by the quality and appropriateness of the service to customer needs, the reason why involving the operator in the design of services is so important.

Where the creation of the services is left to the authorities, i.e. authority-initiated systems, the compliance with requirements established in accordance with the strategic goals can be achieved more easily, at least in theory, and consequently the cost of enforcement should be lower than in other regimes. The main advantage to these regimes is that they give structural priority to integration and to the stability of supply, while seeking cost efficiency through other instruments.

A number of different solutions have been implemented across Europe and world-wide, and there is strong evidence that the trend has been to replicate the political-administrative division of countries (i.e. national, regional and local divisions) in the organisational framework of the transport system. One of the main reasons for this almost systematic mirroring is the need to match fiscal and financial autonomies with organisational responsibilities in order to facilitate the handling of the funding sources and mechanisms that support the management of the urban mobility system.

Additionally, the variety of organisational forms that can be identified is the result of crossing the functions to be performed at the different planning and decision levels with the regulatory regime. This allowed us to find the following organisational solutions in the surveys conducted for the ISOTOPE project and subsequently confirmed in MARETOPE[13]:

- Central planning and tendering of operations – the transport authority determines the policy goals that represent the planning framework for the planning department or agency which, in turn, is obliged to contract out some or all of the planned services to private operators under competitive tendering. This organisational option is known as the "Scandinavian model", found in Copenhagen among other places, in which several local governments co-operate to form a transport authority (the political body of HT) which, in turn, has a planning body (HT-Hovedstadsomradets Trafikselskab). An alternative to this is to have a management contract between the transport authority and the planning company that obliges the latter to outsource the provision of some or all of the planned services to a private company through tendering procedures. This organisational form was used in the Malmoe region[14], but has since been abandoned.

- Similar to the above, but allowing the operator to re-design services in their areas of operation as an incentive, although this freedom is limited in order to preserve system

integration. The planning company sets fares, bears the revenue risk and influences operators' choices by setting minimum standards and by paying a passenger-kilometre based fee, i.e. it shares the commercial risk with the operator. This organisational form is known as the "Adelaide model", based on the experience of Adelaide in South Australia (Radbone, 1997, pp. 1-18).

- Tendering of planning and operations – normally referred to as a concession – where the authority can also establish the minimum standards and impose public service obligations. It is worth noting that this is also the organisational form adopted by British Rail and, in our opinion, wrongly referred to as "franchising", since the objective is to give more freedom to the operator to specify and market services – which is precisely the opposite to what happens with commercial franchises in the retail sector (product specification is rigid and marketing is centralised by the franchising entity). Concessions are common in many European countries, e.g. Portugal and France. A derivative form consists in tendering the planning function through a different procedure to that used for operations. This option was recommended in the conclusions of the ISOTOPE report (TIS *et al*., 1997, pp. 83) and is currently fuelling an increasingly lively debate among practitioners, although no reports have as yet been received of it having been implemented in practice.

- Lastly, the free competition form, with or without light touch regulation, already explained above.

As mentioned earlier, competition is seen as an important but not the only mechanism for improving service performance and in particular efficiency, quality being imposed through regulation, and it should be made clear that outsourcing *is* simply *a "method of production available to any initiator of services"*, irrespective of organisational form or regulatory regime (van de Velde, 1999, pp. 150). As Beesley noted in the case of British Airways (Beesley, 1997, pp. 41), simply announcing an intention to privatise the company helped to increase efficiency, thus providing further evidence that the issue at stake is the ability to maintain competitive pressure on market agents, as we also concluded in the ISOTOPE project (TIS, 1997, pp. 83) with regard to urban public transport.

In fact, a number of studies have been dedicated to analysing the efficiency effects arising from the introduction of competition. In the ISOTOPE project, based on information obtained from 207 operators from 108 cities for the period 1993-96, we concluded that "*Deregulated markets have theoretical and empirical advantages in terms of efficiency of production. Regulated markets have theoretical and empirical advantages in terms of efficiency in consumption. Limited competition markets may have advantages of both.*" (TIS *et al*., 1997, pp. 104). A more recent study, commissioned by the European Commission from Colin Buchanan and Partners and entitled "Study on Good Practices in Contracts" (Buchanan *et al*., 2002, pp. 2-6), was based on data from a sample of 43 cities with a population of at least 500 000 inhabitants (29 with no competition, ten with controlled competition, and four with deregulated market access), all of which had at least six years of data available for a similar period, between 1991-96. The study found that:

- In cities with no competition there was a small average annual decrease in passenger numbers of 0.2%, for cities with limited competition there was an annual increase of 1.7%, and in the cities with free competition (so-called deregulation) a drop of 2.6% per year had been reported;

- The fare coverage ratio increased at a rate of 1.2% for cities with limited competition, while in those with no competition the rate was 0.5%. A small increase of 0.1% was found

for this ratio in cities where competition was free, but in such cases fares tended to cover most, if not all, operating costs since they were unregulated;

- The number of employees in public transport companies revealed an average annual decrease of 2.1% in cities with no competition and an increase of 1.2% in cities with limited competition. In cities with free competition, these data were not available for the period covered.

Despite the implications of the figures reported above, none of these studies was able to prove a causal relation between regulatory and contractual practices and the productive efficiency of the urban mobility system in general or the public transport operation in particular. Looking back at the last 15 years of studies on regulatory and organisational issues and contractual analysis[15], all the evidence only adds weight to the statement that, while competitive pressure helps to improve efficiency and other elements of performance, if a benevolent regulator is associated with a loosely worded performance contract then the operator is offered a clear incentive to under-invest.

4.5. Contractual relationships within the transit system

4.5.1 Selection of agents

The principles reflected in the studies presented in the previous sections of this paper have been transferred to the relationship between authorities and operators, through the use of competitive tendering for the selection of efficient operators and contractual formalisation. In Europe in July 2000, the European Commission introduced a proposal to regulate public service requirements in public transport (i.e. transit) systems which required public service contracts to be concluded by authorities whenever they wished to award an exclusive right and/or operating subsidy to an operator. The award of these contracts should follow the rules set out in the EU Directives (92/50/EEC, 93/36/EEC, 93/37/EEC, 93/38/EEC) relating to the co-ordination of procedures for the award of public service contracts.

As tender procedures are usually complex due to the number of criteria that need to be taken into account, trade-offs and the contracting periods involved, a pre-qualification procedure is advisable. Pre-qualification should be based entirely upon the potential of prospective bidders to perform the particular contract satisfactorily, taking into account aspects such as experience in providing public transport services, professional competence and financial capacity, as well as the minimum technical qualification needed to hold a technical licence to perform the job.

These pre-qualification criteria should, however, be applied carefully in order to avoid, on the one hand, closing the market to newcomers and, on the other hand, the risk of leaving the authorities without any leeway to cancel a contract whenever an operator fails to meet the terms of the contract. In addition, a balance must be struck to ensure that applicants who do not have the pre-defined expertise and experience are not systematically confronted with this barrier to new entrants into the sector. Legislation can overcome this problem by preventing the use of criteria that would introduce a bias against new entrants in favour of incumbents. In Germany, for example, previous experience is not permitted to be used as a selection criterion (NEA *et al*., 1998, pp. 67-80).

The selection of agents will always be the result of an assessment based on more than one criterion, even if no formal competitive tendering procedure is followed, in order to cover the different aspects of performance in terms of industrial and commercial performance. *Ex ante*

evaluation is required to assess the potential of the agent to achieve the desired performance, i.e. evaluation of the risk of contracting a specific agent before doing it?. *Ex post* evaluation is also required, but solely to provide feedback for the continuous learning process of the tendering authority and for future adjustments.

These two performance concepts differ in scope. Industrial performance is concerned with productive efficiency, i.e. the transformation of resources into services, while commercial performance is concerned with the transformation of results (service provision) into impacts. As Viegas (2001, pp. 11) recommends for the supply of public transport services, commercial performance should be analysed in terms of three levels of impact:

- First, the impact on citizens' use of public transport measured in passenger-kilometres;
- Second, the impact on traffic congestion, measured in terms of the market share of public transport;
- Third, the impact on the financial situation of operators and authorities (reduced subsidy requirement), measured in terms of revenue.

The selection of an operator should initiate a learning process for the evaluation method underpinning the selection procedures, so that accumulated information will improve the ability of the authority to better select the contractor, based on the statistical relations between characteristics of an operator and its ability to develop good performance levels in service provision. This knowledge will enable the authorities to fine-tune the criteria for evaluation of mobility providers by taking into account the constraints imposed by both internal changes (e.g. in the local regulatory framework) and external changes (e.g. in the case of Europe, revision of the Directive ruling the procedure for contract awards).

The evaluation of tenders can take several forms but, from observation of several tendering procedures (TIS *et al*., 1997; OGM *et al*., 1998; NEA *et al*., 1999; TIS.PT *et al*., 2003), there are a limited number of alternatives on which the bid should be based, namely:

- Price/minimum subsidy only – in which case full service specification is required;
- A combination of price/minimum subsidy and quality of service – in which case it is common to have a minimum service specification for the services that have to be offered under the contract that will be awarded, plus the possibility for the tenderer to offer higher levels or quality of service in addition to what is specified in the invitation to tender. In this alternative, it is indispensable that the tendering authority indicate in advance the score mark for these options;
- Service quality only – depending on the type of contract, a clear statement of receivable fees (for gross-cost contracts) and receivable subsidies (for net-cost contracts). In any case, tenderers must be informed of the scoring system that will be used to evaluate tenders.

In many cases, authorities ask bidders to present a combination of price/minimum subsidy and quality of service so that they can negotiate the best deal possible with the first-ranked candidate. If the outcome of this negotiation is unsuccessful, the authority still has the right to open negotiations with the second-ranked candidate, and so forth. In this iterative process, the number of possibilities for a best business deal is maximised without having to reissue the tender, and at a low marginal cost increase to the authority.

It is worth noting that the EU's public procurement directives only allow post-tender negotiations in certain limited circumstances. While ensuring that the conditions of competition are fair is an important principle in tendering procedures, this concept can be interpreted in several different ways. In general terms, fairness depends on consistency with past practices and rules to which people and organisations have become accustomed. However, two different interpretations can be found in the literature (Baumol, 1996) for this concept: the procedural notion of fairness, based on the equality of opportunities offered and the type of access provided to an economic process; and the end-state fairness, based on the assessment of the state in which individuals or institutions emerge from an economic process, that is to say, the impact of the economic process.

4.5.2 Contractual forms

Contracts should be designed in such a way that they effectively put pressure on service suppliers to achieve the required levels of quality, and should be the main instrument used to ensure the continuity and stability of services. At the same time, as noted by Viegas (2004, p. 10), public bodies must retain their ability to procure service provision effectively and efficiently. In this respect, contractual design is indeed a delicate and complex issue, with a number of difficulties arising from the following:

- Adjustment conflicts between contract duration and policy evolution during the lifetime of the contract;
- Information on the service being provided;
- Risk-sharing between the parties;
- Skills to manage and monitor the contract;
- Level of decoupling of service provision.

The study by Colin Buchanan and partners, based on an analysis of 49 contracts, not all of which related to urban mobility, reported three major risks (Buchanan *et al*., 2001, pp. 2-6):

- revenue risk, whenever demand is below expectation, service quality is poor, etc.;
- productive (or operating) risk, i.e. maintenance costs, fuel bills, etc.; and
- capital risk, relating to the purchase and replacement of assets.

Based on the structural attributes defined in contract theory, a wide variety of practical contracts for urban mobility systems exist, although they are all quite similar structurally; namely, a basic type of contract according to risk-sharing options, followed by a series of incentives. The basic types of contract we have found for urban transit systems are as follows: management contracts; gross-cost contracts; net-cost contracts.

In management contracts, the authority usually retains ownership and control over depots and rolling stocks, receives all revenues, and pays for all capital and current expenses. There are also cases where the authority chooses to be the employer of the staff providing the services. In fact, a management contract is a form of delegation of power from the authority to the operator, who is restricted to the professional management of operations on behalf of the authority. The degree of delegation and of involvement of the contracted manager in any risk-taking is decided on a case-by-case basis, but in all cases the contract is negotiated for a fixed period of time and an agreed price, usually entailing fairly stringent performance requirements. These contracts are also suitable for transitions from a non-competitive to a competitive environment, as they allow the incumbent operator to gradually adjust to the new context.

In gross-cost contracts, the authority relinquishes control over the productive system – vehicles/rolling stock, depots/other infrastructure, etc. – to the operator, often setting specific standards for quality of service, fleet requirements, etc., together with an agreed price for supplying the service. Under these contracts all fare revenues are transferred to the authority along with the respective commercial risks, leaving the risks to which the operator is exposed limited solely to the production side of the operation. In many cases the length of the contract has to be matched to the lifecycle of the material assets used for production, as is commonly the case with railway companies. However, some recent developments have seen the length of contracts become almost independent of the lifecycle of material assets through the use of operational leasing, with heavy maintenance performed by the suppliers of the assets, or subcontracted under their responsibility, together with disposal at the end of the contract.

In net-cost contracts, both the productive and commercial risks are born by the operator. As in the case of gross-cost contracts, the ownership of assets may be retained by authorities or transferred to a separate entity. The authority also specifies standards for quality of service, fleet requirements in terms of vehicles/rolling stock, etc., as well as an agreed subsidy, premium or compensation for fares that are charged below an economically viable level. In such contracts the operator is normally entitled to retain all fare revenue and bears all the risks (productive and commercial), which typically may include traffic disruptions, fluctuations in revenues for various reasons, or changes in regulatory regimes. Special risk-sharing arrangements may be negotiated in order to limit the operator's exposure to such risks. These contracts may also specify required investment in fixed or moveable assets, in which case they are referred to as net-cost contracts with investment. These contracts are usually fixed-term and are to be found in Europe (UK) as well as in South America (Santos and Aragão, 2001, p. 276) and Australia (Cox and Duthion, 2001, p. 25). In these contracts the operator provides, in addition to the public transport service, the required rolling stock (which is more common) and a fixed infrastructure facility (which is less common). For bus contracts, depots and bus stops are the usual assets to be included; for rail contracts, combinations of track, depots and/or station are the most common elements.

The number of operators in each market is not very high and this is giving authorities cause for concern, especially in the bus sector where there are a number of so-called global operators, because of the potential reduction in competitive pressure. In several cities, the authorities have taken a number of measures to encourage new entrants, namely:

- Shifting to gross-cost contracts, while developing performance-related incentives and penalties, in order to avoid a reduction in quality. The reasons which are usually given for choosing this type of contract are that they reduce tenderers' risks and costs, as well as the costs to the authorities, given the reduced need for customer surveys to allocate revenues among operators. In addition, since fares are set by the authorities, operators have very much reduced scope to increase patronage and revenue, even when incentives are included in the contract, so market concentration is more unlikely;

- Choosing route rather than area contracts in order to encourage smaller companies to tender;

- Requiring tenderers to subcontract a proportion of their services whenever there are risks of market concentration;

- Maintaining ownership of local depots and specialised equipment (e.g. ticketing), as already noted, since lack of access to these facilities is often a barrier to entry, particularly where quality partnerships exist between incumbents.

It is worth noting that these trends on the authority side have prompted a response from operators. For example, in Sweden, smaller operators have grouped themselves into co-operatives to enhance their capacity to bid for larger contracts. In practical terms, this means concentration of the market structure, and with it a significant reduction of market contestability.

Net-cost contracts could be thought to be the best answer from the authority's standpoint, since the operator bears all the risk and receives only a fixed subsidy. However, experience reveals that the opposite is true. For operators, this type of contract brings a number of additional costs and associated risks, such as:

- the cost of constantly driving the market;
- investments that have to be made to foster demand, with lead times that often extent beyond contractual agreements; and
- much higher costs of preparing tenders.

For authorities, there are some externalities in reducing market contestability as a consequence of the lower number of tenders. In addition, all changes in transport policy or traffic regulation may affect the commercial side of the mobility system and, consequently, offer scope to operators to claim new financial compensation.

However, net-cost contracts with investment can be the most appropriate solution for situations where there were no previous services and new infrastructure is required. This is often the case for light-rail systems. One example is the Croydon light railway, where the operating contract was for five years while the contract supporting construction was for 99 years (Buchanan *et al*., 2002, pp. 4-22), far longer than the more usual 15 to 30-year contracts. These contracts offer the benefit of securing the commitment of the operator during the construction stage, which in principle should ensure that the system can be operated efficiently. Buchanan (2002, pp. 4-22) gives a number of examples where the operator was unable to provide the level of service it desired due to cost-cutting measures during construction which, in the long term, result in reduced revenues and/or higher operating costs.

The choice of contract type is not a linear decision and depends on a number of factors which affect the level of risk and determine which entity is best placed to control those risks. Consequently, the solution adopted by one city cannot be directly transferred to another city without thorough consideration of the following factors: local policy; planning of services; level of fare integration; geographical area to be covered by the contract; quality of service issues; budgetary constraints; pricing; entities able to control and mitigate the risk; number of expected tenderers; external constraints, etc.

4.6. Conflicts and risks

As Schelling (1980, pp. 5) states, most conflict situations are essentially bargaining situations, i.e. where the ability of one participant to achieve his goals is dependent on the choices or decisions that the other participants will make. With urban mobility, conflicts can arise in several different areas. They may arise in the context of:

- industrial relations, i.e. between operators;
- contractual relations, i.e. between authorities and operators; or
- political relations, i.e. between authorities or between clients and the agents of the system.

In the ISOTOPE project (TIS, 1997, pp. 51), we identified six types of conflict: roles and responsibilities, definition of objectives, financing, fare policy and performance. In Table 1, we relate those types of conflict to the source framework, i.e. where they are more likely to occur. The result of this qualitative assessment reveals that the greatest potential for conflict lies within the contractual framework.

Contracts usually include provisions for conflict resolution, namely, conciliation or arbitration. In the former case, decisions are left to the contending parties while in the latter the decision is left to a third party. Possible conciliatory paths include: recourse to the contract and its interpretation; bilateral negotiation followed by agreement; recourse to another authority (at a higher hierarchical level); recourse to third parties. Contract design is also a learning process where experience in managing contracts provides extremely valuable feedback for the subsequent opportunity to redesign it, particularly in the case of conflicts where risk sharing is involved, as very often at the time of writing a contract, a large proportion of the potential risks are not even known. In fact, there are three different types of risk, according to their likelihood of occurrence, that can potentially degenerate into conflict situations, justifying different types of contractual provision (TIS, 1997, pp. 51):

- The relatively common risks, for which the contract should try to provide rules that are as clear as possible;
- Risks that can be identified but not the circumstances in which they might arise, in which case provision should be made for conciliation and possibly arbitration;
- Risks that cannot be identified at the outset, for which an incomplete contract would be adequate provision: this type of risk will be discussed in the next section.

Table 1. **Allocation of conflicts (Macário, 2005)**

Alocation of conflicts		Source framework			
		Political	Contractual	Industrial	Client
Conflict types	Roles and responsibilities	❍	❍	❍	
	Definition of objectives	❍	❍		❍
	Financial		❍	❍	
	Fare policy	❍	❍	❍	❍
	Performance		❍	❍	❍

As a general rule, risks should be allocated to the party best placed to avoid their occurrence or mitigate their consequences. This risk allocation should normally be reflected in the terms of the contract, although there is always some degree of unidentified risk that usually gives rise to some conflict when its consequences are allocated *ex post*. Despite this permanent element of uncertainty,

it is possible to identify the following risks in urban public transport systems (TIS, 1997, pp. 41-49): production risk; revenue risk; financial risk; planning risk; environmental risk.

The production risk is one that has been traditionally assigned to operators, since it is associated with the ability to carry out the activities that help transform productive inputs into vehicle-kilometres. This risk usually subdivides into two main categories: loss of service provision and cost overrun. In the latter case, cost overrun may be the outcome of action or failure to take action by the authority, in which case some form of compensation has to be considered in the contracts. Production risks can be still further sub-divided into the following categories:

- Infrastructure-related risks, entailing construction costs and delays, maintenance and upgrading costs; congestion and temporary loss of access;

- Rolling stock, technical plant and consumables related to the operation, entailing delivery times, maintenance direct costs and availability of plant, loss of operational capability, etc. Long-standing guarantees are usually sought by transport operators from their suppliers in order to transfer to them the penalty for any possible non-performance that might reflect on a loss of quality for the end-user;

- Labour-related risks (agreements and regulations), entailing wages and salaries, loss of net productivity and industrial disputes;

The revenue risk relates primarily to patronage and fares and in some cases there are other activities, such as advertising in vehicles or stations, which also contribute to revenues. A wide variety of factors can influence patronage, namely:

- Mobility patterns, which are influenced by life style, location of activities, citizens' purchasing power, demographics, schedule of economic and social activities, labour regulations, etc.;

- Market share, influenced by the perceived quality of urban public transport, level of private car ownership, measures to encourage a shift towards public transport;

- Fare structure and levels, entailing convenience of fare structure, tariff integration, concessionary fares, transaction costs (technology);

- Changes in urban mobility policy, whose effectiveness depends on the degree of integration of policies interacting with mobility, such as land-use, energy, the environment, tax and financing, etc.

Depending on the type of contract, revenue risks can be shifted either to the authorities or to operators. In the latter case, the contract gives the operator an incentive to improve services to customers. A key concern for the organising authorities in this option is to preserve their market knowledge and customer needs; otherwise capture by the operator may well occur within the space of merely a few years.

Financial risk is the risk attached to the cost of money availability and the associated opportunity costs and advantages of retaining revenues from operation. This type of risk arises whenever new systems are installed and the associated expenditure brings exposure to new financing schemes or fluctuations in currency exchange rates, or simply whenever companies finance their capital assets with instruments available in the financial market that carry their own

attendant risk. Financial risks can thus be divided into two sub-categories, the first usually applying to purchasers of capital assets and the second to operators whenever net-cost contracts are in place:

- Risks of financing costs on purchases, entailing interest rates and currency exchange rates;
- Risks relating to the remuneration of current short-term surpluses, entailing sales distributions across different types of ticket and the financial remuneration of short-term surpluses.

Planning risks result from the impacts on production, and revenue risks from changes in any demand generator, which usually occur with some time lag between the time of the change in planning and the resultant impact on demand. These risks arise from three different sources:

- Town planning, entailing offices/factories, homes, shops/leisure, UPT priorities, parking policy, etc.;
- Road planning, entailing ring roads and pedestrianisation;
- Public transport planning, entailing location of access points and routes;
- Interaction with regional, national and European links, to which urban areas are the nodal representation of these wider networks and largely the main generators of mobility needs.

Lastly, environmental risks, which in recent years have become an increasingly important issue for urban planners and urban transport operators, since the risk of having to pay penalties for environmentally unfriendly vehicles is increasing, resulting in faster technological transfer. This risk is very likely to occur in developing countries, where ageing vehicle fleets are more common, and depends very much on changes in public perceptions, and consequently public opinion. The more informed societies are, the higher is the priority given to these concerns on the political agenda. Environmental risks are usually reflected in the following elements, all of which impact on the production side of the mobility system: noise pollution, air pollution, visual intrusion and land use.

From the analysis of these five risk categories, we can easily understand that their incidence is always divided between the production and the consumption side of the mobility system. In fact, this is the understanding reflected in the contractual forms used between authorities and operators where, as we shall see later, risk-sharing is usually identified with only these two categories. However, in a significant number of European research projects (e.g. ISOTOPE, QUATTRO, LEDA, MARETOPE and METEOR, the accompanying measures of the CIVITAS programme), we have observed that, despite confirmation that all five categories of risk referred to above can be covered contractually according to their incidence, there is in fact an advantage in keeping risks decoupled, since the institutions capable of influencing the degree of risk do in fact differ and the need for institutional interaction is in itself a major risk factor.

4.7. Pricing and financing policies

In an urban mobility system, there are essentially two main areas of expenditure that require financing. These are the ongoing cost of operation of the mobility system and the specific investments in system construction, expansion or renewal. In spite of heavy reliance on public funding to cover operating costs in the 70s and 80s, more recently there has been increased pressure

to reduce use of this source of funding, as other sectors (health, education, housing, etc.) also require public support.

As we concluded in the research project (EC, TIS *et al*., FISCUS, 1999c, pp. 9), the inherent limits of collecting user contributions (payments from direct users according to usage, i.e. revenue from pricing), combined with the political limits of public expenditure from the general budget (or even earmarked budgets), reveal that further sources of financing are needed to maintain the urban mobility system at an acceptable level of quality. In addition, we must not forget that price (a major funding source) influences the perceived quality of services through the expectation effect, based on the connotation that high quality is generally associated with high prices (EC, OGM *et al*., 1998, pp. 139). This relation imposes the constraint that changes in prices should always be accompanied by changes in quality if consistency of signals is to be achieved. This is especially relevant for urban transit systems.

The main source of funding for the urban mobility system consists of revenues from various mobility activities, involving two different types of source which are treated very differently from a financial and fiscal standpoint. The first are operational revenues such as:

- urban transit fares;
- infrastructure charges;
- parking pricing;
- road pricing (e.g. cordon tolls, area licensing, distance-based schemes, time or congestion-based schemes),
- taxes related to the amount of use (e.g. kilometre tax, fuel taxes, fixed vehicle taxes, etc.) or levies (annual circulation tax).

In general, price differentiation (e.g. related to the level of congestion) is an effective tool with which to manage demand, due to its potential to encourage changes in behaviour.

The second type of revenue source is non-operational revenue in the form of an agent's internal cross-financing: for example: advertising, renting infrastructure space or the use of infrastructure for telecommunications, etc. The distinction between operational and non-operational revenues is extremely important for reasons of transparency and the correct assessment of efficiency, especially when subsidies for public service are also applied.

In urban mobility systems, contributions from public budgets are often provided for both operational and capital costs. For operating costs these are usually granted either as general subsidies, special subsidies for specific purposes (e.g. fleet renewal to allow use of less polluting fuels, concessionary fares for less affluent user groups), cross-subsidies from other public sectors (e.g. water, electricity, etc.) or as tax benefits. Many European countries use such cross-financing to pay for municipal transport systems. The European Union currently imposes a separation of activities to ensure transparency and better control over state support.

In capital costs, this type of financial assistance is usually provided through transfers of ownership of capital values and general subsidies. Subsidies can also be differentiated by other elements (EC, TIS *et al*., FISCUS, 1999c, pp. 18), in particular by the level of the responsible territorial authority, where we have subsidies from local authorities and transfers from other central or regional budgets (in federal countries, like Brazil, the distinction is between the Union, the State, the Metropolitan Region and the Municipality). The reference quantity is also another element of distinction. Quantity subsidies are paid for each unit of the good (or service) subsidised, value subsidies are price-related, and lump sum subsidies are a fixed amount granted to the receiver. The

type of subsidy influences market prices for goods and services and they can be granted directly or by way of a competitive process.

Another very convenient source of financing for urban transit systems takes the form of contributions from indirect beneficiaries or value capture, that is to say, taxes on the additional value created by mobility, which are usually generated by one of the following three opportunities, as concluded in EC, TIS *et al*., FISCUS, 1999c, pp. 27:

- *"forced concentration of people at certain places at predictable points of time due to operational necessities of transport (certain road sections, stations and their surroundings, interchanges, vehicles);*

- *increased opportunities for all human activities related to distance owing to the existence (not just usage) of transport infrastructure / services; and thus*

- *increased level of land values in the neighbourhood of transport facilities."*

Another example of a contribution from indirect beneficiaries is the French *"versement transport"*, applied to employers with more than nine employees, in cities with more than 20 000 inhabitants. In the Netherlands and in Italy, the authorities have the power to levy a special tax to cover infrastructure needs (EC, TIS *et al*., FISCUS, 1999c, pp. 33), and in Brazil similar provisions exist for added value taxes (Trajano and Silva, 2005, working document, pp. 1-27). Another example is the congestion charge in force in London and Stockholm: a charge for access to a limited area (although still a resource, i.e. urban space) within the urban mobility system, from which some of the revenue is used to finance public transport. This return of revenues to the transport system substantially improves the public acceptability of the overall package. We have also observed, and it is worth noting, that many of the problems associated with covering the cost of urban mobility result from the fact that the revenues from most of the taxes charged on individual motorised vehicles are paid into the central budget, and only a small portion is retained for local government. Consequently, local authorities are too dependent on parking revenues.

Lastly, private financing has emerged as a source of income as a result of growth in the use of urban mobility systems since the 70s. Several reasons have been put forward for this trend, the most common arguments being lower demands on the public purse, a larger source of available funds, speedier implementation of projects, a greater propensity to innovate, and increased value for money. One particularly popular type of private financing in recent years has been public-private partnerships. These partnerships are forcing the transport sector to improve the quality of its management, since private funding providers (contrary to public finding) demand a return on their investment commensurate with the level of risk, which is why capital costs are always higher for private funding than for public funding. As a result, the operating entity is forced either to release the cash flow generated by the activity (i.e. service operation or infrastructure development) once the operating costs have been covered, or to mobilise public funds to bridge the gap. Often these partnerships also involve international financing institutions which can provide grants (e.g. the World Bank) or loans (i.e. EIB, EBRD, etc.), a common situation in developing countries, given the fact that these institutions offer better conditions at lower rates and for longer terms than commercial investment banks.

Nonetheless, the use of private financing is not devoid of the risk of conflict with government. This is mainly due to the different stances of both parties towards incentives for particular projects. Three potential areas of conflict have been identified (EC, TIS *et al*., FISCUS, 1999c, pp. 21):

- projects with positive financial but negative social net present value;
- projects that meet private sector objectives but conflict with government policy objectives;
- projects involving imbalanced bidding consortia, e.g. a construction company that has the objective of maximising turnover and that is also a dominant member of a consortium would have an incentive to over-specify the project, which might be against the public interest, might lead to rigid contracts or simply might not represent best value for money.

If performances reach acceptable levels according to investors' criteria, and thus provide a good return on investment, it would seem possible to move on to a sponsorship type of relation with private financing, where a particular service or segment of linear infrastructure is covered by a sponsorship contract, reflecting the value of the benefit of having that particular service or infrastructure to improve accessibility and fluidity in a specific area.

An important interaction exists between all the financing mechanisms reported, and we have evidence from the empirical studies undertaken in the PATS research project (EC, TIS *et al*., PATS, D3, 2000, pp. 36) that people react with varying degrees of acceptability to each instrument. Consequently, the choice of financing mechanism, as well as its packaging into sets of consistent end-goal instruments, is in itself one of the most important management tools, since it is through the specific application of those instruments that the system management is able to influence the behaviour of both agents and final users. While monitoring the demonstrations of CIVITAS' cities (METEOR) and evaluating the potential for transferability of pricing measures, among others, we have also perceived that the packaging of measures was a condition influencing the satisfactory performance of any measure (Macário and Marques, 2004, pp. 45).

This interaction is recognised as worthwhile, and two examples of multi-source funding for mobility systems that are worth noting for their systemic character are the New Zealand Land Transport Funding (http://www.ltsa.govt.ns/funding/nltp/index.html, 01-07-2005) (Land Transport NS, former Transfund) and the Japanese model for the financing of railway networks (Killeen and Shoji, 1997, pp. 8-10).

The former provides financing for a wide range of activities, e.g. development of infrastructure and services, research into alternatives to road use, social services, etc. The entity managing the fund also manages the National Program for Land Transport. In the latter case, the railway operating companies evolved into multi-sectoral companies, thereby introducing internal cross-funding between the following four areas of activity: rail operation, transport (road, i.e. feeder services), real estate and other business. The weight of non-transport activities in the overall turnover of these companies varies widely, from 20% to 80% (Killeen and Shoji, 1997, pp. 15).

5. CONCLUSIONS

From the analysis in the preceding sections of this paper, we can conclude that for any city to ensure an attractive environment for the privatisation of urban transit it is of the utmost importance to ensure a sound organisation of its urban mobility system, the envelope in which urban transit develops.

The success of urban transit operations ultimately depends on the interaction with the other modes of mobility, which together represent the transport supply from which citizens and users can assemble their own mobility chains.

A number of conditions are required to encourage private agents to commit themselves to providing and planning in line with the objectives defined by the state and local governments, and to envisage some degree of transfer to private capital ownership of the services that are currently ensured either by public companies or by publicly-owned private companies. These are:

- A clear and stable organisational structure, with management and regulatory responsibilities allocated in such a way that assessment of the quality of decision-making is made possible;

- Information systems able to support the management of such complex systems and to ensure transparency to all stakeholders and rigorous evaluation by citizens;

- Sound contractual arrangements, with flexibility to adjust to the changing environment;

- The recognition of the existence of different customer segments of the urban mobility system was consolidated in the last decade. However, in the large majority of urban systems no action has yet been taken to create stable and lasting relations with those customers. Relational marketing has to be adopted by the planning agency in order to improve the specification and configuration of mobility systems, thereby providing greater insight into the characteristics of society and population as clients of the urban mobility systems.

- To support the steering, control and enforcement functions, policy instruments must be implemented within local organisational arrangements.

- Consistent policy-making, enabling the use of fiscal instruments and other pricing-related instruments in the inducement of citizens to use urban transit.

- Avoiding configurations based on regulatory dogma and support decisions.

Lastly, with regard to the use of private financing for mobility investments, two major issues require careful thought: identification of the risk, sizing and sharing; and the ability to prevent contractual rigidity, so that the relationship between the partners can be adjusted whenever the factors influencing the performance of the partnership change (i.e. avoid contractual completeness).

NOTES

1. Taken here to mean an aggregation or continuous network of urban communities, often using common supply services.

2. These authors only considered the labour market and failed to take account of the existence of a social market, where leisure activities occur, which is also fostering competition between cities and is a determinant factor of mobility needs.

3. In Europe. In other parts of the world, the conceptual basis for state intervention is not the same as that which exists in European countries (which have a long-standing tradition of public service) and may sometimes be enshrined in the constitution itself, as revealed by the survey conducted by the author as part of the study entitled: "Examination of Community law relating to the public service obligations and contracts in the field of inland passenger transport", EC-DGVII, 1997/1998.

4. Reported in detail in the following European Research Projects: PETS, OPTIMA, FATIMA, FISCUS, PATS, UNITE, developed under the 4th and 5th RTD Transport Programme.

5. Referred to as longitudinal equity in the PATS research project (EC, 2001, pp. 66).

6. This issue was the subject of in-depth analysis in the accompanying work of the CIVITAS I demonstration and research programme of the European Commission. For further information on transferability methods for policies and instruments of Urban Mobility, see R. Macário and C. Marques (2004).

7. In our definition, co-ordination should be understood as concerted decision-making, since no hierarchical dependencies exist between interacting organisations.

8. A number of authors (such as Simon, Chisholm, etc.) define this as co-ordination. However, we defined co-ordination as a steering process above action and processes. Therefore, the term concertation is used in this paper to express combined action and processes as defined in the main text.

9. Note that we disagree with Simon, who uses the concept of co-ordination instead of that of concertation in the sense in which it is understood in this paper.

10. End 2003.

11. There is even evidence of contracting out in freely competitive environments, as reported by Van de Velde (1999, pp. 150); one example being services in the general interest that are not offered by Southern Vectis (House of Commons, 1995, pp. 227).

12. It is worth noting that the terms "licence" and "authorisation" are often used to mean different things. In this paper we use "licence" to mean a professional qualification

(including creditworthiness and reliability) and "authorisation" to mean the right to the commercial exploitation of the service.

13. Also reported in Van de Velde (1997, pp. 154).

14. Reported in ISOTOPE research (TIS *et al*., 1996, D 153).

15. The main European studies in the domain of regulatory and organisational issues in urban mobility are: Tyson (1994); TIS *et al*. (ISOTOPE, 1995-97); OGM *et al*. (QUATTRO, 1997-98); NEA *et al.* (Public Service Obligations, 1998); Buchanan *et al*. (2001); NEA *et al*. (Integration, 2003); TIS.PT *et al.* (MARETOPE, 2002-2004).

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PRIVATISATION AND REGULATION OF URBAN TRANSIT SYSTEMS

Urban public transport services generally run at a large deficit. This has led public authorities to seek efficiencies, notably through private sector involvement. Private entry is complicated by the essential network characteristics of public transport, with parts of the network potentially profitable and others perennially unprofitable.

Support for the sector traditionally seeks to provide basic mobility services to all segments of society, including low-income users. Intervention is also required to manage the natural tendency towards concentration and market power in the provision of these transport services. Policy towards urban public transport is increasingly aimed at managing congestion on the roads and mitigating CO_2 emissions by substituting for travel by car. The sprawl of cities complicates the regulatory environment as responsibilities tend to be split among different institutional levels.

Achieving coherent transport networks that are efficient and financially sustainable is a challenge for any public authority. This Round Table examines experience in integrating private management and capital with public transport policy objectives in a number of developed economies. For network operators, the Round Table concludes that innovation is the key to surviving the rapidly changing policy and regulatory environment.

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