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**THE IMPACTS OF SUBSIDIES, REGULATION,
AND DIFFERENT FORMS OF OWNERSHIP ON
THE SERVICE QUALITY AND OPERATIONAL
EFFICIENCY OF URBAN BUS SYSTEMS
IN LATIN AMERICA**

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Source

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Explanatory notes

A point (.) is used as a decimal separator.

A dash (-) between years –as in 1985-1986– indicates that both are included in the period.

The word “tons” means metric tons, and the word “dollars” refers to United States dollars, unless otherwise indicated.

The following conventions are used in tables:

three dots (...) indicate that data are lacking or not separately reported;

a dash (-) indicates that the quantity is less than one half of the least significant digit in the respective column.

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PREFACE

The project on the impacts of subsidies and different forms of control and organization of urban bus systems in Latin America, whose main results are presented in this report, was carried out by the Transport and Communications Division of the United Nations Economic Commission for Latin America and the Caribbean (ECLAC) between November 1988 and December 1991. It took into account some previous work in the same area, particularly a 1988 questionnaire survey of public transport in Latin American and Caribbean cities.

A draft version of the report was distributed to the participants in a regional seminar on institutional aspects of bus transport in Latin American cities, which was held at ECLAC headquarters in Santiago, Chile, from 13 to 15 November 1991. As a result of observations made by these participants, certain modifications were introduced into this final version of the report. Some updating was done at the same time.

The project involved the preparation of case studies for ten cities: Bogota (principal consultant Jorge Acevedo), Brasilia (Willian Aquino), Buenos Aires (Olga Vicente and Patricia Brennan), Havana (Humberto Valdés), La Paz (Johnny Sanjinés), Lima (Augusto Dall'Orto), Mexico City (Víctor Islas), Quito (César Arias), Santiago (Oscar Figueroa), and São Paulo (José Generoso and João Correa). These reports, which are unedited and in Spanish or Portuguese only, are available on request from the Transport and Communications Division.

ECLAC gratefully acknowledges the financial support of the Government of Germany, without which it would have been impossible to carry out more than superficial research into the subject matter covered. The German Government has agreed to continue its support in 1992. This will permit additional seminars to be held in other cities of the region, thus giving wider dissemination to the results of the project, which will be especially relevant in countries where short-term urban transport policy is being developed. It will also permit further research into the best form of bus company organization and institutional environment under Latin American conditions.

Chapter I

MAIN RESULTS, CONCLUSIONS, AND RECOMMENDATIONS

A. REGULATION AND DEREGULATION

1. Some experiences to date

The kinds of regulations applied to urban bus services in Latin America can make them excessively rigid. The route structure frequently does not adapt itself quickly enough to the growth in the urban area and the development of new suburbs. In already developed areas, the combination of officially imposed regulation and the self-protective instincts of existing operators' trade associations often ensures that existing routes are insulated against competition, with consequent adverse effects on service quality.

Fares are controlled with the idea of protecting low-income travelers from being exploited by profit-hungry bus owners, but the policy often ends up by causing serious harm to the very people it is designed to protect, by discouraging investment in fleet expansion and renewal. Authorized bus operators have no incentive to invest, service quality deteriorates and a void is created in the market which comes to be filled by unauthorized operators, unless the regulatory body makes things even worse by trying to stop this from happening. The unauthorized operators charge low-income citizens high fares for travel that is usually unreliable, sometimes unsafe, and always uncomfortable.

In some cases, the government decides to fill part of the void by operating bus services directly, with sad and predictable results. These services are normally badly managed. Costs are excessive and not covered by fare revenues; more and more buses are laid up for repairs; trouble is encountered acquiring spare parts; excess staff is retained, and the ratio of staff to operating buses rises, sometimes to ridiculous levels; such buses as the company does succeed in getting onto the road are overloaded, which in turn increases the need for spare parts for seats, gearboxes, clutches, brakes, springs, shock absorbers, and so on, which the company has no money to buy; etc. Sooner or later, regardless of its political leanings, the government of the day begins to consider any available option to rid itself of the service by selling it or giving it away to the private sector or to some other arm of government.

Many of the ills of public transport in the cities of Latin America can be attributed to excessive or misguided regulation.

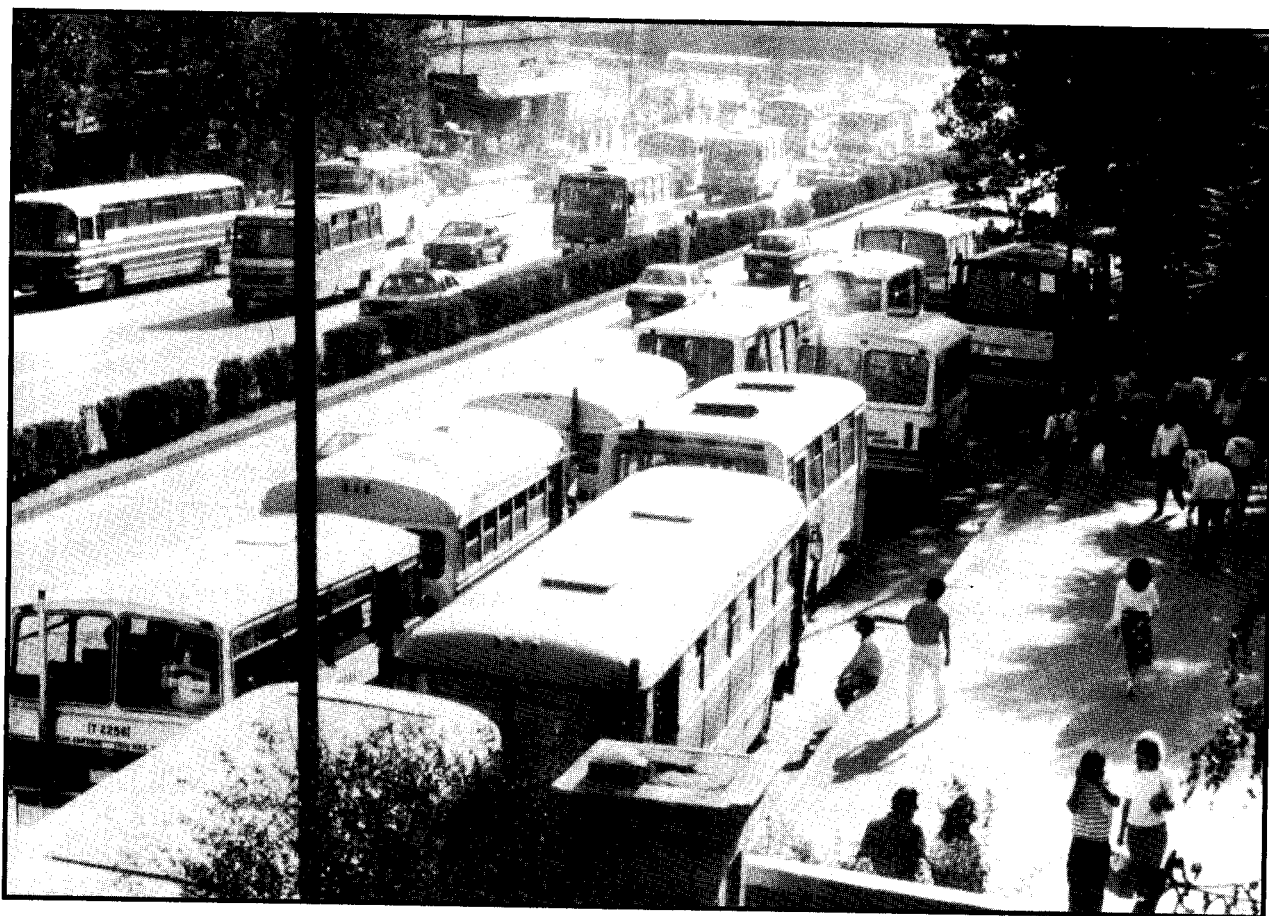
It is possible to claim as well that excessive or misguided deregulation does not make things much better, as explained in chapter VII. Badly-thought-through deregulation causes (i) high fares, (ii) excessive supply expansion, (iii) buses (and other public-transport vehicles) of undesirably small carrying capacity, (iv) bus-created congestion, and in the end, (v) a desperate attempt to get things back on an even keel that runs the risk of making conditions worse rather than better.

Clearly, both bad regulation and bad deregulation should be avoided.

2. A better way to regulate

In the past, urban bus regulation in Latin America has been plagued by a perceived need on the part of the authorities to, first, protect bus operators from "cut-throat" competition, and then, to protect passengers from the potential evil effects of self-interested bus owners who do not have to fear that mistreated travelers might switch to another operator's buses, which the government does not allow to exist.

Authorities should realize that competition is not bad. One way to do this, which maintains the basic ingredients of regulation, would be to put licenses to operate specific routes up for bid every few years. The required service quality (routes, frequencies, operating hours, size of buses, etc.) would be specified in the tender documents, and the operator offering to charge the lowest fares would be selected. Conventional wisdom suggests that services should be relet at the end of the economic life of the buses currently operating them, but this is not necessary in a large city with an active market in new and used buses.



As a result of deregulation policy, the bus fleet has expanded until it fills all available space in the twin bus lanes on Santiago's Bernardo O'Higgins Avenue.

Good regulation requires good inspectors, together with an adequate supply of them. There is little point in drawing up regulations if their enforcement cannot be guaranteed. Ways should be sought to include within the monitoring system consumers' groups, i.e., involving the very people that much of the regulation is designed to benefit.

Good regulation also requires good route-planning procedures. The development of comprehensive, mathematically based computerized simulation models of the urban bus market is really indispensable for this purpose. Only via such models can the route structure, frequencies, etc. be optimized and kept optimized. Cities evolve and need bus networks which evolve with them. If a consumers group or a bus company suggests the operation of a new route or a modification to an existing one, the authorities should be in a position to work out what effect the change would have on existing routes. If a concession is given to an operator to run a service from A to C through B, and then another route is proposed to link A and C through D, the former might have a just claim to compensation for any loss of net revenue.

Good regulation requires sensible fare setting as well. Authorities must recognize the basic truth that low fares breed low-quality services. Private-sector bus operators cannot subsist in the long term unless their gross revenue covers their long run costs. The authorities can choose among a spectrum of options varying from high fares, low occupancy factors, dense networks, and frequent services, to low fares and infrequent services provided by crowded buses operating on main streets.

3. A better way to deregulate

The urban bus market is different from most other markets, due mainly (i) to the difficulty consumers experience in obtaining adequate information about the alternatives available to them and (ii) to external effects, especially congestion and pollution. If an urban bus market is deregulated without recognizing this, mistakes are likely to be made. External costs can be internalized via pricing or other measures, but the information problem is more difficult to solve.

If the market is deregulated and different buses charge different fares, passengers waiting at a stop cannot make rational choices about what bus to board unless they know the fares, occupancy factors, and expected arrival times of congestion-affected buses on routes which pass close to their intended destinations. A comprehensive technical solution to this information problem has not yet been achieved and probably will not be in the immediate future, although a start has been made. The inadequate information possessed by travelers reinforces the tendency of deregulated urban bus markets to offer excessively frequent services at high cost to the user.

If the external effects of congestion and pollution are not charged to bus operators (who would pass them on to their customers), the tendency towards excess supply will be further reinforced. Services will be too frequent and buses will be too small. To counteract these tendencies, some form of urban road pricing should be introduced to require operators to pay for the congestion and pollution they cause. Since this would be inconceivable unless higher-income car users had to do the same, one concludes that deregulation should be accompanied by the generalized application of an urban road pricing scheme.

B. ORGANIZATIONAL STRUCTURES FOR PRIVATE-SECTOR BUS COMPANIES

1. The basic problem

Throughout Spanish-speaking Latin America, a large percentage of urban bus service is run by what are known as route associations, i.e., groups of individual bus owners who get together to operate one or more routes. Such associations are often only very loosely integrated. The individual owners retain a great deal of independence, and give correspondingly little control being to the association itself. This creates a series of difficulties, one of which is the negative effect on traffic safety caused by races between buses on the same route to be first to the next stop. Another is the uncoordinated individual purchasing of buses, which does not permit quantity discounts and results in a variety of shapes, sizes, and vintages of vehicles. Such associations do not exist in Brazil, although in mid-1991 the São Paulo municipal government was thinking about creating them.

2. The recommended solution

Route associations have quite a lot to commend them. For instance, they encourage small entrepreneurs, are dynamic, tend to ensure that bus services are supplied where a demand for them exists, and are efficient in terms of staff and bus-kilometers per bus. But, if loosely integrated, they leave too much power in the hands of individual owners. This results in (i) services being run, even when demand is low, as long as each owner thinks the fare revenue collected would exceed what he imagines his costs to be; (ii) higher-than-necessary investment costs per bus; (iii) higher-than-necessary maintenance costs per bus; (iv) difficulties in relations and negotiations with the regulatory authorities; etc.

In Buenos Aires, these problems have been effectively solved, in a manner that does not require the wholesale reorganization of the bus transport sector. Under this scheme, a bus is effectively treated as a share in a bus operating company (i.e., the association). The company manages the bus fleet on behalf of its members in a coordinated manner. In many cases, however, each individual owner closely monitors the way his particular bus is treated, ensuring –for instance– that it is given its fair share of peak-period frequencies, that it is not laid up for excessive periods for maintenance, and that scheduled intervals between his bus and the one in front are maintained.

No one solution to any urban transport problem should be transferred blindly from a city in one country to another city in another country. But if the Buenos Aires model should not be adopted, then it should at least be adapted for application in other Latin American cities.

C. TO SUBSIDIZE OR NOT TO SUBSIDIZE

1. The nature of the problem

Subsidizing urban bus operation has been proven to result in wastage of resources in the industrialized countries. The same cannot be proven in Latin America because the statistical base is not good enough to permit rigorous research into the matter. Nonetheless, it is probable that the same result applies here as well. However, subsidization is highly correlated with public ownership and, while the main cause of wasted resources may well be public ownership rather than subsidies *per se*, the latter probably contribute to the problem. Perhaps it would be fairer to say that subsidies of the particular kinds handed out in the past (and still handed out in Mexico, Quito, and elsewhere) are to blame.

On the other hand, subsidies of any kind, even relatively efficient ones, are expensive in opportunity-cost terms, since the demands made upon the resources available to Latin American governments are large compared with supply. In general, money saved on public transport subsidies can be usefully employed elsewhere.

2. The need to subsidize

The income distribution of Latin American citizens is skewed, and an important percentage of urban families cannot afford to pay normal commercial prices for the minimum amount of bus services they use. In many cities, basic home-work and home-school trips can consume 15% or more of the income of the least affluent families. Clearly, these are people who need to be helped. Otherwise, they will have only limited access to work and educational opportunities and, in the medium term, their plight will be made worse.

In Latin America as elsewhere, the traditional approach to the problem has been to grant blanket subsidies to publicly owned bus companies, which offer low-user-cost basic transportation. Although such companies have been shown to be inviable in Latin American conditions, the need to help remains. A better way to do it is required.

One of the problems of blanket subsidies is that they benefit everybody who gets on board, rather than just the people who need assistance. Hence they are intrinsically wasteful. A way around the problem has been applied in Colombia and Ecuador for many years, by requiring employers to give workers special allowances on top of their wages, meant to cover basic urban transportation needs. Such allowances are simple to administer but over time come to be considered an integral part of wages. Also, there is no guarantee that they are in fact spent as originally intended. They do not reach the unemployed, nor people engaged in the informal sector. Even so, they may constitute the most effective solution to the problem.

In Brazil, a more sophisticated variety of the same measure is used. The scheme involves the distribution of transport vouchers (*vales transportes*) by employers to low-income workers. It is partially financed by the employers themselves, and partially by the government (through tax rebates). It is complicated to administer, and does not benefit workers in the informal sector, but has come to be widely used in Brazilian cities. A detailed evaluation of the scheme is required before reaching a conclusion regarding whether it is suitable for use in other countries.

In the United Kingdom, socially desirable but commercially nonviable bus services are put out to tender by local authorities, who are obliged to accept the lowest bid to run the particular quality of service specified in the tender documents. The British system results in a subsidized network superimposed on a commercial one. It guarantees that the services required are offered, that operators compete among themselves to provide those services, and that the total amount of subsidy is minimized. But it too is complicated to administer, and needs to be studied in depth before being recommended for application in Latin America.

3. Concessionary fares

In Latin America, both public and private bus companies are usually required to carry schoolchildren and occasionally retired people at lower-than-standard fares. Sometimes they are obliged to carry such people free. In some countries, policemen, military personnel, postmen, and others have similar entitlements. However, the government body which orders concessionary fares rarely compensates the bus company for the losses it thereby directly incurs. Indirectly, other passengers pay the costs, either through higher fares or lower-quality services. There may be good justification for the granting of concessionary fares, but there is no reason to ask the other passengers to pay the bill.

Correct compensation requires taking into account the demand elasticity for travel, i.e., recognizing that lower fares attract more passengers. This is actually done in the United Kingdom, but it is probably a second-order sophistication that can often be ignored. Correct compensation for generalized concessionary fare schemes also requires that surveys be carried out to estimate the number of passengers who travel at reduced fares on each route, which is a complication to be avoided if at all possible.

The idea behind allowing school children to travel at reduced fares is to enable them to get to and from school without straining family budgets. Thus, it should be possible to grant each child a pass to travel on a specific bus line, the cost to which can be reimbursed without any complicated calculations or administrative procedures. The distribution of school children per route is much more varied than that for retired people or most other special categories. These others can be given all-line passes, with compensation being granted to all bus companies at the same rate per seat-km offered. If the government wants them to travel free, the rate will be equal to the product of each company's fare revenue times the ratio of the sum of the estimated number of trips they make on all routes, to the number made by regular fare-paying passengers.

D. FARE CONTROL

1. The need to control fares

If any market (be it for urban bus transportation, telephone services, water supply, or whatever) is controlled by regulations which confer semimonopolistic privileges upon operators, it is virtually obligatory to control the prices they charge so that they cannot exploit such situations for their own benefit. In the particular case of the market for urban bus transportation, even if supply is not controlled, there are arguments in favor of controlling fares. This ensures that the market does not tend towards a condition in which fares are abnormally high, the bus fleet unusually large, and bus occupancy correspondingly low (as can occur under complete deregulation). In short, fare control is necessary under regulation and might be desirable even if supply is deregulated. In either case, the justification for fare control would be to make sure that the market produces that combination of service quality and user cost that the authorities prefer.

2. Fare control to serve political ends

Latin American urban transport history abounds with cases in which fares have been fixed, not using technical or economic criteria but rather for political convenience. Often, to gain votes, fares are fixed at low levels which makes it impossible for operators to cover long-run costs at reasonable occupancy factors. Fare increases are rarely granted just before elections, which means that they are reduced in real terms given normal Latin American inflation rates. If compensating increases are allowed after elections, little permanent harm might be done, but politicians are not always prepared to do this. In some Latin American countries, fares have been held at levels lower than long-run costs for a period of several years, which results in the kind of disinvestment mentioned at the beginning of this chapter.

Bus operators have come to distrust fare-setting institutions and react by giving them false information, overestimating costs and underestimating ridership. In turn, this gives such bodies reasons not to grant the increases requested. Among the results of this mutual distrust, in the Latin American environment with high inflation levels, are lock-outs by operators and the destruction of buses by irate bus users on the rampage.

Fare setting must be taken out of the political arena. Technical formulas should be devised and applied by non-political bodies. This is easy to say but difficult (although not impossible) to do. It requires the establishment by law of independent tribunals, well-defined cost estimation formulas, and periodic surveys to count the number of passengers each bus carries.

3. Fixing service quality via fixing fares

If fares fall (rise) relative to bus operating costs, service quality will fall (improve) as well, unless operators' revenues are increased (reduced) by compensatory subsidies (taxes). If fares are low, operators can only cover costs by carrying a large number of passengers per bus, which implies overcrowded conditions and infrequent service. If they are high, and entry is not blocked by excessive regulation, occupancy factors will tend to fall until each bus owner earns just normal profits. In Santiago, increasing real fares resulting from the deregulation policy went hand in hand with the decline in mean bus ridership over the 1977 to 1988 period (see figure 1). The inverse correlation coefficient between the annual values of real fares and ridership over the 1977 to 1988 period is 0.97. In cities where fares are fixed, the respective authorities should be made fully aware that fares and service quality are directly related. They can choose between a continuum of different fare and quality standards. Where personal income levels are low and there are insufficient public funds to finance subsidies, low fares and low service levels may be the politically preferred option. In high-class suburbs, people may prefer to pay high fares for premium service.

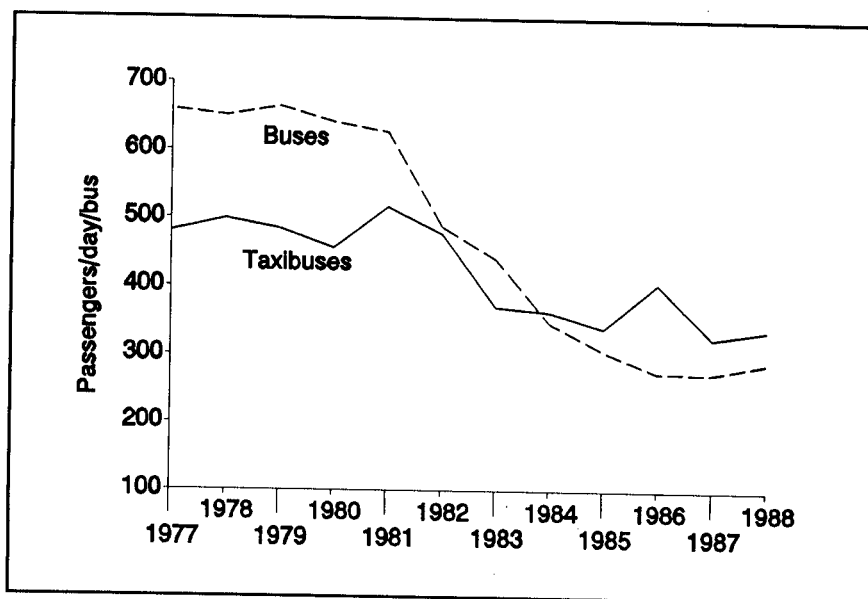
4. Fare structures and collection mechanisms

In most Latin American cities, the norm is that a flat bus fare is charged on all routes throughout the city, and usually at all times of the day. Sometimes surcharges are allowed in the evening, on Sundays or on public holidays. Sometimes too, premium services are allowed to charged higher fares (see below). But fare structures which relate the amount paid to the distance traveled are rare. Equally rare are structures which allow a change of bus without payment of another fare.

Flat fares have a number of disadvantages. They inevitably imply cross subsidization; they discourage operators from servicing long routes or ones with low passenger turnover; they become increasingly inefficient as cities grow; they complicate integration with rail modes, etc. But with one-man operation of buses and difficulties of inspection, they have come to be accepted.

However, interest has recently been expressed in technologically advanced ticketing systems involving electronic cards. A system of this nature is being installed in Cordoba, Argentina, being evaluated for Buenos Aires, and being thought about in Santiago, Chile. It is not costly in relation to its benefits, which include: minimization of cross subsidy, facilitation of fare integration in multioperator environments; elimination or severe reductions in nonpaying passengers, and others. The Cordoba experiment should be watched by public transport authorities and operators' associations from other cities.

Figure 1

BUS UTILIZATION IN SANTIAGO, CHILE**E. WHAT TO DO ABOUT PUBLICLY OWNED BUS ENTERPRISES****1. The relative efficiency of publicly owned bus companies**

As previously mentioned, the Latin American experience with publicly owned bus companies has been unfavorable (see chapter VI). Publicly owned companies are inefficient whether they are administered at the national or local level, although it would appear logical to expect that locally managed companies can respond better to the city's needs and avoid unnecessary layers of management. It is difficult, however, to escape the conclusion that public provision of urban bus services should cease. Similar conclusions have been reached by national and local governments of different political inclinations in various Latin American countries. The arguments in favor of terminating public ownership have nothing to do with politics but everything to do with the efficient allocation of resources.

2. Terminating publicly owned companies

There are several ways to terminate a publicly owned bus company. One of the more interesting, which was successfully applied in Buenos Aires at the beginning of the 1960s, is to transfer the buses to workers in place of severance payments. This transforms employees into small-scale entrepreneurs and, at the same time, transforms inefficient publicly owned companies into embryonic Buenos Aires-style route associations, which have become a model of efficiency.

F. ILLEGAL OPERATORS AND FREEDOM OF ENTRY INTO THE SECTOR

1. The role of illegal operators in the transport system

As already mentioned, illegal operators exist, basically because –for one reason or another– authorized operators do not supply the full array of public transport services that the city needs. In outlying suburbs of some cities and in the whole area of a few, they have come to be almost essential. Without them, people would experience many problems in getting from one place to another.



The poor mechanical condition of some illegally operated vehicles is illustrated by this pickup in Bogota, which has a problem with the rear suspension that its owner/driver is trying to fix between trips.

2. The problems of illegal operators

Illegal operators often provide authorized ones with unfair competition. By having no legal existence, they pay no taxes, their drivers do not comply with any labor or social-welfare legislation, and their vehicles are usually not in good enough condition to be licensed to carry passengers. Thus, illegal services can generally be operated at lower costs than formal ones. Their fares may be excessively high, due sometimes to the intrinsic nature of the routes operated (e.g., over steeply graded unpaved tracks in outlying suburbs), and sometimes to collusion between operators. Having no legal right to operate, they have little incentive to invest to improve the quality of the services they offer.

3. What to do about them

Illegal operators usually fulfill a need. If they did not, they would probably not exist. The fact that they do is a strong argument for continuing to tolerate their existence. Most of the problems associated with them could be solved simply by legalizing them, and then requiring them to comply with the same laws and regulations applied to other authorized operators. By so doing, (i) public safety would be ensured, (ii) there would be no unfair competition with previously authorized operators, and (iii) they would be brought within the scope of fare-setting procedures.

Legalizing hitherto illegal operators can usually be done at zero political cost. It makes users happy, since the continued existence of the services on which they depend is ensured. The illegal operators are pleased for the same reasons. Previously authorized operators suffer no increase in the physical volume of the competition they face, and stand to gain by the fact that this competition no longer has any unfair cost advantage.

4. The basic problem of access to the business

If there were to be no restrictions on access to participation in the public transport sector, there would be no illegal operators. However, it is relevant to ask whether there should be any other restrictions placed on would-be operators. The conclusion is that only the following restrictions should be placed on entry:

- (i) all operators should comply with legislation regarding drivers' working hours, vehicle safety and technical standards, taxation, and rules concerning traffic discipline;
- (ii) external costs of congestion and different forms of pollution should be borne by all road users in an equitable manner.

Bus operators have managed to convince governments for too long that their business is different from other retail services such as selling shoes, socks, or sausages, and thus they –but not others– should be protected from the threat of competition. Governments have done nothing to reason with them, probably because cities can continue to function for a few days even though citizens cannot buy new shoes, socks or sausages. A lock-out by bus operators, however, has a much higher economic and social cost. Nonetheless, the net present value of supporting increased costs for a limited period of time, and then reaping the benefits for a long time afterwards, can be considerably greater than that of forever tolerating unnecessarily expensive urban transportation systems.

G. AN ARRAY OF BUS SERVICES TO REFLECT CONSUMER DEMAND

1. The demand for bus services in Latin American cities

Generally speaking, income distribution in Latin American cities is highly skewed. This is clearly the case of people who use bus services, especially when compared with their counterparts in Europe or North America. The need thus exists for a greater array of public transport services in this region than in cities of the industrialized world.

The demand for bus services of different standards is related as well to the need to do all that is economically feasible to reduce car usage in congested and polluted areas, and to transfer people to modes which generate lower external costs per traveler. The ability of buses to attract the car commuter has sometimes been overestimated, but there have been some successful cases in Latin America.



This executive-style bus operates in Brasília. Similar services can be found in other Brazilian cities.

2. Approaches to the problem

In Bogota, an attempt to match quality and cost with demand for bus transportation has produced 11 different service categories, all with different fares. This is done not only to provide services for all tastes and budgets, but also to provide financial incentives for bus owners to replace old vehicles, for which fares are set at lower rates than for newer ones. (Of course, such diversity may also create some confusion.)

The basic need is to provide a superior-quality service for higher-income travelers, some of whom would otherwise use their cars. The service should be available on many routes, especially those going to higher-income suburbs. It should not be significantly more profitable than regular service, to avoid giving operators an incentive to abandon the latter. In Buenos Aires, luxury-bus licenses are only granted if the applicant already runs regular services on the same route. Superior services should probably be provided by comparatively small vehicles able to operate frequently and move quickly through congested traffic.

However, it is not necessary to specify the type of vehicle. In principle, allowing superior-quality services to charge more is incentive enough to bring them into existence. Fares can either be set at a high level to reflect greater costs per passenger, or they can be left up to the operator. If such services succeed in reducing the number of car commuters, they will tend to lower congestion and pollution costs, whereas if they attract users from regular bus services they will do the opposite. The external effects of superior-quality services should be monitored to determine if additional incentives or disincentives need to be applied.

Chapter II

OBJECTIVES OF THE PROJECT

A. BASIC CONCERNS

The project which forms the subject of this report derives from certain fundamental concerns of the Economic Commission for Latin America and the Caribbean (ECLAC) about urban bus transport policy in the region. While the underlying problems were often the same from one country to the next, there seemed to be little consistency in the ways chosen to solve them. There was sometimes even considerable inconsistency between two cities in the same country, if the commonality of the problems they shared was outweighed by differences in the political inclinations of their respective local governments.

It might be worth citing some examples. For instance, while Colombia and –in particular– Bogota were concerned over the cost of subsidies for urban bus operation, Mexico and especially Mexico City were freely distributing subsidies in an attempt to provide affordable mobility to the bulk of the urban population. In Mexico City, all private bus companies were eliminated by decree and their operations and equipment transferred to a single publicly owned company, at virtually the same time as publicly owned enterprises were themselves being terminated in Santiago (Chile) and Caracas. While government controls were being tightened on bus transport in Curitiba (Brazil), they were being loosened in La Paz (Bolivia), and so on.

To a large extent, divergent urban public transport policies reflect the different political orientations of the governments applying them. For instance, Bolivia's National Road Transport Company (ENTA) was formed in 1983 under an interventionist government which believed in the State participating as an operator of transport services. The succeeding government, of neoliberal orientation, believed in a decentralized economy and promptly handed ENTA's buses (and trucks) over to the authorities of the various cities where they were based.

But the general political thinking of the government certainly does not explain all the divergences in urban transport policies. In the early 1980s, bus transport in Mexico City was passed to State ownership, while several years later a government of the same party was thinking about some mechanism to return it to the private sector. It was under a left-of-center government in Bolivia that entry restrictions to the urban bus transport sector were lifted. Under the socialist government in Cuba, a special category of minibuses charging premium fares was authorized, while such services were never licensed by conservative governments in Paraguay. Under a free-market-orientated government in Ecuador, the fleet of municipally owned buses in Quito was expanded by 400%. In São Paulo, a left-wing municipal government that in mid-1990 had announced zero fares on municipal buses, by mid-1991 had changed its mind and was even thinking of transferring its bus company to the private sector due the difficulty it was having in funding the company's deficit.

One of the fundamental reasons for urban bus transport policy divergences was a virtual complete lack of fundamental and practically orientated research into the effects of different policy options in Latin American conditions. Such research was in its infancy even in the developed countries in the 1970s. Researchers concentrated their energies on the easily modeled physical aspects of transport and traffic planning, and placed little emphasis on institutional matters. Nobody really understood, for instance, the broad effects likely to result from subsidizing urban bus operation, and subsidization normally happened

as a consequence of pressure from operators or users, or as a result of general inertia. The deregulation which took place in Chile from the end of the 1970s was not based on any fundamental analysis of the likely effects. Neither was the Mexican Government's decision to take over all private buses in Mexico City in 1982. The Chilean measures were adopted to be consistent with overall economic policy, while in the Mexican case, the takeover was precipitated by the failure of an agreement between the bus operators and the authorities on fare levels and service quality improvements.

Beginning in certain developed countries in about 1980, some quite rigorous research, both statistical and of other types, began to be carried out on institutional aspects of urban bus transport. One of the most interesting studies was conducted by the Transport and Road Research Laboratory (TRRL) of the United Kingdom, using data from a number of countries. It concluded that subsidies to urban bus transport do restrain fares and lead to better service, but they also result in what might be termed "leakage," i.e., the subsidized operators become less efficient and their costs rise [Bly, Webster, and Pounds, 1980]. In effect, part of the subsidy goes to bus-company staff rather than to the traveling public. These findings were later confirmed by another TRRL study using multinational data, and by research carried out in the United States on national data [Pucher, Markstedt, and Hirschman, 1983].

It might have been supposed that the general conclusions of these studies were equally valid in Latin America, but no investigation was undertaken to prove it. The present study at one time had hopes of doing this, but the quality of available data made it impossible to use methods anywhere near as rigorous as those used by the TRRL and in the United States.

In certain developed countries, concern about the costs and effectiveness of subsidies encouraged thinking about what could be done to reduce them. This was especially true in the United Kingdom during the period of the Thatcher governments, where interurban bus transport was deregulated at the beginning of the 1980s. Deregulation of local services, which were mainly but not entirely rural in nature, was tried out in three areas during the first years of that decade. The results were not conclusive, but deregulation was at least shown not to be harmful. Later, bus deregulation was extended nationwide to all rural bus services and to all urban services outside London. At the beginning of the following decade, the government announced its intention to deregulate bus transport in London as well.

In Latin America, urban bus deregulation was applied in Chile, as from the end of the 1970s, with mixed results (see chapter VII). In other countries, considerable interest has been shown in the British and Chilean experiences, but there has been no great rush to emulate them. Peru, however, deregulated in 1991.

Along with the interest in deregulation, the possibility of privatizing urban bus services has also commanded much attention from policy makers. In both the United Kingdom and Chile, privatization effectively formed part of the deregulation package, and the same is planned in Peru. Nonetheless, it is possible to privatize without deregulating, as was done in Buenos Aires in the early 1960s. In some sectors of the economy such as airports or telecommunications, the strengthening of regulations is normally thought to be necessary if publicly owned companies are privatized, in order to control the resulting profit-motivated monopoly. Deregulation itself tends to be favored by neoliberal governments on ideological grounds, but privatization is sometimes considered by left-wing governments as a way of solving economic problems and generating revenues without raising taxes, even though this may go against their ideology. But as is the case with deregulation, there is more interest than action in the privatization of urban bus services.

B. THE GENERAL STUDY APPROACH

Complete uniformity of policy in the area of urban public transport management and organization is neither necessary nor desirable. For example, the São Paulo metropolitan area has a population of approximately 15 million people with high incomes by Latin American standards. It also has an extensive urban rail network. Clearly, its policy needs are different from those of La Paz, which has one million relatively low-income inhabitants and no urban rail services at all. Nonetheless, there was a definite need to evaluate the effects of different policy measures on service quality and efficiency, and to place the results of that evaluation at the disposal of urban transport authorities in the region. It was anticipated that such an evaluation would contribute to improved decision making.

Special attention was given to certain issues known to be of particular interest to policy makers:

- (i) the comparative advantages of publicly and privately owned urban bus companies;
- (ii) the extent to which deregulation of urban bus transport is desirable;
- (iii) the advantages and disadvantages of subsidizing urban bus transport;
- (iv) the best way to organize small- and medium-sized bus transport enterprises.

The analyses conducted were largely empirical, although it was planned to carry out various conceptual and theoretical investigations. While this aspect was not ignored, the scarcity and inadequate quality of cost and other type of data prevented them from becoming the focus of attention.

First, a survey was made of the current status regarding subsidies, ownership, and regulation in urban bus transport in Latin America and the Caribbean. For this purpose, a questionnaire was developed and distributed throughout the region. A total of 51 usable replies were received from cities in 17 countries, which provided adequate coverage of the region. The results of this survey largely tended to confirm previous ECLAC findings.

Second, a list was drawn up of cities that warranted more detailed study. The main criterion used to prepare the list was that the cities should exhibit some variation with respect to at least one of the three independent variables –subsidies, ownership, and regulation– selected for analysis. For example, a good candidate would be a city where bus transport had been deregulated during the recent past, or where bus ownership had been transferred from the private to the public sector, or vice versa. This would make feasible the analysis of a before-and-after situation. Cities in which public and private bus companies subsist side by side with one another were also likely candidates.

The final selection took practical aspects into account as well, especially the availability of suitable consultants who could conduct case studies within the project budget. In general, preference was given to specialists already known to be experts in the field and whose work was also of recognized quality.

The cities chosen were the following:

- **Bogota**, where subsidies for bus operation were withdrawn during the 1980s;
- **Brasilia**, where one publicly owned (local government) company operated with three private firms in a highly regulated environment;
- **Buenos Aires**, mainly because of its interesting and highly successful form of bus route association;
- **La Paz**, where the local operations of a national-government-owned company formed in the 1980s were transferred to the municipality two years later, to complement services provided by partially deregulated route associations;
- **Lima**, where a company owned by the national government operated together with a variety of private services;

- **Mexico**, where almost all bus operations were provided privately until the beginning of the 1980s, when they were taken over by a company belonging to the city government;
- **Quito**, where private route associations operated alongside an expanding municipally owned company;
- **Santiago**, where bus transport was deregulated at the beginning of the 1980s;
- **São Paulo**, where a municipally owned operation coexisted with private companies.

Terms of reference were drawn up to give consultants common guidelines for their analyses. Each city was visited, and consultants identified and contracted.

Most of the case studies were delivered late, for a number of reasons. A case study was presented voluntarily by Havana, which would not have been chosen on the basis of the original selection criteria. Nonetheless, the city is interesting, since all bus transport is provided by one State-owned and locally controlled company.

Supplementary information was collected from a number of sources and used to reinforce that presented in the case studies.

Local seminars were held in most of the 10 cities studied (Bogota, Buenos Aires, La Paz, Lima, Mexico, Quito, and Santiago), in which representatives of bus companies, regulatory authorities, research institutions, bus manufacturers, and other relevant bodies analyzed the corresponding consultant's draft report. Advantage was taken of these seminars to obtain up-to-date information on transport in the respective cities.

Chapter III

THE RECENT EVOLUTION OF BUS IN SURVEYED CITIES

A. BOGOTA

Even though all public transportation in Bogota is roadborne (i.e., there are no rail services), the variety of submodal options is probably a world record. In early 1989 the following privately owned public transport vehicles were officially authorized to operate: (i) 1,208 subsidized 35-seat regular buses, (ii) 5,944 unsubsidized 35-seat regular buses, (iii) 178 40-seat executive buses, (iv) nine 50-seat super-executive buses, (v) 6,171 28-seat regular *busetas*, (vi) 582 28-seat executive *busetas*, and (vii) approximately 1,000 15-seat vans or shared taxis. Not counting the latter, there were 14,092 buses of all types. The executive and superexecutive vehicles are not allowed to carry standing passengers, and the vans and collective taxis are physically unable to do so.

There was, in addition, a fleet of 75 State-owned and -operated trolleybuses, which could only offer sparse and irregular service on four routes due to an undisclosed –but presumably large– proportion of the vehicles not being available for use.

In 1986, 3.8 million trips per day were made by *busetas*, 1.4 million by standard-size buses, and 0.1 million by shared taxis or vans. Regular taxis account for 0.1 million trips. Trips made by trolleybuses were insignificant.

Remarkable features of public transport in Bogota were the size of the bus fleet and its growth. Between 1969 and 1989, the number of buses (of all kinds) grew by 6.5% annually while the population grew at a yearly rate of 3.6%. Although static and dynamic capacity probably grew more slowly than the fleet, per capita effective public transport supply must have increased significantly. Even in 1969, the Bogota bus fleet was stated as being “one of the largest in the world” [Thomson, 1977]. In that year, only one of the 23 regular bus companies was municipally owned, and it had less than 10% of the fleet. Then as now, drivers were paid a proportion of the fares they collected, which is recorded as having generally favorable consequences for frequencies and quality of service from the passengers’ viewpoint. The *busetas* arrived on the scene in 1970, operated by six private companies, and in 1975 were elevated to a special category reserved for seated passengers only. Later, as has also occurred elsewhere in the region, they started to carry standing passengers, and their right to charge a premium fare was cancelled. The role they once played in catering to passengers prepared to pay a higher fare for a better service was taken over by the executive buses and *busetas* and the superexecutive buses.

In Bogota, the route associations found in most Spanish-speaking Latin American cities do not exist as such. The license to operate a route is to a large extent separate from the ownership of the buses themselves, although some buses are owned by the companies holding the licenses. There is a legal obligation for all bus owners serving a particular route to have a share holding in the company licensed to operate it, although this obligation is not always heeded. In 1989, 430 routes were operated by 38 authorized groups: 23 corporations, 13 cooperatives, one limited liability company, and one limited partnership. Owners join the group with which they wish to operate by paying an entry fee –of dubious legal validity– whose value varies according to the profitability of the route. Unauthorized vehicles serve outlying suburbs, charging higher and uncontrolled fares, and also run on radial routes in peak hours.



The fare for this executive minibus in Bogotá is higher at night than during the day. The amount charged is posted on the windshield.

Bus transport in Bogotá is theoretically highly regulated, at one time by the National Transport Institute (INTRA) but since 1986 by the Bogotá Special District Authority (equivalent to a municipality). This Authority is responsible for (i) granting, modifying, or cancelling route licenses and operating hours; (ii) authorizing, modifying and cancelling company licenses; (iii) fixing fares (except for the now-extinguished subsidized services, whose fares were set nationally); (iv) licensing vehicles; and (v) establishing capacity limits on the companies.

By April 1991, the fares of superexecutive buses had been decontrolled, but all others were fixed. Any possible resultant expansion of superexecutive bus services was nullified by route licenses still being needed. Regular buses were classified into three different age groups, for each of which a different fare was fixed. Nighttime, Sunday, and public-holiday fares were approximately 20% higher than the standard fare for each category of vehicle. The fare increases authorized to take effect as from the beginning of July 1991 classified buses, *busetas*, shared taxis, and vans into as many as 12 different categories, for each one of which a separate daytime and nighttime flat fare was set. Superexecutive buses were still allowed fare freedom. Standard bus fares were usually around 0.10 dollars; while superexecutive fares were approximately 0.45 dollars in April 1991.

Explicit operating subsidies for privately provided bus transport in Bogota have now been terminated. In 1982, they peaked at the equivalent of over 40 million dollars. The subsidy, which was paid monthly to buses making at least three round trips during 21 days of that month, encouraged inefficiency and so was gradually eliminated [Acevedo, 1988]. Beginning in 1981, no buses newly entering the Bogota public transport market could be subsidized (which meant they had to be allowed to charge higher fares). Little by little, subsidized buses were moved to the unsubsidized category by successive age groups until there were none left. There is little doubt that the particular form of subsidy contributed to the high growth rates in the bus fleet, especially in the 1970s.

Although no subsidized buses remain, workers receive a specific bonus to their wages, set at the cost of approximately 80 standard bus fares, to cover a basic number of urban bus trips each month.

B. BRASILIA

Buses are still the only form of public transport in Brasilia, despite numerous proposals over the years for a metro or a light rail transit network. Three different kinds of services are available: regular buses (*convencional*), luxury buses (*executivo*) and local minibuses (*vizinhança*). In the planned central city (*plano piloto*), luxury buses provide essentially the same services on longer routes as do minibuses on local routes. By far the most important type of service is that provided by regular buses, which account for 98% of trips made.

Four companies operate bus services, with ridership spread more or less evenly among them, from 20% for the smallest to 31% for the largest. In total, almost 400 routes are operated, including those in satellite towns. The public-service bus fleet, comprising approximately 1,700 vehicles, is relatively large, taking into account quite high car ownership levels, ample road space, and parking problems considerably less acute than in other Latin American capitals. However, buses are not used productively in terms of the average number of passengers that each one carries per day. This is largely due to intrinsic characteristics of the city, where trips are relatively long and peaking is accentuated (more than 11% of trips are made between 06:00 and 07:00 hours). Some 815,000 trips are made daily by bus, and 783,000 by car.

In addition to the public transport buses, in 1988 approximately 1,000 extra buses were chartered by various ministries and other government agencies for the transport of their employees. These services were expensive to provide, because the buses remained idle for most of the day, and they were terminated in March 1990. Some of the commuters transferred to public bus services, which needed an extra 200 or so vehicles to cater for the higher demand.

The regulatory body for Brasilia's public transport system is the Secretariat for Public Services. A publicly owned company, Transportes Coletivos de Brasilia, Ltda. (TCB) was formed to operate directly those bus services required by the Secretariat. Nonetheless, many such routes are put out to tender to private companies. The Urban Transport Department carries out day-to-day and operational supervisory tasks, such as specifying timetables to the operating companies. These are published and made known to the traveling public, can lodge complaints if announced frequencies are not maintained.

By decree, a revenue pooling system was instigated in 1986. All fare revenues are paid into a central fund managed by the TCB, from which the four separate companies are paid according to the mileages performed by their buses. The Federal District Government subsidizes the fund whenever revenues are insufficient to cover the companies' costs. In 1988, the subsidy varied from zero in August and September to 18.5% of fare revenues in December.

In practice, the TCB operates much the same as the three private companies. Although it performs administrative tasks such as managing the revenue pooling system that are not required of the private companies, it apparently employs fewer staff per bus than the latter on public transport work. It is possible, however, that the companies file distorted returns, assigning more staff to such work (and correspondingly less to their charter operations) than is really the case, in order to make their costs look higher than they really are for fare-fixing purposes. TCB's buses are significantly older than those of the other companies.

C. BUENOS AIRES

Public transport passengers in Buenos Aires have the choice of buses (known locally as *colectivos*), suburban trains operating over a very extensive network, a metro (known as an underground), and a modern tramway line of little importance. In addition, the city has a convenient taxi service, and car ownership is relatively high (0.0714 cars per person). There are an increasing number of commuter bus services from outlying suburbs, some of which are of dubious legality.

During the 1970s and 1980s, the number of trips by public transport fell as a result of increasing car ownership and decreasing economic fortunes. Bus ridership increased somewhat in relative terms and fell slightly in absolute numbers, while the railborne modes lost ridership both relatively and absolutely. In 1986, 64% of all trips more than ten blocks long were made by collective modes, of which the bus share was 86%.

There has been little fundamental change in public transport networks or organization since the early 1960s, when public participation in bus operations came to an end, and trolleybus and traditional tram services ceased entirely. Later, in the 1980s, the metro company reintroduced trams in the form of a little-used feeder service to Line "E" of the underground system. Some provincial cities have reintroduced or expanded their trolleybus systems, but there are no plans to do so in Buenos Aires.

Suburban trains are operated by the National Railway Company, although in early 1991, following a strike, plans were announced to form a separate metropolitan network (which had been done before) and privatize it (which was a new idea). The underground railway is operated by the Buenos Aires Municipality, but the Federal Government has announced plans to privatize it too. For years, investment in both the suburban railways and the underground system has been inadequate to cover depreciation. Some operating rolling stock is almost 80 years old.

Regular bus services fall into three separate categories:

- (i) services operating entirely within the confines of the Federal District or running between the latter and the built-up areas beyond in the Province of Buenos Aires, which in 1989 were regulated by the Urban Transport Directorate in the Transport Secretariat of the Federal Ministry of Public Works and Services (since merged with the Ministry of Economic Affairs);
- (ii) services operating entirely within municipalities in the Province, which are regulated by the municipality concerned;
- (iii) intermunicipal services within the Province, which are controlled by the provincial government.

There are approximately 9,600 federally regulated buses, 2,300 buses under the jurisdiction of the Province of Buenos Aires, and some 2,000 regulated by different municipalities within the Province.

In general, services are operated by a highly evolved version of the standard Spanish-speaking Latin American route association, through concessions, authorizations, or permissions from the relevant regulating agency. Fares are fixed by the corresponding agency, which, where jurisdictions overlap, sometimes results in different fares being charged by different lines for the same journey.



A Buenos Aires bus run by a route association confronts one of the city's traffic problems, in the form of a railway grade crossing.

Federally regulated services comprise 147 lines operated by 123 companies owning 9,600 buses, whose capacity averages approximately 25 seated passengers. The buses are effectively owned by individuals who group together to form the company. The buses, or bus, or part holding in a bus, effectively represent shares in the company. Owners elect a board of directors, which appoints managerial staff to run the company. The actual organizational details vary from one case to the next. In the most developed companies, fare revenues are collected by the central administration, which, after paying expenses, distributes the net income among the respective owners.

There are no explicit subsidies conceded to bus transport in Buenos Aires, although railborne modes are subsidized. Fares are scaled by distance and, during 1990 and early 1991, have been among the most expensive in Latin America. The minimum fare was the equivalent of 0.28 dollars in April 1991, approximately double the fare some three years previously, and the maximum was 0.57 dollars.

Some of the companies which operate regular buses also run luxury buses (*diferenciales*) over the same routes, at freely set premium fares.



Buenos Aires commuters board a luxury bus in the city center, at the end of the working day.

D. HAVANA

All public transport in Havana (including a relatively insignificant service of waterborne launches) is provided by one State-owned bus company, the Empresa de Omnibus Urbanos de La Habana (EOUH), which ran a fleet of 2,325 vehicles in 1988. There were also 6,199 State-owned taxis and 614 taxis still operated by their private owners. Plans to build a metro in the city are stalled for lack of financing. No genuinely suburban trains are operated. The bus company was formed in 1961 and until 1964 was part of a nationwide corporation. From 1964 until 1984, it was a separate company within the Transport Ministry. It is now administered by the Provincial Assembly of the People's Power of the City of Havana.

The private car fleet is comprised of only 77,000 vehicles, which make 8% of all motorized trips, while taxis perform 2%. Buses make 86% of the trips, the highest proportion among all Latin American capitals. Mobility is quite high, with more than 1.5 trips per person per day, in part due to fares being set quite low compared with personal incomes. Another relevant factor is the limited range of consumer goods and services on the market, which tends to divert purchasing towards public transportation, simply because it is available. In Havana as elsewhere, fraud is a problem, and an estimated 20% of passengers ride without their fares accruing to the company. No tickets were issued (as of 1989), but a ticketing system was under consideration.

The company's buses are relatively new, their mean age being less than four years in 1989. Even so, technical deficiencies and inadequate supplies of spare parts limit their availability. Of the 2,325 buses in the company's fleet in 1988, only 1,567 were operating on a daily basis. Each of these carried a very heavy load -2,465 passengers daily in 1988- which tended to aggravate maintenance problems. Some second-hand buses have been incorporated through donation by an Italian municipality.

Bus transport is formally regulated by the Transport Ministry, which is responsible for authorizing the establishment, modification, and abandonment of routes. However, in practice, since the transfer of the administration of the company to a city institution in 1984, the company has become self-regulating. The flat fare is set by the State Prices Committee.

In 1990 a separate company, the Empresa Provincial de Servicios Especiales por Omnibus de la Ciudad de La Habana, began operating a small fleet of luxury minibuses known as *ómnibus ruter*os. These carried only seated passengers and run over fixed routes with increased spacing between stops. Although confirmation is not available, it is thought they ceased to operate the following year, when cut-backs on the order of 35% were made in bus services due to an acute shortage of fuel and spare parts.

EOUH normally incurs an annual deficit which is financed by the National government. This subsidy is partially offset by taxes paid by the company. Buses are bought at preferential rates considerably below world market prices (at the official exchange rate). The company is probably effectively subsidized, although since prices in Cuba do not necessarily reflect true opportunity costs, it is impossible to be sure. Paying passengers as a whole would be subsidized less than the company, due to the fraud problem.

E. LA PAZ

As in Bogota, all public transport in the La Paz urban area (including the adjoining Municipality of El Alto) is roadborne. Projects for alternative systems have been developed, including a mass-transit version of the cable car which has been actively promoted by the Municipality of La Paz and for whose construction tenders were being invited in mid-1991.

La Paz is served by municipally owned buses, privately owned buses, smaller minibuses known locally as *trufibuses*, fixed-route shared taxis known as *trufis*, and a peculiar variety of shared taxis not found anywhere else in the region. Residents of La Paz have forgotten what the name *trufi* means, but a likely explanation is *taxi de ruta fija* (fixed-route taxi). The *trufibus* offers the same kind of service using a bigger vehicle. The La Paz type of shared taxi has no set route. A passenger hails a taxi and inquires if it will take him where he wishes to go. The first passenger to board determines the general route the taxi will take. Subsequent passengers, each of whom pays the standard fare, are accepted if they wish to go in the same general direction. This type of operation seems to have arisen when the government started fixing fares at less than the operating cost for conventional taxi services. Taxi drivers decided to carry multiple riders out of economic necessity. From the birth of the system until the comparatively recent introduction of radio taxis, there were hardly any regular taxis in La Paz.

In 1989, there were 1,305 privately operated buses registered in the city, approximately 1,200 *trufibuses*, 3,500 *trufis*, and 1,500 (shared) taxis. The municipally owned bus company possessed a fleet of 94 vehicles. Private buses carried approximately 620,000 people daily, while the municipal company carried no more than 15,000. Figures for *trufis*, taxis, and *trufibuses* are not available, but in the higher-income southern zone of the city, these three modes together carry more passengers than do buses.

Private buses are organized much as in other Spanish-speaking Latin American cities, i.e., in route associations (known as syndicates in La Paz) of individual owners which operate specific lines. The syndicates rotate buses by route (as in Quito) so that profits are evened out among individual bus owners. They were protected from competition until 1982, when a law was passed to permit entry of new operators. However, very few did so, due both to a restriction on new services which overlapped significantly with existing ones, and the prevailing general economic chaos and escalating inflation, which reached over 10,000% in 1985 [ECLAC, 1987a]. In fact, the only new entrant of any significance was the Empresa Nacional de Transporte Automotor (ENTA), set up by the national government in 1983 to run not just urban buses in La Paz, but also urban services in other cities, rural bus services, and even inter-urban truck transport.

ENTA was badly conceived and hurriedly put together, which showed up in various ways, such as the ordering of buses inappropriate to Bolivian conditions and the spreading of its resources over too many routes in too many cities. In 1985, a new government liquidated ENTA and handed its buses and trucks over to the municipal authorities where they happened to be based. In the case of La Paz, the municipality formed the Empresa Municipal de Transporte Automotor (EMTA) to continue operating as many of ENTA's previous services as it could. For the most part, these connected central La Paz with low-income suburbs in El Alto and other satellite towns. EMTA's role in La Paz was considered to be that of providing a social service. As such, it had –and still has– limited possibilities of reaching profitability, due to the intrinsic nature of the routes.

EMTA's operating and administrative problems mounted and the number of buses it succeeded in getting into service continued to fall. Its problems were compounded by the almost anarchical behavior of its unionized employees. Its role in La Paz's transportation system was very minor by early 1991.

The private bus fleet decreased throughout the 1980s. In 1989, only five vehicles in this fleet buses had construction dates between 1982 and 1987 inclusive, indicating a virtual drying up of new investment during these six years. The fleet size fell from over 2,000 buses in 1987 to scarcely more than 1,300 two years later. They were severely underutilized, many covering less than 2,000 km per month. On the other hand, the fleet of *trufis* and *trufibuses* expanded to compensate. Bus owners bought *trufibuses* essentially because they were more profitable to operate. These small minibuses are taking over a steadily increasing role in La Paz's public transportation; 1,200 were operating in 1989 and more have entered service since.

Bus transport in La Paz seems to be relatively deregulated, but a restriction which prohibits new routes if they duplicate existing ones by more than 60% effectively restrains the establishment of new services. Fares are fixed by municipal authorities, normally at different rates for long and short journeys.

No explicit subsidies are given to privately provided public transport services. In 1989, EMTA had a minimal operating surplus, but earned no significant return on capital. Fares were set at levels close to the average for principal Latin American cities, which permitted private bus operators to cover short-run but not long-run costs. Costs were high, due to factors external to bus operations (such as the difficult terrain of the La Paz area), to internal factors (such as low bus productivity), and to those lying somewhere between (such as the use of gasoline-powered vehicles, which was partly a consequence of the area's topography and its rarified atmosphere).

F. LIMA

Virtually all public transport is roadborne in Lima. In 1989, the only exception was one suburban train service each way per weekday to and from Chosica, which has since been discontinued. Construction of an elevated metro was started in the late 1980s. It was actually inaugurated in early 1990, presumably for political reasons, since the short stretch opened served no useful purpose for transportation. It was expected to start regular passenger-carrying operations in 1991, but did not.

At the end of the 1980s, Lima's bus fleet was small and antiquated. In 1988, there were 7,063 buses of all types. There were also approximately 2,000 authorized passenger-carrying vans, and an unknown number of unauthorized ones. From the early 1970s to the late 1980s, bus fleet capacity grew at a rate of 4.4%, slightly more than the 3.9% rate of the city's population over the same period. Considering the expansion of the urbanized area and the likelihood of lower traffic speeds, dynamic capacity per bus probably fell.

There is one publicly owned company, the Empresa Nacional de Transporte Urbano (ENATRU), which also operates in the larger provincial cities. ENATRU carried approximately 0.72 million passengers daily in Lima during 1988, while private public transport operators carried approximately 4.28 million.

During recent decades, Lima's public transport system has been characterized by the decadence of formally authorized services and the appearance of unauthorized ones which, in important instances, have later gained official recognition. Such is the case, for example, of the "microbus," the term given to 12-seat passenger-carrying vans which first appeared in the 1960s. Once officially recognized in 1970, microbus operators formed *comités*, the Lima variant of the standard Spanish-speaking Latin American route association. They then started to acquire larger vehicles, and the government required that the associations be legally constituted as companies.

During the 1970s, the National Government periodically bought new buses and delivered them to ENATRU, which enabled the company to increase its share of the public transport market from 7% to 12%. Even so, growth in demand outstripped supply, and in the early 1980s 12-seat passenger-carrying vans reappeared.

In 1988, public transport services were provided by ENATRU (48 routes), one employee-owned company (TLMEPS — 10 routes), 21 private companies running full-size buses (46 routes), 117 microbus companies (105 routes), 43 private companies running passenger-carrying vans (56 routes), and one remaining shared-taxi firm (with one route). The network was not integrated in any way, and not even ENATRU used multiline ticketing, although this practice had existed on buses and trams some 40 years before. ENATRU in many ways was a model of inefficiency, with almost half its total fleet out of service awaiting repairs.

Public transport was regulated, mainly by the municipalities of Lima and Callao, which approved fares, granted route concessions, fixed frequencies and operating hours, etc. ENATRU was explicitly subsidized by the national government, which gave it buses free of charge and covered its operating deficits. Some private-sector companies benefitted from tax exemption on new vehicles and parts, as well as from preferential interest rates. But there was no clear subsidization policy, and some companies benefitted much more than others. To a certain extent, subsidies were probably intended to favor the domestic vehicle-assembly industry rather than public transport operators or users. Under the Fujimori government installed in 1990, protection of vehicle assembly received less attention and the importation of used buses was permitted.



Marginal vehicles such as this dilapidated old Kombi try to make up for the shortage of adequate bus transportation in Lima.

The real value of the prevailing flat fare has varied markedly (as elsewhere in the region) due to rampant inflation, but it averaged the equivalent of 0.07 dollars in 1988, and is normally lower than in comparable cities. Bus companies were generally unable to cover depreciation and hence –apart from ENA-TRU (which had its buses provided free) and certain private companies especially favored by government subsidies– could not renew their fleets. As a result, the buses belonging to some companies had an average age approaching 30 years, a few were more than 40 years old, and the most ancient was said to date from 1927. Considerable ingenuity was required to keep them running. Fare controls largely explain the low growth and obsolescence of the bus fleet.

Most of the problems affecting public transport in Latin American cities were to be found in Lima, from a metro built for political reasons rather than to serve the urban population, to a short-sighted fare control policy leading to reduced transport capacity available for people with no access to a private car. Drastic solutions were needed, and one was introduced in mid-1991 when bus fares were liberalized and supply deregulated. The results were predictable: fares rose, and minibus services proliferated.

G. MEXICO

Public transport services within the Mexico City Metropolitan Area (MCMA) are provided by privately owned buses, publicly owned buses, privately owned minibuses, publicly owned trolleybuses, publicly owned metro trains, and publicly owned premetro articulated units. The privately owned buses do not operate in the Federal District itself, but rather serve the urbanized zones beyond, principally in the State of Mexico.

In 1988, approximately 4.6 million trips were made daily by metro. This figure counts journeys involving a change from one line to another as a single trip, and hence is not comparable with those reported for other public transport modes. Counting a leg on each line as a separate trip, there would have been approximately eight million metro journeys, which probably made it the most-used mode within the Federal District. Publicly owned buses, a term virtually synonymous with buses operating in the Federal District, carried 6.9 million passengers daily, trolleybuses and the premetro together one million, and privately owned minibuses 6.0 million. Within the MCMA as a whole, however, buses and possibly minibuses as well carried more passengers than the metro.

Since 1988, minibuses have almost certainly increased their market penetration, although there are no concrete data to prove it. The small 10-seat Volkswagen Kombis are being steadily replaced by 20- to 25-seat minibuses, of which 50,000 of one type or another are reported to be operating in the Federal District. If on average each one carries 175 passengers per day, in total they move 8.75 million people.

The Department for the Federal District controls three publicly owned companies which manage, respectively, the metro (Sistema de Transportes Colectivos — STC), nonmetro electrically powered modes (Servicio de Transportes Eléctricos — STE), and diesel-engined buses (Autotransportes Urbanos de Pasajeros R-100 (Ruta-100, or R-100)). All Federal District buses were privately owned and operated until 4 February 1960, when the Department took control of the Lomas de Chapultepec-Reforma Ruta-100 S.A. bus line with the idea of transforming it into a model for other lines still in private hands. Some new routes were opened. In August 1981, administration of the line was transferred to the new decentralized public company R-100.

In January 1981, the Department for the Federal District, and the trade associations to which all private bus operators belonged, signed an agreement that: (i) obliged the operators to buy a specified number of new buses, (ii) rationalized the network of routes to conform with a new highway plan, (iii) introduced a system of insurance for passengers, (iv) set fares at three pesos on main routes and two pesos on feeder services, and (v) required operators to recondition existing buses, equip buses with antipollution devices and increase service frequencies. The operators did not comply with their obligations, despite having received fare increases of 50%.

Cost inflation, which might have left operators without the financial resources needed to fulfill their part of the bargain, was not the cause of noncompliance (although this did occur later). Inflation from February to August 1981 was less than during the previous year. Therefore, in September 1981, the concessions of the private operators were revoked. R-100 was entrusted with running all bus services in the Federal District, for which it was given the buses and installations belonging to the private companies.

The new management of R-100 claimed that only 3,800 of the private companies' 6,500 buses were in a state fit to operate. In 1982, R-100's operational fleet is stated to have been 4,300 vehicles, compared with the 5,600 that the private companies were operating in 1979. Despite route restructuring that tended to increase the productivity of each bus in operation, service quality probably declined substantially. The number of daily bus trips fell by 20% between 1979 and 1982, a period during which the population of the Federal District increased by around 10%.



Minibuses called peseros have become the most widely used mode of transportation in the world's largest city.

The sharp decline in the bus supply greatly expanded market opportunities for minibus operators, whose daily ridership is reported to have increased by more than 20% over the same period. Effectively, the nationalization of bus services in the Federal District created the conditions which led to 15-seat (on average) minibuses becoming the most important mode of public transport in the world's largest city. Total daily public transport ridership increased by 4.9% from 1979 to 1982, indicating that ridership per person fell.

R-100 never managed to get into service the same number of buses that the private companies were operating in 1979. During the mid-1980s, the daily average operating fleet fell marginally from 4,300 to 4,150. In 1991, approximately half the total fleet was effectively written off and scheduled for sale. The operational fleet was planned to stabilize at around 3,500 buses.

During the late 1980s, consideration was given to reprivatizing R-100 by forming a cooperative with the company's workers. However, by 1991 this idea had been abandoned, and the office of the General Transport Coordinator (GTC) was planning to invite tenders from private bus companies to operate principal routes currently served by R-100 in central zones and along the city's highway axes. These companies would be permitted to charge commercial fares and would not be subsidized. R-100 would continue to be subsidized, but would increasingly concentrate on serving lower-income suburbs.

GTC, established in 1984, has overall responsibility for transport coordination within the Federal District. Tasks delegated to it include transport and highway planning, setting fares for buses and taxis, approving changes in bus and taxi fleets and in bus frequencies and operating hours, putting bus services out to tender, and traffic control. It licenses the operation of minibuses, although in practice permission from the trade association of existing owners is also required in order to operate such vehicles.

All publicly owned urban transportation in Mexico City is heavily subsidized, but private minibuses are not, at least not explicitly. The relative importance of the subsidy varies over time, since the fare charged tends to be adjusted infrequently and in correspondingly large jumps. In May 1987, the subsidy amounted to 25% of the operating costs of buses, metro, trams and trolleybuses combined. By September of the same year it had increased to 64%.

Most of R-100's subsidy is financed directly by the Federal Government (93% in 1986), with lesser payments being made by the Department of the Federal District. The latter normally covers just capital costs and debt repayment, while the former largely serves to cover current expenses. In most years, R-100 (in the 1980s, at least) receives a budgeted subsidy and then proceeds to incur a further loss, which requires additional government support at the end of the year. While it is generally recognized that the subsidy serves to reduce the transport costs of bus users and to reduce air contamination by enabling buses to be replaced or reconstructed, there is a noticeable lack of control over the amounts conceded. Little incentive exists for R-100 to maximize the efficiency with which it uses the resources assigned to it.

In early 1991, the flat fare charged on R-100 buses (as well as on the metro, trolleybuses and the pre-metro) was 300 pesos, equivalent to 0.10 dollars. Minibus fares were distance related, varying between 500 and 1,000 pesos. During 1989 and 1990, R-100 operated some buses charging 100 pesos and others charging 300 pesos. The former were older, unrenovated vehicles while the latter were either new or reconstructed. In some cases, buses charging different fares operated over the same route.

H. QUITO

Public transport services in Quito are provided by authorized associations of private bus owners, a municipal bus company, and unauthorized owners of vehicles of different types used for public transport in marginal areas at all times of the day, and in all parts of the city in the evening hours. In 1991, Quito had the lowest bus fares among all Latin American capitals. It is also noteworthy for being the only Latin American capital where people are carried in open pickup trucks having hardly any modifications to make them safer or more comfortable for passengers.

Private undertakings run vehicles known locally as buses, *colectivos*, and *busetas*. The different types of vehicles vary according to capacity, but the way they are organized and operated is the same in each case. The buses seat 38 people on average and have a total unit capacity of 70. *Colectivos* seat 30 and can hold 55, while *busetas* seat 25 and can carry 30 in total.

There are eight associations and 18 cooperatives running buses or *colectivos*, or a combination of both. Together they operated 68 routes in 1988. Six cooperatives and seven associations run *busetas* on 18 routes. In 1988, there were 2,110 buses of one or other of these three types registered in the city, and they carried approximately 1.5 million passengers a day. The participation of the Empresa Municipal de Transporte was minimal (less than 1%). In that year, the municipally owned company operated only nine buses, six of which were typical English double-deckers, the only ones in Latin America.

By 1991, the situation had changed considerably, mostly for the worse. According to representatives of the private companies, the number of their buses (again of all types) had fallen by 45% since 1988. Those remaining sometimes carried very heavy loads for their size, up to nine passengers per square meter of floor space. In 1988, each bus averaged approximately 850 passengers per day; by 1991 this figure had probably increased to around 1,100, a large number considering the size of the vehicles. In all, they were probably transporting 1.25 million people daily in 1991. On the other hand, the Empresa Municipal has expanded its activities by receiving 21 additional single-deck rigid-frame locally assembled buses, and 40 imported Ikarus articulated vehicles. However, it was still not carrying more than approximately 72,000 passengers daily, representing some 5% of total bus passengers. One of the objectives of the municipal company is stated to be the carrying of 10% to 15% of total demand.

From the time bus transport was started in Quito after World War II until 1982, all such services were provided by the private sector. The *busetas* are a relatively recent innovation, dating from 1980. The municipal company commenced operations in June 1982 by running luxury (for Latin America) double-decker buses on a single route from the airport (which is located within the urbanized area), along Amazonas Avenue, through a high-class residential and commercial zone. This created an unusual situation in which the only publicly owned and subsidized buses in the city served medium- to high-income people, while the unsubsidized private-sector buses served low-income groups. However, workers are granted a bonus intended to defray the cost of commuting by bus.

Towards the end of the 1980s, it was decided to expand the municipal company's network to cater for low-income groups whose needs for transportation were outstripping the capacity offered by the associations and cooperatives. In April 1991, consideration was being given to authorizing trolleybus operations, which would probably be municipally owned but operated by a concessionaire on reserved lanes through the central part of the city, which has high architectural and historical value and is being damaged by the vibrations and exhaust from gasoline-powered buses.

Private bus services mostly cease operating at around 20:00 hours. Informal operators then take over, employing various types of vehicles such as those which carry school children during the day. Informal services also run throughout the day in lower-income peripheral areas. Unauthorized operators charge whatever fare they think appropriate, which is normally considerably more than the standard fixed bus fare that since 1988 has been around 0.06 dollars. Urban bus fares, which are set at the same rate for the entire nation, are almost certainly less than the full cost per passenger in Quito. The municipally owned company fails to cover even operating costs.

Private bus owners normally rent their buses out by the day to professional drivers for a fixed amount that in April 1991 was equivalent to approximately 1,000 fares. It is somewhat surprising that formal private services normally cease to run at 20:00 hours. By this time of day the driver will have taken in enough fares to cover the rental fee, and any additional revenue goes straight into his own pocket.

One noteworthy feature of private-sector bus operation in Quito is the weekly rotation of vehicles between different routes. This system is voluntarily imposed by the route associations to even out income between owners in spite of variations between routes in terms of passenger turnover and loadings, and costs.

Bus transport in Quito is formally regulated, but enforcement is weak except in respect of the fare. Route establishment and abandonment must theoretically be authorized by the National Transit and Land Transport Council, but in practice these tasks are delegated to provincial transit councils. Moreover, routes are sometimes set up or abandoned without official approval. There is no effective enforcement of route operating hours, frequencies, vehicle age (which is officially restricted to 20 years), etc.

Until 1991, no subsidies were granted to private bus owners, who complained that the low fare allowed made it impossible to obtain commercial financing for new vehicles, and that no help was offered by the government. On the other hand, the Empresa Municipal de Transporte has its buses provided free of charge, first by the Municipality of Quito and, more recently, by the Ministry of Public Works. Its operating deficit is covered by the municipality. In 1991, seemingly as an unplanned reaction to a crisis situation, a system of non-use-related subsidies for private sector bus operators was introduced.

The Quito case is a prime example of one arm of government creating a problem, and then leaving another to attempt to find a solution in a "second best" environment in which there is a risk of making things worse. The inadequate supply of transport available to low-income families is primarily due to fares being set so low that they actively encourage disinvestment in buses. *Ad hoc* cost studies are carried out by the National Transit Council, but the urban bus fare finally set nationwide is based more on politics than on economic criteria. This is presumably a short-sighted attempt to help low-income travelers in large cities, but may also be intended to control inflation. The Municipality of Quito has no powers to fix fares for city bus services, and as an alternative decided to subsidize the expansion of the Empresa Municipal de Transporte to cater for the needs of such travelers, who were incurring ever greater hardships as a direct result of the national government's fare-control policy aimed at helping them.

The articulated buses bought for the Empresa Municipal were possibly not the most suitable. Within two years of arrival, they needed spare parts to keep them in operation, which the bureaucratic ordering procedures characteristic of publicly owned companies were incapable of having delivered in time. For social and political reasons, staff could not be laid off as more and more buses ceased to operate pending arrival of parts, and hence the financial situation of the Empresa Municipal worsened. Since it had no positive cash flow to finance the acquisition of spare parts, it had to resort to municipal subsidies whose attendant bureaucracy aggravated the problem even more.

In Ecuador, strong rivalry exists between the two principal cities of Quito, the capital, and Guayaquil, the most populous city and the main port and industrial center. Hence it is politically impossible for the Ministry of Public Works to buy buses for Quito and not for Guayaquil, where 70 of the second order for 100 Ikarus buses are destined. In Guayaquil, the buses will not even be operated by a company as such, but rather by the local Transit Council, which has no previous experience operating buses, and may well encounter even greater difficulties than the Empresa Municipal in Quito in keeping them running.

The developing crisis in Quito's public transport was identified during the analysis stage of the project (see section C of chapter V). By late 1991, no policy measures had been taken to resolve the basic problem that revenue per passenger is inadequate to cover the long-run costs of private bus operators.

1. SANTIAGO

Santiago has a two-line 30-km metro system. It is progressively reacquiring some suburban train services which ceased operating in 1986, although at the time the Santiago case study was carried out, these had not yet been reintroduced. In 1988, the bus fleet was comprised of 6,868 buses of regular size (even though they are referred to locally as "microbuses"), and 4,026 smaller 32-seat taxibuses. At one time, the taxibuses were reserved for seated passengers only and were allowed to charge premium fares, but the distinction between the two kinds of vehicles has become increasingly blurred and has now effectively disappeared. In 1988, there were also approximately 5,000 shared taxis operating in the city.

Buses carried 2.6 million passengers daily, the metro 0.5 million, and individual and shared taxis 0.2 million in 1986.

The most interesting feature of public transportation in Santiago is the deregulation policy applied from the end of 1979, and the results it produced. Before deregulation, public transport in Santiago was much as in other Spanish-speaking Latin American cities, with route associations, an inefficient State-owned bus company, residual suburban train services and a new and still-expanding metro system. There were very few shared taxi routes, and unauthorized services were not widespread. Fares were controlled, and bus routes could only be operated by concession holders. The government even controlled the import of buses. At the end of 1977, there were 5,435 buses in Santiago.

Over the next 10 years, the bus fleet grew, on average, at 7% annually, to a considerable degree as a direct result of deregulation. In Santiago, entry controls had been effectively abandoned by early 1979, operations of a State-owned bus company ceased as from 1980, and fares were decontrolled in stages over the period September 1980 to June 1983. Weakly enforced limitations on the number of buses allowed to pass through the city center existed between 1984 and 1988, but from then to 1990, virtually complete deregulation was applied. The only exception was the forced withdrawal in 1989 of buses built before 1967, largely as a public-relations exercise to quell mounting popular concern about air pollution. This measure was notable for its ineffectiveness [ECLAC, 1990].

Other forms of traffic control were also applied –usually to cars and other types of vehicles as well as to buses– in an effort to reduce air pollution. The most widespread measure was that prohibiting 20% of the total vehicle fleet from operating each weekday, in rotation according to the last digit of the license plate number.

However, there was increasing concern about the expansion of the bus fleet. Spectacular congestion occurred in the dual bus lanes of the main east-west avenue through the center of Santiago. Apparently at the suggestion of the bus owners' trade associations, in 1990 half the bus fleet was not allowed to circulate on weekends, with vehicles having even-numbered license plates operating one day and odd-numbered plates the other. In the Valparaíso/Viña del Mar conurbation, bus and shared-taxi owners voluntarily imposed upon themselves a 20% weekday restriction in April 1991.

Between the late 1970s and the late 1980s, real public transport supply probably increased at about the same rate as the number of buses. At the same time, mean bus size decreased and congestion grew, because the capacity offered by both the metro and shared taxis increased significantly. The Santiago Metropolitan Region's population increased by less than 3% annually over the same period, but demand for public transport would have increased less since car ownership grew. Undeniably, the supply of bus transport services increased much more than demand.

One consequence of this was a steady decline in ridership per bus. Particularly noteworthy is the fact that from the early to mid-1980s, each one of the smaller taxibuses was carrying more passengers on the average than the larger minibuses, as was shown in figure 1 on p. 16.

Real fares increased sharply and the surcharges specified for taxibuses and for nighttime/Sunday/public-holiday journeys vanished. Under deregulation, virtually all buses in Santiago charge the same flat fare at all times of the day and week. The average real fare paid per passenger increased at an annual rate of 11.6% between 1980 and 1987. On important stretches of certain routes, shared-taxi fares are the same as bus fares.

Although difficult to prove, it is at least highly likely that the virtually uniform high fare is related to concerted action on the part of the route associations (which are grouped into federations that in turn form part of the General Overland Transport Council). The basic organizational structure of bus transport in Santiago is very much the same as in other Spanish-speaking Latin American cities. Bus ownership is fragmented (1.5 to 2 vehicles per owner), and drivers are normally contracted by owners and paid 15% to 17.5% of gross revenue.

The democratic government installed in March 1990 has not made any fundamental changes in the urban transport policy of its predecessor, insomuch as it has maintained the basic deregulation guidelines. However, it has taken increasingly strong action to control congestion and air pollution. It decided to put the right to operate bus routes over several streets in central areas of the city up for bids, and allow only genuine companies (rather than associations) to participate. This was reluctantly agreed to by the federations of route associations, which had suggested forms of self-imposed regulation as an alternative.

All registered buses with pre-1974 construction dates were bought by the government and taken out of service in early 1991. A law has been passed to enable the forced withdrawal in following years of buses with successively later construction dates. Shared taxis have had the central sections of their routes modified in an attempt to reduce congestion, and possibly also to win the Ministry of Transport and Telecommunications some support from the bus associations, which were opposed to most measures proposed by the Ministry to reorganize bus transport.

No subsidies are granted to bus transport in Santiago.

J. SÃO PAULO

In São Paulo, public transport is provided by buses, trolleybuses, suburban trains, and metro. Buses are owned and operated by both a municipal company and private-sector companies. In common with other Brazilian cities, and contrasting with the situation commonly found in Spanish-speaking countries, private-sector urban buses in São Paulo are owned by genuine companies, rather than by individuals who get together to form a route association.

The metro is slowly being extended and had a route length of approximately 30 km in 1990. Suburban trains are currently run by two different companies, one owned by the State of São Paulo (FEPASA) with a route length of approximately 65 km, and the other by the Federal Government (CBTU) with a route length of 191 km. The central government has proposed that the individual states take over responsibility for running CBTU's trains. The São Paulo state government plans to merge its share of these operations with FEPASA's suburban services. Most of the network is broad gauge (1.6 meters), and nearly all services are provided by multiple self-propelled units. Trolleybuses are run by both the municipality and the State of São Paulo, with a total route length of approximately 500 km.

A survey of the entire São Paulo Metropolitan Region carried out in 1987 classified trips by the principal mode used. Private cars accounted for 8.5 million trips and collective modes 10.3 million, of which the metro performed 1.4 million, suburban trains 0.8 million, and buses of all kinds 8.1 million. During the previous 10 years, metro trips increased by 165% as the network expanded, suburban train trips by 61%, and bus trips by only 6%. Natural population growth was accompanied by growth in the use of collective modes other than buses, which essentially stagnated. Car ownership per person fell.

The Municipal Bus Company, known as CMTC, ran a fleet of 2,830 buses in the São Paulo city area in 1988, compared with 5,409 operated by private companies. CMTC provides services throughout the city area, and in 1988 operated routes which were, on average, of lesser commercial attractiveness (although this was not so earlier in the 1980s).

From 1983 to 1988, the total bus fleet grew at an insignificant 0.5% per year, from 7,383 to 8,239 vehicles. The private fleet edged downwards at 1% yearly, but with marked fluctuations, including 4% positive annual growth between 1986 and 1988. The CMTC fleet grew, on average, at almost 4% over the period. 1980 to 1988

CMTC was created in 1946, initially as a mixed private-municipal company to operate trams [Museu CMTC, 1977]. It was given exclusive rights –including those in respect of a potential rapid transit system– to provide the São Paulo municipality with all public transport services, which until then were wholly operated by private companies. By 1954, CMTC was carrying 90% of all bus passengers. Since then, it has contracted out many routes to private companies, which in 1977 were assigned specific geographic operating zones. CMTC retains sole responsibility for bus services in the São Paulo municipal area, and in 1988 it was directly operating 32% of all bus mileage. The company is heavily subsidized, but this is only partially due to its being moderately less efficient than its private counterparts.

The private companies benefit from bus priority measures implemented by various public sector entities, including CMTC. A 1986 municipal decree authorized CMTC to receive a portion of the fare intake of the private companies in exchange for services rendered, but the decree never went into effect and has since been revoked.

Each of the 23 private companies was assigned a distinct geographical segment of the city, with the center being common to all. Their activities including routes, frequencies, fleet size, fare setting, timetables, operating hours, bus-stop locations, procedures for putting lines out to tender, selection of chosen companies, etc., are highly regulated by the Municipal Transport Secretariat. The only company to which this Secretariat officially grants the right to offer services is CMTC, which proceeds to effectively subcontract most routes to the private companies.

São Paulo enjoys significant intermodal integration for a Latin American city. There are 350 bus lines directly connected with the metro through ticketing. There is physical and fare integration between buses and suburban rail services. The regular bus fare, converted at the parallel exchange rate, varied between the equivalent of 0.07 and 0.13 dollars during the first eight months of 1989, but increased to the equivalent of approximately 0.25 dollars during the following year. Real bus fares remained relatively constant throughout the 1980s, while the minimum wage dropped by about a third. However, the real impact of higher fares has been tempered by the *vale transporte* system (see chapter IV) and integrated ticketing.

In 1988, CMTC's fare revenues covered only about half its costs. The company must obviously be subsidized, although as already mentioned, at that time it was not exceptionally inefficient from a technical point of view. The private companies are subsidized to a certain extent as well, through a subsidy on diesel fuel and through preferential interest rates granted by government credit institutions. All rail-borne passenger transport services are explicitly subsidized.

In 1990, the mayoress of São Paulo seriously announced a plan for free bus transport, to be applied as from mid-1991 with financing from property taxes. It is not known how the metro and suburban rail enterprises owned by the State of São Paulo and the federally owned suburban rail company would have responded. The municipal council did not accept the proposal.

By April 1991, the institutional situation of São Paulo's bus transport was in a state of flux, with 21 of the 30 private-sector companies acting as contractors to CMTC in return for payments based on the number of bus-km operated. Fare revenue was passed directly to CMTC. However, there was no legal basis for this, since the enabling legislation was not passed by the municipal council until later the same year. Vehicle occupancy factors had risen to alarmingly high levels, and the CMTC wanted to reach an agreement with the contracted operators for them to increase their fleets by 2,000 buses, for a total of 7,400. Although there are no figures to verify the fact, it appears that the availability of CMTC buses had decreased significantly since December 1988 [*Carga & Transporte*, 1990]. CMTC's subsidy was the equivalent of some 350 million dollars annually. The municipal government was reported to be considering ways of transferring ownership of its buses to staff, and transforming the company into a series of cooperatives.

Chapter IV

OWNERSHIP, SUBSIDIES AND REGULATION OF URBAN BUS TRANSPORT: AN OVERVIEW OF THE SITUATION IN THE REGION

A. INTRODUCTION

During the early stages of the research, a questionnaire was sent to agencies responsible for urban public transport in all countries of Latin America and the Caribbean. The survey covered only officially recognized bus services, and excluded all forms of rail transit, unauthorized services, and authorized services operated with minibuses. Usable replies were received from 51 cities in 17 countries, a number sufficient to permit general conclusions to be drawn. The review presented in this chapter is based both on these findings and on information obtained in the course of ECLAC's regular monitoring of urban transport activities in the region.

In general, bus transport in the cities of Latin America and the Caribbean is operated by privately owned companies regulated by municipal, regional, or national government agencies. Direct subsidies are usually paid to publicly owned companies, but only rarely to private companies or to users.

B. OWNERSHIP

On the subject of ownership, the survey confirmed that bus services are normally operated by some form of private enterprise in 96% of the cities covered. The only capital cities where no private operations were reported in 1988 were the Federal District of Mexico, Georgetown (Guyana), and Havana (Cuba). However, Georgetown is believed to have unregistered buses operated by private individuals, rather than by companies; in Mexico, the *peseros*—small VW Kombi-type vehicles and somewhat larger minibuses—are run by cooperatives. Thus, only in Havana were all kinds of bus transportation provided only by public-sector operators. The only publicly available transport services in Havana provided by the private sector were a declining number of elderly taxis, which existed in 1959 and were allowed to continue in the hands of their erstwhile private owners.

In some countries, virtually all urban bus transport was provided by the private sector, for instance, in Argentina, Colombia, Chile, Paraguay and Uruguay. However, publicly owned buses shared the market with the private sector in a considerable number of cities — e.g., Brasilia, Bogota (trolleybuses), Cochabamba, São Paulo, Rio de Janeiro, Lima, Quito, La Paz, Mendoza (trolleybuses), and Cuzco. The level of government which operates public-sector bus services varied from one case to another. From the questionnaire survey, in 25% of the cities (41% of the total number of countries from which replies were received), there was municipal operation, while in 18% of the cities (29% of the countries) the operator belonged to a provincial or regional government. Nationally owned operators existed in only 12% of the cities (29% of the countries). Most publicly owned companies were controlled by local or regional governments.

Among the cities which replied to the questionnaire survey, cooperatives ran at least some of the bus services in 59% of the cities (76% of the countries). Brazil stood out by having no such operations, since its private-sector buses were normally in the hands of genuine companies. Some were quite large but none, as far as was known, were open in the sense that their shares were publicly traded. One of the fundamental differences in urban bus transport between the Portuguese- and the Spanish-speaking parts of Latin America is that, in the former, genuine companies dominate the sector, while in the latter, route associations do so.

In some cities, ownership and operation were separated, with the former being in public hands and the latter in the private sector. For instance in Cordoba, Argentina, the recently installed trolleybus system was owned by the municipal government, which left its operation to a concessionaire.

In a few cases, ownership and operation were in private hands, but the private-sector operator was under contract to a government authority. For instance, at the end of the 1980s and the beginning of the 1990s, privately operated routes in São Paulo were gradually switched from being run by concessionaires to the municipal government, to a system whereby the local government paid the operator a flat fee per bus-km and retained the fare takings.

C. SUBSIDIES AND TAXES

Almost universally, public-sector operators were subsidized directly by having their deficits covered by some form of government financing. On the other hand, private operators had to fend for themselves, government financing being provided in less than 10% of the cities (in two of the 17 countries). In 1988, according to the survey, most public-sector operators did not pay taxes on their profits, one of the prime reasons being that they did not earn any (e.g., Lima, Mexico, and São Paulo). In some cases, the public-sector operator was not legally constituted as a company, being instead –for instance– a department of the local government authority, which gained it tax exemption. In Guayaquil, buses imported by the national government in the first half of 1991 were to be operated by a municipal department and not by a company as such.

In Havana, the publicly owned bus company did not earn profits, but did pay a tax on its gross revenue. However, its deficit exceeded the amount it paid in taxes.

In contrast, private operators in 90% of the cities where they existed were required to pay taxes on profits, in amounts that varied markedly from case to case. They sometimes paid more than their share of public-sector expenditures on the urban street network, while often, by one means or another, they ended up paying hardly anything.

Subsidies were not necessarily conceded directly, e.g., in the form of tax exemptions or deficit financing. In 1988, taxes on fuel or other inputs were waived or charged at reduced rates in 22% of the cities (29% of the countries). Three cities in Brazil reported giving financial aid to acquire new domestically produced buses, while similar aid was granted in 13 cities in nine other countries for imported buses. Nevertheless, such indirect subsidization was generally the exception rather than the rule. This finding was not expected and may have been artificial. In Lima, for instance, the basic situation was that no help was granted for bus acquisition by private companies, which consequently seldom bought buses. As an exceptional measure, however, financial help may occasionally be given. At such times, the vast majority of buses are purchased.

In some countries, especially ones with domestic bus assembly or manufacturing capacity, the importation of buses may either be discouraged by high duties or simply banned. This situation often varies from one year to the next. Argentina and Peru, for instance, sometimes fall into this category. The existence of a negative subsidy is implied by requiring private companies to buy locally assembled buses if they would have preferred to buy imported ones. Some countries normally allow the import of used buses. This happens in the Dominican Republic and Guatemala, which for very favorable prices buy low-mileage school buses withdrawn from service in the United States by maximum-age regulations. Larger countries generally prohibit the importation of used buses, or allow it only in exceptional circumstances. This has happened in Argentina, where the federal government permitted the Mendoza provincial government to buy used trolleybuses in Germany because Argentina does not produce them. In short, urban public transport is often discriminated against by being subject to the policy requirements of other sectors such as vehicle manufacture.

In only 36% of the cities covered in the survey (29% of the countries) were public funds assigned to promoting the use of bus transport. In this regard, a sharp difference exists in comparison with the industrialized countries. It is partly explained by the fact that the private operation of bus services is the norm in Latin America, rather than the exception. Governments thus expect the private sector to advertise its own wares.

On the other hand, in 45% of the cities (41% of the countries), government help was given to bus transport operations, e.g., by implementing schemes for bus lanes. Latin American governments are more inclined to help private bus companies by giving their buses priority over cars and other vehicles in the traffic stream, than by promoting their use. This may be because governments recognize that buses are the victims, rather than the cause, of traffic congestion.

One matter of interest is that, so far as is known, when Latin American governments make their calculations to fix urban bus fares, they never explicitly consider the fact that exclusive bus lanes and other bus priority measures enable buses to move faster and be more productive. The cost savings that result from such measures, therefore, accrue in the short term to the bus companies and not to passengers. In the medium term, the latter might benefit if specific cost reductions generated by the priority measures on particular routes were reflected in overall citywide bus operating speeds and ridership figures used as input to the fare setting procedures.

Public authorities were eager to grant free or, at least, cut-rate fare privileges to special groups of travelers such as school children (in 78% of the cities covered, in 76% of the countries), but were significantly less enthusiastic about paying the bill. In only 6% of the cities were special student fares wholly financed by the authorities, while some assistance was given in an additional 16% of the cases. The help granted by the authorities is financed with other peoples' money since, in the end, full-fare travelers pay more or receive poorer service than they otherwise would.

In Brazil, a scheme known as a *vale transporte* has been introduced, under which low-paid workers receive vouchers for bus journeys to and from their places of work. The vouchers are financed partially by the employers themselves and partially by the community in general, since the costs incurred to the employer are tax-deductible. This scheme enables the subsidy to directly reach the needy user whom it is designed to help, but is complicated to administer. In Colombia and Ecuador, users are also subsidized directly, via a simpler but inherently less-efficient measure whereby firms are legally required to pay their workers a bonus to cover basic urban transportation costs. In effect, these bonuses have come to be considered an integral part of wages.

Cross subsidies abound in urban bus transport in Latin America. Flat fares ensure that this happens, since passengers on short routes or routes with high passenger turnover subsidize the others. Sometimes, such cross subsidization forms part of official policy. Low-income families often live on the outskirts of towns and cities and have to travel longer distances for essential trips than higher-income families. In order to help low income families in Brazil, flat fares have been advocated on equality grounds. In some Brazilian cities, bus companies deposit all fare revenue in a common bank account, from which it is distributed back to the companies as a function of bus mileage operated (or a similar but more sophisticated measure). This way, companies operating long routes with low passenger turnover do not suffer under a flat fare policy. In La Paz and Quito, the same effect is produced in a simpler way by the weekly physical rotation of buses over a series of routes.

D. REGULATION

Bus transport in the region is theoretically highly regulated, although lax enforcement means that theory often differs from practice.

In the field of regulation, the norm revealed in the survey was that (i) fares were fixed by the authorities, either exactly (86% of the cities) or a maximum (8%); (ii) fleet sizes were fixed, exactly (69%), a lower limit (12%), or an the upper limit (8%); (iii) frequencies were specified, exactly (56%), a maximum (6%), or a minimum (12%); (iv) new routes could not be operated nor existing ones altered (88%); and (v) companies could not abandon the routes they operated (82%). In a minority of cases (40%), bus companies had to comply with minimum capital requirements.

Some forms of regulation are more difficult to enforce than others. For instance, the fares set are usually more or less adhered to, but the required frequencies often are not. The only cases where fixed fares are not heeded are (i) where passengers pay a tip to the driver in order to travel, rather than buying a ticket from the company which operates the bus, and (ii) where the fare set is an odd amount such as 95 pesos and most users actually pay 100 (the difference probably finding its way into the pocket of the driver).

The main regulating agency is more often municipal than national or regional. Basic traffic laws, standards for bus construction, maximum working hours for drivers, etc., are usually fixed by the national government, while fares tend to be set locally. National governments, such as in Bolivia or Brazil, often prefer to hand fare setting over to local authorities, thereby ridding themselves of a task from which they almost always suffer political harm. In a few cases, one of which is Ecuador, the national government not only still fixes fares, but imposes the same rate on all cities, regardless of local conditions.

In many cities, bus operators' trade associations impose their own regulation. For instance, if one operator wishes to extend a route, it must not only obtain official authorization, but also the approval of the operators' association. In Buenos Aires, for example, in 1988 and probably still today, approval by the operators' association was a prerequisite for official authorization.

Chapter V

CITIES COMPARED

A. THE DETERMINANTS OF BUS USERS COSTS AND SERVICE QUALITY AND THE DIFFICULTIES OF MAKING INTERCITY COMPARISONS

The aim of this chapter is to compare the costs and service quality of bus transportation in the cities surveyed, in the hope that something can be learned about what determines these attributes. The analysis, which for reasons explained in the following paragraphs is very elementary, is later extended to embrace the entire transportation system. Nothing is explicitly said about individual bus companies, this being left for the next chapter.

From the citizen's point of view, the only really important attributes of an urban public transport system are its costs and the service quality it provides. The word "costs" involves not only the amount users must spend to travel over it, but also the environmental consequences they suffer and the sums they and others pay in taxes and other fees to keep the system running. Costs depend both on factors internal to the bus transportation system, particularly its efficiency, and on more general or external factors related to the city itself.

Among the external factors, two of the more important are the territorial extension of the urban area and the number of people it houses. Mean trip length depends on the city's territorial extension and configuration, while the amount of congestion varies with the total number of inhabitants as well as the number of inhabitants per unit of territory, i.e., population density. Both trip lengths and congestion also depend on other characteristics of the city such as urban planning policies, income levels, traffic restraint measures, etc. The urban area and its population are, in themselves, usually interrelated and, at a first level of approximation, may be considered as one. In a previous study, ECLAC estimated that the total cost of transport increases by 150% as a city's population increases by 100% from five to ten million [ECLAC, 1984].

There are fundamental grounds for assuming that bus trip costs per passenger-km might tend to be higher in both smaller and larger cities than they are in those of intermediate size. In the former, trips are short and peaking is usually highly acute. Both of these factors have an unfavorable impact upon the productivity of buses and staff, which tends to be reflected in high costs per passenger-km. Short trips usually mean short route lengths, which are normally associated with relatively high layovers or terminal times compared with running times. Acute peaking means that there is little demand for travel during much of the day; if buses run at all, they carry few passengers at high unit costs, while if they do not, nonproductive time is further increased. In the small city of Campo Bom in the south of Brazil, 11 of the local fleet of 15 buses only run in peak hours [ECLAC, 1991].

In the larger cities, trips are comparatively long. This increases bus and staff productivity per bus-km, which tends to lower fixed costs (capital and staff) per passenger-km while raising variable costs per passenger. Congestion tends to be related directly to city size (although this is evidently not the only determinant), and to be especially severe in the centers of the largest cities. Congestion lowers bus and staff productivity by creating a need for more vehicles and employees to provide any given volume of passenger kilometers, and can also adversely affect operating costs by increasing fuel consumption and maintenance of buses running at speeds which fluctuate widely around a low mean in heavy traffic.

Service quality is necessarily a composite variable that is impossible to define objectively in any unique way. It is related to (i) service frequency, (ii) network density, (iii) cleanliness, quietness and comfort afforded by buses, (iv) number of passengers per unit area of bus floor space; etc. In this report, only crude proxies can be used instead of direct reference to these attributes, the values of which remain unknown in all but a minimal number of cases. The main proxies are fleet size, bus mileage performed, and number of buses normally available for use in peak periods (all in relation to the number of inhabitants). These factors are related, albeit not necessarily very closely, to service frequency and network density. Reference is also made to the daily mean number of passenger-km per bus (which is related to the factors already mentioned, since if bus mileage—for instance—goes up, the number of passengers per bus goes down). Mean bus age is used as a proxy for the quality of the bus itself.

Bus services of adequate quality are difficult to maintain in smaller cities, where lower demand makes high service frequencies uneconomical. In few Latin American cities is car ownership high enough to cause problems for the economic provision of adequate bus services, although one exception could be Brasilia. High-class suburbs of other cities are affected in the same way. Urban densities and the general topographical configuration of cities also affect bus service quality. Where densities are high, services can be frequent and the route network closely spaced. City planners sometimes encourage high densities in corridors that can be well attended by frequent bus services, as is the case in Curitiba.

The economic costs of providing bus services are affected by prevailing costs of inputs. In countries with high labor costs, urban bus transportation is expensive because labor is expensive. The operation of urban buses requires, as a minimum, approximately 2.5 persons per vehicle unless demand is highly peaked and drivers perform maintenance tasks in off-peak hours, when certain services can be curtailed. Capital is more expensive in some countries, especially those with lower incomes, which increases the costs both of the buses themselves and of fixed installations such as garages.

A number of Latin American countries apply subsidies and/or excessive tax burdens to bus operations, thereby making them less or more expensive, respectively, at market prices. In some countries such as Brazil and Uruguay, diesel fuel is effectively subsidized, which tends to lower the market cost—although not the opportunity cost—of services such as urban bus transportation that use this fuel. In certain countries at certain times, the import of buses is subject to quantitative restrictions such as quotas (e.g., Chile in the 1970s or Peru ten years later), to prohibitively high import duties, and the like, which push up the market price of bus services. Such discriminatory measures are gradually disappearing with the adoption of more liberal economic policies, but there is much still to be done in this regard.

The problems of intercity comparisons of bus services costs and quality are compounded by data deficiencies and incompatibilities between the definitions used in one country at one time and those used at other times or places. Even the comparison of such an apparently straightforward variable as the absolute value of fares between cities of similar sizes and characteristics in different Latin American countries is difficult to do in a reliable manner. Local currency values must be converted to a common base, which is normally the United States dollar, but what exchange rate should be used is not a trivial question. More so in 1988, the base year for the data collection phase of the study, than in 1991, Latin American countries employed multiple exchange rates. In extreme cases, the market exchange rate was five, six, or more times the official rate, as occurred in Cuba and Nicaragua, for instance. For purposes of the present study, the official and the free-market rates have generally been averaged to make inter-country comparisons, but there are obviously many other feasible ways to convert to a common base.

Absolute fare levels might give some indication of the efficiency of bus service provision in different cities, but they are less likely to reveal the burden of basic transportation costs on the traveling public. Travelers earn more in one country than in another. For some comparisons, fares should be transformed into the corresponding proportion of the travelers' incomes, but incomes are almost universally unknown. Although minimum wages are fixed by the government in many countries, at times at least, the levels

set are more useful as a basis for fixing constant values for fines, fees, general wage mark-ups, duties, and so on, than for defining the wages really earned by a significant number of people. In most countries, bus passengers who are employed tend to be paid more than the minimum wage, whereas others with whom they travel, such as students or retired people, either have no gainful employment or receive a pension which is worth less than the minimum wage.

The percentage of income received that is destined to urban transport fares for work and educational trips would be a reasonable basis for an intercity comparison of the importance of urban transport in family budgets. However, such percentages are not usually available, not even from family expenditure surveys carried out every ten years or so. These generally include sums spent on car transportation within cities, on "optional" trips (e.g., to go to football games, family visits, etc.), and sometimes on nonurban transportation. If such survey data are not used, the problem of the number of fares required to complete a journey makes its presence felt. A traveler can change trains any number of times within the eight lines of the 150-km Mexico metro system and not pay any more than the basic 0.10 dollar fare, whereas every change of buses in Buenos Aires or Santiago will cost the user around 0.30 dollars.

There are many ways to specify "service quality." In general, only the simplest are worth using in Latin America, due to data and definition deficiencies and incompatibilities. It is thus pointless to try and be more sophisticated, unless data can be obtained from specially commissioned surveys conducted on a common basis for a number of cities. For instance, comparing service quality between cities by reference to the total length of the bus routes in each requires a common definition of what constitutes a "bus route." A bus route in some cities would, in others, be considered a minor variation (variant) of a basic route. Another measure sometimes proposed is the percentage of the population living within 500 meters of a bus stop, but the utility of living near a bus stop obviously depends on the frequency of service as well as on, for instance, possible differences between the extent to which the available services match desired origin/destination patterns and travel times.

In summary, even if reliable statistical information were available for all cities covered, the relevance of sophisticated intercity comparisons of user costs and service quality would be limited. Therefore, remembering that available data are neither precise nor always reliable, the comparisons used in this report will make use of the following simple, robust, and relatively readily available measures:

- (i) basic fares converted to United States dollar equivalents at the arithmetic average of the prevailing official and free exchange rates, for late 1988/early 1989;
- (ii) 50 basic fares expressed as a percentage of the minimum wage;
- (iii) number of buses in the fleet per city inhabitant;
- (iv) number of operating buses per inhabitant.
- (v) number of operating buses plus different measures of the supply of other transport modes, expressed in bus equivalents;
- (vi) bus-km per inhabitant;
- (vii) the age of the bus fleet.

B. AN INTERCITY COMPARISON OF FARES

The third column of table 1 shows basic fares, in dollar equivalents in late 1988/early 1989, for the 10 cities surveyed. They vary extremely widely, the most expensive being more than 10 times the cheapest. Fares were highest in Brasilia and Santiago (both more than 0.25 dollars per ride), and cheapest in Havana, Mexico, Quito and Lima (all under 0.10 dollars). It should be mentioned, however, that by 1990, fares in São Paulo and Buenos Aires had risen to the levels prevailing in Brasilia and Santiago, mainly because of the effects of macroeconomic policy on the exchange rate. Such variations make it hazardous to draw conclusions from an intercity fare comparison.

Table 1
BUS FLEET SIZE AND FARE- AND SERVICE-LEVEL INDICATORS
IN VARIOUS CITIES OF LATIN AMERICA
(Data for late 1988)

City	Estimated population (millions)	Number of buses in the fleet	Average fare ^a (dollars)	50 fares as percent of minimum wage	Percent/millions of daily motorized trips made by bus ^b	Trips per person per day	Buses per million people	Bus-km per person per month ^c
São Paulo								
• City	11.16	9 501	0.12 ^d	10%	—	—	851	4.66
• Metropolitan region	16.74	12 329 ^e	—	—	42.8/8.058	0.48	736	—
Brasília	1.71	1 717 ^f	0.32	26%	47.9/0.815	0.48	1 004	5.59
La Paz/EI Alto	0.98	1 305	0.16	33%	—	—	1 332	3.02
Santiago	4.38	10 500	0.28	28%	65.0/2.578 ^g	0.59	2 397	8.40
Lima	6.05	7 058	0.07	9%	84.3/4.280 ^h	0.71	1 167	7.39
Havana	2.06	2 325	0.03	3%	86.1/3.740 ⁱ	1.82	1 129	5.51
Mexico (Federal District)	12.71	7 729 ^j	0.04 ^k	2%	26.2/6.800	0.54	608	2.11
Bogotá	4.67	14 150 ^l	0.10 ^m	6%	84.0/5.236 ^l	1.12	3 030	10.63
Quito	1.12	2 110	0.05	5%	—/1.143	1.02	1 884	8.71
Buenos Aires	11.90	14 000	0.15 ⁿ	8%	55.0/9.120	0.77	1 176	9.79

^a Fares have been normalized by applying the average of the official and (where appropriate) the parallel exchange rates to the local-currency fares charged between successive fare increases. The period covered is late 1988/early 1989.

^b The definitions used in estimating modal split vary slightly from city to city.

^c Subject to a considerable margin of error, especially in the cases of Bogotá, La Paz, Lima, Quito, and Santiago.

^d In July 1989. By March 1990, the fare had increased to the equivalent of 0.25 dollars.

^e Does not include buses operating routes wholly within the limits of municipalities other than São Paulo.

^f Refers to buses operating services available to the public at large. In addition, there were 699 buses chartered daily for transportation of office workers.

^g The number of trips comes from a transport model and refers to trips by origin/destination rather than by link.

^h Refers to trips by public transportation, including those made by vehicles other than buses, such as informal minibuses.

ⁱ Based on survey data, which include passengers who travel with out paying. In Havana, these are estimated to make 25% of all trips. The same problem exists to a greater or lesser extent in other cities as well.

^j Refers to the entire fleet, of which some 3,000 vehicles were effectively out of service. The figure includes trolleybuses.

^k During the three following years, there was a gradual change to new or rebuilt buses, which charged fares three times the amount shown. At the beginning of 1991, the single standard fare was the equivalent of 0.10 dollars.

^l Includes *busetas*.

^m Executive and superexecutive services charge more.

ⁿ By April 1991, the minimum fare had increased to 0.28 dollars.

Fares are intrinsically high in Brasilia because (i) trip distances are long, especially between the central city and satellite townships, (ii) peaking is acute, and (iii) fare-setting policies to a large degree relate fares to costs, although they do concede subsidies to cushion the blow of cost increases. In Santiago, high fares resulted from collusion among operators, as well as from the deregulation of urban public transportation (see chapter VII). Relatively low population densities in the city also have some effect.

Low fares in Havana can be attributed to fare-control policy and low service quality, resulting in very high occupancy factors and consequent low costs per passenger. In Havana, buses are full-sized and congestion is insignificant, factors which also contribute to lower costs. The fare level was being reappraised towards the end of 1991, partially on the grounds that an increase might serve macroeconomic policy by helping to reduce excess liquidity. In Mexico, low fares were due to government subsidies, fare-setting policies, and the use of large buses. They have since risen somewhat in real terms, and official policy implies that they will increase even more on main axes and in the central part of the city. In Quito, low fares are a result of the Ecuadorian government's policy of setting fares at the same rate nationally. At the values set, they are probably less than operators' long-run costs everywhere. They certainly are in Quito. In Lima, fares are set at the city level, but in 1988-1989 they were lower than long-term costs.

Considering fares in relation to minimum wages, the situation varies somewhat (see the fourth column of table 1). Looked at in this relative sense, fares are still high in Brasilia and Santiago, but high absolute fares in these two cities are somewhat compensated by comparatively high wage levels. However, this was not the case in La Paz, where lower absolute fare levels were paid by travelers with lower incomes. In La Paz in 1989, 50 bus fares per month consumed 33% of the income of a minimum-wage earner, as against 26% or 27% in Brasilia or Santiago. Another point to be borne in mind when analyzing fares paid in La Paz is that buses are in short supply, and many people have little option but to use considerably more expensive *trufis*, *trufibuses*, or shared taxis. Those who cannot afford such luxuries have to resort to walking long distances. Fares in La Paz are undoubtedly high for a city of a million people in a low-wage country.

Mexico and Havana retain their status as low-fare cities, even when fares are related to minimum wages. However, some comments should be made in both cases. In Mexico as in La Paz, the scarcity of regular bus transportation meant in 1988 –and still meant at the time of this writing– that many passengers had to use more expensive alternatives such as *peseros* (Kombis or minibuses). A trip made by *pesero* could easily have cost four times as much as a comparable journey by bus. A minimum-wage earner who made 50 trips monthly by *pesero* would have had to spend around 8% of his wage, rather than the 2% needed for bus travel. In Havana, fares are not just low in comparison to incomes, but the opportunity cost of these incomes is low because there is only a limited array of goods and services available for purchase in the marketplace. This results in a high propensity for bus travel, each inhabitant making on the average almost two trips a day, which contributes to high occupancy factors.

Cities are ranked by absolute and relative fare levels in table 2.

C. AN INTERCITY COMPARISON OF BUS SUPPLY

Also in table 2, cities are ranked in the third column by buses per inhabitant. The information refers to the total size of the bus fleet, whereas availability ratios vary from city to city. Account of this will be made later on. By a considerable margin, Bogota has the most buses per person, followed by Santiago. At the other end of the scale come São Paulo and Mexico.

Table 2

**LATIN AMERICAN CITIES INCLUDED IN SURVEY, CLASSIFIED
ACCORDING TO BUS FARES AND SERVICE QUALITY^a**

absolute	Listed by fare: compared to minimum wage	Listed by number of buses per person	Listed by bus-km per person	Listed by passengers per bus in operation per day
Havana	Mexico	Bogota	Bogota	Santiago
Mexico	Havana	Santiago	Buenos Aires	Bogota
Quito	Quito	Quito	Quito	La Paz
Lima	Bogota	La Paz	Santiago	Brasilia
Bogota	Buenos Aires	Buenos Aires	Lima	Quito
São Paulo	Lima	Lima	Brasilia	Lima
Buenos Aires	São Paulo	Havana	Havana	Buenos Aires
La Paz	Brasilia	Brasilia	São Paulo	São Paulo
Santiago	Santiago	São Paulo	La Paz	Mexico
Brasilia	La Paz	Mexico	Mexico	Havana

^aCities are listed best first, i.e., in ascending order of fare and in descending order of bus service quality. In the last column, the city with the lowest figure is listed first.

Bogota has a very large fleet per inhabitant because (i) railborne passenger transportation does not exist; (ii) informal transport is less important than in many other cities; (iii) private cars are used comparatively little, despite car ownership not being especially low; (iv) the after-effects of a particularly wasteful form of subsidization are still in evidence, even though subsidies were phased out at the end of the 1980s [Acevedo, 1988]; and (v) the city authorities have a policy of encouraging a multiplicity of different categories of bus service, some of which carry only seated passengers and tend to require a relatively large number of buses to transport a given number of people.

It is noteworthy that Mexico and São Paulo, the two largest cities, have the lowest number of buses per person. It was suggested in section A of this chapter that bus services in the largest cities may exhibit characteristics such as longer routes and less-sharply peaked demand than in small cities which tend to raise bus productivity. Congestion would have the opposite effect, but inasmuch as it affects buses, it has been tempered in both Mexico and São Paulo – although by no means brought under control – by traffic management measures, bus priority schemes, and relatively minor construction projects. Both cities have high car ownership and significant metro and suburban rail systems which reduce the need for buses. In São Paulo, bus availability is reasonably good. In Mexico, bus availability is low, which aggravates the effect of there being few buses per person; the shortage of operating buses has stimulated the use of *peseros* (which are not counted as buses for the purposes of this report).

Bus-km per person per month is a much better indicator of the adequacy of bus services than the number of buses per person in each city's fleet. The trouble with using this measure in Latin America is that the available data on which to estimate it are not always reliable. However, the fourth column of table 2 reproduces some estimates from the eighth column of table 1. Bogota remains the city with the best supply, but Buenos Aires moves to second place due to high bus productivity. Quito moves ahead of Santiago, due to apparently greater mileage per bus (note that the data on which the table is based refer to late 1988; since then, public transport in Quito has suffered a marked deterioration.) La Paz drops to next-to-last place due to the low number of kilometers covered monthly by each bus.

Santiago's large bus fleet is mainly a direct consequence of deregulation and collusion among operators, which result in high fare levels and encourage fleet expansion. Other contributory causes include exchange rate policies, reduction of import duties, and economic restructuring (see chapter VII).

The final column of table 2 ranks cities according to the number of passengers per operating bus per day, which gives a crude idea of passenger comfort. Passengers in cities such as Santiago and Bogota appear to travel in the least-crowded conditions. However, this interpretation merits qualification. On the average, operating buses in these cities carried around 400 passengers per day. This does not necessarily imply that the average passenger traveled in comfort or had a reasonable probability of finding a vacant seat, due to demand peaking. In fact, many of Santiago's buses run almost empty in off-peak periods. In the hours when most people want to travel, however, conditions do not appear to be markedly different from those in other cities, with passengers on some routes clinging to the doors of the vehicles. This is partially due to the prevalence of buses of relatively low unit capacity in both these cities. In La Paz, while ridership per operating bus per day is low—approximately 500 people—daily bus mileage is also very low and the vehicles themselves are small, which means that passengers did not necessarily travel comfortably.

At the other end of the scale, operating buses in Buenos Aires, Mexico and Havana cover around 7,000 to 8,000 km each month. The relatively high productivity of each operating bus means that the daily passenger loading is spread over a large distance. The number of passengers per bus per day in Buenos Aires is approximately 1,000, compared with over 2,000 in the cases of Mexico and Havana. In spite of the relatively high bus mileage in the latter cities, it is extremely likely that most passengers had to tolerate unpleasant conditions. The situation in Havana became worse towards the end of 1991, due to service cutbacks of some 35% imposed to economize on fuel consumption. A shortage of petroleum-based fuels does not normally result in policy decisions to reduce public transport supply, but this is what happened in Cuba. Traveling conditions for the public must have deteriorated from being merely bad to virtually intolerable.

In the case of Quito, the 1988 situation portrayed in the tables is probably one of disequilibrium that overstates the long-term number of buses per person, because the prevailing fare levels are not sufficient to encourage operators to retain their capital in the business. During the analysis stage of the project, out of all the 10 cities studied in detail, Quito was identified as the one where public transport quality was likely to fall most in the short term. Warnings about the potential seriousness of the situation were expressed during a seminar held in the city early in 1991. By this time, bus supply per person was reported to have fallen by as much as 50% from 1988 levels, which would demote Quito to eighth or ninth place in the ranking of cities by buses per person. Bus-km per person would also have fallen, but probably by less than buses per head, since those buses still running are probably used more intensively. Before the end of 1991, an inefficient system of subsidies for private-sector bus operators had been introduced and the municipally owned company was incapable of operating more than half of its total bus fleet. Until the fundamental problem of income from fares is addressed, it is impossible to be optimistic about the restoration of bus service quality in Quito to 1988 levels.

D. VALUE FOR MONEY IN BUS SERVICES

The rankings in the first, fourth, and fifth columns in table 2 reflect, respectively, the user cost, quantity, and quality of bus transport. Other, better indexes could be estimated to measure the same separate variables if the necessary statistical information were available. Nonetheless, these rankings have been used to derive the composite indexes of value for money in bus services, as shown in table 3. The separate rankings are simply added together and the arithmetic mean used to assign a city's position. A high position (low-numbered ranking) is "good" in each case.

Table 3

**LATIN AMERICAN CITIES CLASSIFIED
ACCORDING TO USER COST AND
SERVICE QUALITY**

City	Classification criterion ^a			
	Absolute basic fare	Bus-km/person	Passengers/operating bus/day	Average
Havana	1	7	10	6
Mexico	2	10	9	9
Quito	3	3	5	2
Lima	4	5	6	4
Bogota	5	1	2	1
São Paulo	6	8	8	10
Buenos Aires	7	2	6	4
La Paz	8	9	3	7
Santiago	9	4	1	3
Brasilia	10	6	4	7

^aThe best-ranked city – i.e., the one having the lowest fare, highest bus-km/person, or lowest passengers/operating bus/day – is assigned the lowest number.

Base

The best value for money accrues to bus passengers in Bogota, where both the quantity and range of qualities of bus services are noteworthy. Nonetheless, intercity comparisons derived from the basic daytime fare, whereas many users actually pay considerably more to ride premium-quality services such as executive or superexecutive buses or *busetas*, or for nighttime, Sunday or holiday travel. The same situation also occurs to a lesser extent in a few other cities. The range of fares in Bogota can be gauged from the following examples, selected from the structure approved for application as from 1 July 1991:

- (i) pre-1964 regular buses — daytime 65 pesos, nighttime 75 pesos;
- (ii) 1991-vintage regular buses — daytime 120 pesos, nighttime 140 pesos;
- (iii) superexecutive buses — daytime 180 pesos, nighttime 200 pesos.

The prevailing exchange rate was 627 pesos per dollar. Note that, once converted into dollars, fares in inflation-prone Latin American countries always appear exceptionally high immediately after an increase is granted.

In Quito, as already stated, the bus transport market was in disequilibrium in 1988. In the longer term, fares must rise and/or service quality fall from 1988 levels, unless an efficiently devised and applied subsidy policy is developed.

In Santiago, deregulation has resulted in good bus service at comparatively high user costs.

In Mexico, bus passengers receive poor bus service, both in terms of quantity and quality, in exchange for the payment of a modest fare. However, as in São Paulo, the relatively low bus mileage per person is related to other modes being used for more than half the trips made in the metropolitan area.

No simple correlation should be expected between fares charged and the average age of buses. Too many other factors are involved. No complete information is available on bus age in more than a few cities. However, at the end of 1988, the highest average age among surveyed cities probably occurred in Lima (1974), Bogota (1978) and La Paz (1978). The first two are low-fare cities, while fleet renewal was discouraged in La Paz during the early and mid-1980s due to economic chaos, and subsequently by effective protection of existing operators and the higher profitability of *trufibus* operation.

The most modern fleets were probably those of Mexico (mean building date of buses 1983 at the end of 1988), São Paulo (1983), Brasília (1984) and Havana (1985). In Mexico and Havana, purchase orders are issued by public authorities, which do not necessarily take into account the commercial profitability of buying new buses. In Mexico, new buses were ordered instead of repairing older ones that were out of service for lack of spare parts. The Transport Ministry of Cuba fixes an economic life of just four years for the Ikarus buses used in the city of Havana, because of their technical characteristics. Thus it might be deduced that, even though buses in the cities of Mexico and especially Havana are young in terms of years, they might be more decrepit than considerably older buses elsewhere. In Brazilian cities, private-sector bus companies tend to renew buses after a service life of five to seven years, based on the economic criterion of the extra overhaul and maintenance costs of old buses compared with the capital costs of new ones. Both in Brasília and São Paulo, buses belonging to public-sector companies are older than those of private-sector companies, the difference in the case of Brasília being very marked.

E. THE ADEQUACY OF THE TOTAL TRANSPORTATION SYSTEM

So far in this chapter, the term "service quality" has been confined to just bus services, with occasional qualitative comments being made about other transport modes where appropriate. However, it would be interesting to compare a single index of the adequacy of city transportation systems. No one index can possibly be suitable for all comparisons, and every feasible index can be criticized on important grounds. It can be argued that no effort to develop an index is likely to be repaid by the utility of the results obtained, but in this section an attempt will nonetheless be made.

It is extremely difficult to incorporate nonbus modes when assessing the adequacy of a city's public transport. The difficulties arise from problems such as (i) knowing how many informal vehicles operate (e.g., Lima or Quito) (ii) knowing to what extent rail services attend the needs of the city itself as opposed to the surrounding suburban area (e.g., Buenos Aires or São Paulo), (iii) knowing how many passengers per day the other modes really carry (e.g., almost everywhere), and (iv) recognizing that mean trip lengths vary between modes (especially in cities where suburban rail is important).

Table 4 presents some alternative rankings of the cities by successively more refined measures of bus equivalents per inhabitant (although even the figures upon which the final column is based are not very refined in the absolute sense). The first column is taken directly from the buses per person data in table 2. The second column allows for the fact that bus availability ratios differ from one city to another. Such ratios are known for sure only for cities with totally publicly owned or very highly regulated bus transport, but reasoned estimates have been made for the other cases. The changes in ranking are quite minor. La Paz falls three places, because of a relatively low bus availability ratio of 60%. Brasília rises two places, again on the basis of inadequate data. Mexico falls from a very bad last place to a completely hopeless last place, although this not apparent from the table, which refers to relative rather than to absolute standings. Note that the categories in this column are analogous but not identical to the last column of table 2, in which they are classified by passengers per bus in operation per day.

The first two columns of table 4 only take buses into account. However, public transport is seldom provided just by buses. The problem is how to convert other public transport vehicles into bus equivalents. There is no sure method to do this and, even if there were, the available data would not be good enough to apply it. Thus, for the third column, the following bus equivalents (beq) have been assumed: charter bus — 0.5 beq; trolleybus — 0.9 beq; minibus, *trufibus*, and *camioneta rural* — 0.4 beq; Bogota *colectivo* — 0.3 beq; shared taxi — 0.2 beq; individual taxi — 0.075 beq; metro carriage — 3.0 beq (2.5 in Buenos Aires); suburban rail carriage — 2.0 beq. These factors are considered to be appropriate as day-long averages.

Table 4

**LATIN AMERICAN CITIES INCLUDED IN SURVEY, CLASSIFIED
ACCORDING TO VARIOUS MEASURES OF SERVICE QUALITY^a**

WEIGHTING FACTORS IN BUS EQUIVALENTS					
Listed by number of buses per person	<i>Entire day</i>		<i>Peak hours</i>		
	Listed by number of operating buses plus all other public transportation, in bus equivalents per person	3	Listed by number of operating buses plus all other passenger transport vehicles, in bus equivalents per person	4	Listed by number of operating buses plus all other public transportation, in bus equivalents per person
1	2	3	4	5	6
More than 50% above average					
Bogota Santiago Quito	Bogota Santiago Quito	Bogota		Bogota	
Less than 50% above average					
La Paz	Buenos Aires Lima	La Paz Santiago Mexico Quito	Bogota Mexico Santiago La Paz Quito	Santiago Quito Mexico Buenos Aires	Mexico Bogota São Paulo Brasilia Santiago
Less than 50% below average					
Buenos Aires Lima Havana Brasilia São Paulo	Brasilia La Paz Havana São Paulo	Buenos Aires Lima Brasilia São Paulo	São Paulo Buenos Aires Brasilia Lima Havana	La Paz Lima Brasilia São Paulo Havana	Quito Buenos Aires La Paz Lima
More than 50% below average					
Mexico	Mexico	Havana			Havana

^aCities are listed best first, i.e., in descending order of bus supply. Note that, in this table, São Paulo refers to the municipality and not to the metropolitan region; Mexico refers to the Federal District, and Buenos Aires to the metropolitan region.

There is now a greater change in the rankings, as shown in column three. La Paz moves up five places due to its large fleet of *trufibuses*, *trufis*, and shared taxis. Mexico moves up six places as a result of its well-developed metro and large minibus fleet. Quito falls two places due to its heavy reliance on regular buses. Lima also falls two places, in spite of having a relatively large fleet of minibuses, the exact size of which is not known. Brasilia falls two places as well, since its fairly large fleet of charter buses was much less productive than its regular bus fleet. Havana is now at the bottom of the list, because in 1988, the year to which the table refers it had no other form of public transportation except regular-sized buses and a relatively small number of conventional taxis, most of them publicly owned.

The fourth column refers to all-day conditions and takes into account private cars, at a beq value of 0.008. This causes Mexico to move up to second place. São Paulo moves up three places due to its relatively high car ownership, while Lima falls to second from the bottom due to its low number of private cars.

Different beq factors are appropriate for the peak period alone. During the day as a whole, the agility of minibuses makes them more productive relative to regular buses than a straight comparison of the static capacity of the two types of vehicles would indicate. However, during the peak period, this greater agility does not translate into a carrying capacity much greater than the static capacity. Although minibuses can maintain higher commercial speeds than regular buses, they are not always able to make more than one journey in the main flow direction during the peak period. Therefore, the assumed peak-period beq factors are as follows: charter bus — 0.9 beq; trolleybus — 1.0 beq; minibus, *trufibus*, and *camioneta rural* — 0.275 beq; Bogota *colectivo* — 0.2 beq; shared taxi — 0.075 beq; individual taxi — 0.03 beq; metro carriage — 3.0 beq (2.5 in Buenos Aires); suburban rail carriage — 3.0 beq.

The most significant differences between the all-day and peak beqs relate to minibuses and similar vehicles, shared and individual taxis, and suburban rail. The factors rise for the latter, since Latin American suburban trains are often utilized to crush capacity on peak runs, and fall for other vehicle types for reasons mentioned earlier. Nevertheless, the rankings in the fifth column do not vary substantially from those in the third.

Considering just the peak period, the private car has a considerably higher beq than during the day as a whole. The rankings of the final column of table 4 were calculated using a peak-period beq for cars of 0.03. The main differences between the rankings of the fourth and the last columns refer to relatively affluent cities with high car ownership, such as Mexico, Brasilia, São Paulo and Buenos Aires, which move up. La Paz, where car ownership is low, moves down.

The main conclusions from the analysis are the following:

(i) Mexico has a good supply of transport services, even though the quality of its bus service leaves something to be desired. The former condition is related to the latter, since the minibus service expanded so much precisely because the bus service left a significant segment of the market unattended. Moreover, a policy decision was taken to assign to the metro the role of the line-haul public transport mode in the city, which clearly diminished the need for buses. There are no other significant railborne passenger-carrying services in the city, but car usage is not as severely restricted as one might expect in what is probably the largest city in the world. It is debatable whether the Mexico metro is really railborne, since the carriages have rubber tires which run over steel beams. Only when a tire bursts do a car's emergency steel wheels lower onto a backup steel rail. However, this report treats both the Mexico and Santiago metros as railway systems.

(ii) In other large and relatively affluent cities such as São Paulo and especially Buenos Aires, the bus service, unlike that in Mexico, has maintained better standards. Because of this and the existence of fairly well-respected regulations which impede (but by no means prohibit) the operation of informal public transport services, vehicles comparable to Mexico's *peseros* do not exist on the same scale in these two

cities. On the other hand, the well-developed rail services and high (by Latin American standards) car ownership of São Paulo and Buenos Aires complement their adequate bus services. Therefore, in an overall sense, the transportation supply in these two cities is quite good.

(iii) Private-sector operators (sometimes unauthorized) can fill the gap left by traditional companies that prove unable to meet the transportation needs of a city. This has occurred in Mexico, Lima, La Paz, and elsewhere. However, if regulations prohibiting new operators are both strong and strongly enforced, the deficiencies of traditional companies cannot be made good by others. The prime example is Havana, where the gap cannot be filled by private cars, which are imported in only limited quantities, or by taxis, which are in very short supply. The result is an inadequate overall transportation system.

(iv) Normally, high fares go hand in hand with a good supply of bus services (e.g. Santiago), and low fares with a deficient supply (e.g. Mexico or Havana). The quantitative data sometimes appear to contradict this logic, but on delving deeper, the rule holds. In Quito, supply in 1988 was good, although fares were low, but the situation seems to have been one of disequilibrium. At the same time, Lima was a less extreme example of the same phenomenon. In Bogota, the basic fare used in the analyses is significantly lower than that charged by the considerable array of premium services which operate in the city. In La Paz, fares are high and service is poor, due in some measure to the difficult terrain in and around the city. Other factors that influence the situation in La Paz are the strength of the bus owners syndicates, the introduction of partial deregulation measures that in practice offer little incentive to new bus operators, and the even higher fares authorized for minibuses and other vehicles whose operation is genuinely deregulated. In Brasilia, fares are high and the supply only mediocre, due long trips and acute peaking.

Chapter VI

COMPANIES COMPARED

A. THE EFFICIENCY OF PUBLICLY AND PRIVATELY OWNED COMPANIES

Many political or economic analyses of company efficiency have concluded that private ownership of productive enterprises results in greater efficiency than public ownership. One example from the urban transport sector is a World Bank study which finds the costs of private bus operations in less-developed countries to be between 50% and 60% of those of publicly owned services [Feibel and Walters, 1980]. A subsequent Australian study concluded that the available evidence supports the view that the private sector provides urban public passenger transport services more efficiently than does the public sector [Henscher, 1987].

Other studies, including some which used both rigorous analytical procedures and adequate data, have concluded that subsidizing urban bus transport provokes inefficiency [Bly, Webster, and Pounds, 1980]. Since the subsidized companies were nearly all publicly owned at the time most of these studies were carried out, the results could possibly be interpreted as implying that public ownership caused them to be inefficient. The most convincing studies on the interrelations between subsidies and efficiency are those with access to adequate quantities of high-quality data, which usually exist only in developed countries. As a result, the nature of any such relationships in developing countries is largely unknown.

Another study published by the World Bank considers that there is no case for granting substantial subsidies of appropriately organized urban bus transport. It also concludes that the best kind of institutional framework is the small firm such as the owner/driver, and not the large firm or municipal authority [Walters, 1979].

There are various *a priori* reasons for expecting a publicly owned urban bus operation to be less efficient than a private one, or at least to appear to be less efficient. Some of these are the following:

- (i) private companies normally include reaching adequate levels of profitability among their prime objectives, whereas public companies sometimes do not, concentrating instead on socially oriented aims such as providing transportation to needy classes or making low-cost transportation available to everybody (e.g., R-100 in Mexico or EMTA in La Paz);
- (ii) publicly owned companies in Latin America are often subject to political meddling, which may take the form of well-paid administrative posts for supporters of the governing party, or massive hiring to reduce unemployment before an election (e.g., ENATRU in Lima);
- (iii) publicly owned companies are more subject to trade-union pressure (e.g., EMTA in La Paz);
- (iv) publicly owned companies are sometimes used by governments as a means of promoting other economic policy objectives not directly related to, and to the detriment of, the provision of transport services (e.g., the Havana bus company is required to acquire domestically built or assembled buses);
- (v) publicly owned companies are more likely than their private counterparts to comply with labor and social security laws (e.g., CMTC in São Paulo).
- (vii) publicly owned companies may be required to offer high-cost or low-demand services that make some of their operating indexes appear as if they are inefficiently managed (e.g., night-time service in Havana);

- (viii) publicly owned companies are sometimes adversely affected by fluctuations in government budgets that make efficient planning difficult (e.g., ENATRU).

Before continuing, it is necessary to define what is meant by efficiency. In this chapter, the term is generally taken to mean the number of units of output per physical resource input. No rigorous statistical analysis of this measure is possible, due to data that are deficient from both the qualitative and the quantitative viewpoints. Hence the results cannot be rigorous either, especially in the sense of identifying the effect on output of different types of resources.

Not all measures of technical efficiency lead to the same conclusions. For instance, if passenger-km output are related to labor input, a company which offers nighttime services in low-demand areas would appear inefficient. On the other hand, if the output measure were bus-km, the same company might appear efficient, since night services normally run over uncongested streets and do not incur the kind of delays which might affect daytime services. By not complying with labor laws, companies can improve labor productivity, but whether by so doing they should be regarded as improving efficiency is debatable.

The indexes used for measuring efficiency are not financial. It is virtually impossible to obtain adequate financial data on many private-sector bus operators in Latin America. Most private companies, syndicates, and associations are under no legal obligation to publish accounts and are very reticent about revealing such information, suspecting that it might fall into the hands of fare-setting or tax-collecting authorities. Accounting data are also often presented in a confusing manner for publicly owned companies. For instance, some have their buses provided free, and thus their respective depreciation and interest costs are either not included or shown in an arbitrary way. A company can be technically or operationally efficient even though it is called upon to provide loss-making services.

In the analysis of operational indexes, it should be noted that relative factor prices are not the same for all companies and all countries. For instance, if it is estimated that more staff are employed per bus in Bolivia than in Brazil, it would not necessarily be correct to interpret this to mean that Brazilian companies are more efficient. Were a Brazilian company to establish a subsidiary in Bolivia, where wages are lower than in Brazil and new bus prices often higher, it might have similar staff/bus ratios as Bolivian-owned companies. One real-world example of this phenomenon is certain private bus companies in Lima which, in the 1980s, employed large maintenance staffs to attend the elderly vehicles they were obliged to operate.

Moreover, labor and social laws vary, and sometimes require that companies in one country employ more staff or buses to produce the same output than companies in another country. A practical example of this is the legal requirement that buses in São Paulo carry fare collectors (conductors). The maximum number of hours which a bus driver is allowed to work daily varies between countries, and obviously has an effect on staff/bus ratios.

Congestion also varies markedly from one city to another, and even between parts of the same city. Companies whose lines are routed through congested streets would naturally generate fewer kilometers per bus per time period than companies whose buses are less subject to congestion. Companies operating routes over exclusive bus lanes and streets in Bogota, Curitiba, Lima, Porto Alegre or São Paulo are favored relative to those whose buses run over the regular street network.

It should also be pointed out that Latin American bus companies are sometimes suspected of falsifying statistical returns –e.g., underestimating the number of passengers carried– in order to pressure the authorities into conceding fare increases. Furthermore, drivers or fare collectors sometimes allow people to travel without tickets, in exchange for a tip amounting to some proportion of the fare. Such passengers are not recorded in the operating company's statistical returns.

In table 5, basic operating data are presented for bus companies in the ten cities embraced by the study. From these data, some basic indicators of operational efficiency have been calculated and presented in table 6.

Table 5

**BASIC OPERATING DATA FOR SELECTED
LATIN AMERICAN URBAN BUS COMPANIES**
(Data for 1988-1989)

City/Company	Buses in fleet	Buses in operation	Bus-km per month	Passengers per month (millions)	Number of employees	Percentage of employees who are: Drivers	Fare collectors	Maintenance workers	Mean model year
São Paulo									
• Private ^a	5 982	5 408	35 253 579	112.67	29 790	38	41	12	1983.6
• CMTC	3 519	2 829	16 700 000	47.58	24 351	34	33	5	1983.1
La Paz									
• EMTA	94	31	147 235	0.39	166	45	...	28	1984.0
• S. Bolívar	...	71	135 879	0.90	...	...	...	...	1977.8
• V. Victoria	...	145	329 502	1.94	...	...	...	...	idem
• P.D. Murillo	...	49	94 897	0.61	...	...	...	...	idem
• E. Avoroa	...	176	325 123	2.26	...	...	...	...	idem
• San Cristobal	...	178	343 533	1.92	...	...	...	...	idem
• Litoral	...	210	717 037	3.21	...	...	...	...	idem
Santiago									
• ... ^b	131	83	627 561	1.19	284	92	0	...	...
• ... ^b	362	...	...	2.75	733	95	0	...	...
Lima									
• ENATRU	638 ^c	523	3 939 835	19.52	4 500	...	...	...	1981.2
• San Miguel	25	22	186 846	1.02	130	26	29	27	1960.2
• San Judas	24	20	168 000	1.01	127	34	45	...	1979.6
• Lima Metro.	150	130	1 040 000	2.99	746	...	47	26	1982.6
• SOTISA	63	61	366 000	1.23	217	35	57	— ^d	1970.9
Havana									
• Emp. Omn. Urb.	2 325	1 567	11 360 000	104.63	12 159	34	2	48 ^e	1985.4
Brasília									
• ICB	354	...	1 998 214	3.63	1 430	40	25	14	1978.0
• Viplan	444	...	2 876 251	4.02	2 451 ^f	38	38	15	1985.3
• Pionera	539	...	3 247 845	5.71	2 560 ^f	42	42	10	1985.5
• Alvorada	201	...	1 432 270	3.57	1 228 ^f	38	38	15	1986.1
Mexico									
• Ruta-100	7 200	3 024	26 762 000	204.67	22 896	51	...	23	1983.0

Continues

Table 5, concluded

City/Company	Buses in fleet	Buses in operation	Bus-km per month	Passengers per month (millions)	Number of employees	Percentage of employees who are: Drivers	Fare collectors	Maintenance workers	Mean model year
Bogota									
• La Nacional	534	...	...	...	...	...	...	...	1975.9
• Copenal	365	...	2 059 498	7.10	...	...	Data not comparable	...	1973.0
• Sidauto ^g	1 036	...	2 512 148	6.71	...	...	Data not comparable	...	1975.4
• Sidauto ^h	259	...	735 884	1.57	...	...	Data not comparable	...	1982.4
• Cooptrans.	680	...	5 344 976	...	...	...	Data not comparable	...	1982.6
• Unión Com.	557	...	1 382 810	7.80	...	...	Data not comparable	...	1974.2
Quito									
• Alborada	26	23	65 156	0.38	52	88	...	...	1971.2
• Car-Tarq.	88	80	482 144	1.50	190	93	...	...	1983.9
• Sae Sur	25	19	134 400	0.40	47	85	...	...	1977.2
• Libertad	119	101	382 946	2.69	223	95	...	...	1973.0
• Municipal	9	7	34 960	0.32	65	46	5	15	1983.7
• Municipal ⁱ	70	54	459 000	1.80	350	50	...	...	1988.7
Buenos Aires									
• Nuevos Rumbos	82	...	482 565	2.40	236	75	—	11	1984.3
• San Vicente	229	226	1 954 747	3.91	616	81	—	9	1982.3
• Micro Omn. Norte	392	361	3 590 264	6.51	1 364	79	—	12	1984.1
• San Lorenzo	30	28	198 536	0.54	105	68	—	18	1981.0
• T.A. Plaza	47	43	262 882	1.17	144	76	—	9	1981.9

Source: Case studies performed for ECLAC.

^a City-wide data for all private-sector buses.

^b Data not made available by the associations. Bus owners are responsible for maintenance, i.e., the associations do no employ maintenance workers

^c Excludes 582 buses officially considered to be under repair, but in fact probably waiting to be scrapped or sold.

^d Bus owners are responsible for maintenance.

^e Data include employees assigned to repair work (as opposed to maintenance).

^f Data refer, so far as possible, solely to regular bus services — i.e., they exclude charter operations, in which all four companies were heavily engaged in until 1990. For statistical purpose, the private companies Viplan, Pionera, and Alvorada apparently attribute to regular services personnel who actually perform charter services, as a means of pressing for higher fares.

^g Data refer to regular-size buses.

^h Data refer to smaller-size buses.

ⁱ Bus owners are responsible for maintenance.

^j Data are for 1991.

Table 6

**INDICATORS OF OPERATING EFFICIENCY FOR SELECTED
LATIN AMERICAN URBAN BUS COMPANIES**
(Data for 1988-1989)

City/Company	Bus-km per month per operating bus	Employees per operating bus	Passengers per operating bus per day	Bus-km per employee per month
São Paulo				
• Private	6 519			
• <u>CMTC</u>	5 903	5.51	769	1 183
La Paz		8.61	621	686
• <u>EMTA</u>	4 750			
• S. Bolívar	1 914	5.35	465	887
• V. Victoria	2 272	—	466	—
• P.D. Murillo	1 937	—	496	—
• E. Avoroa	1 847	—	459	—
• San Cristobal	1 930	—	474	—
• Litoral	3 414	—	398	—
Santiago			565	—
— ^a	7 561	3.42	534	2 210
— ^a	—	—	281 ^b	—
Lima				
• <u>ENATRU</u>	7 533	8.60	1 378	876
• San Miguel	8 493	5.91	1 708	1 437
• San Judas	8 400	6.35	1 822	1 292
• Lima Metro.	8 000	5.74	847	1 394
• SOTISA	6 000	3.56 ^c	746	1 687
Havana				
• <u>Emp. Omn. Urb.</u>	7 250	7.76	2 465	934
Brasília				
• <u>TCB</u>	—	—	379 ^b	1 397
• Viplan	—	—	337 ^b	1 174
• Pionera	—	—	391 ^b	1 269
• Alvorada	—	—	655 ^b	1 166
Mexico				
• <u>Ruta-100</u>	8 850	7.57	2 380	1 169
Bogotá ^d				
• La Nacional	4 441	3.00	507	1 480
• Copenal	4 492	3.00	505	1 498
• Sidauto	3 600	3.00	540	1 200
• Sidauto	4 625	3.00	500	1 542
• Cooptrans.	4 615	3.00	500	1 539
• Union Com.	4 174	3.00	518	1 392
Quito				
• Alborada	2 833	2.26	620	1 253
• Car-Tarq.	6 027	2.38	701	2 538
• Sae Sur	7 074	2.47	786	2 860
• Libertad	3 792	2.21	978	1 717
• <u>Municipal</u>	4 661	8.67	1 572	538
• <u>Municipal</u> ^e	8 500	6.48	1 333	1 311

continues

Table 6, concluded

City/Company	Bus-km per month per operating bus	Employees per operating bus	Passengers per operating bus per day	Bus-km per employee per month
Buenos Aires				
• Nuevos Rumbos	6 032	2.95	1 107	2 045
• San Vicente	8 649	2.73	639	3 173
• Micro Omn. Norte	9 945	3.78	666	2 632
• San Lorenzo	7 091	3.75	711	1 891
• T.A. Plaza	6 114	3.35	997	1 826

^a The associations supplied only a limited amount of confidential data. Bus owners are responsible for maintaining their own vehicles; the associations do not employ maintenance personnel.

^b Per bus in the fleet, rather than per bus actually operating on a given day.

^c Does not include bus owners who drive their own vehicles, so the figure is not comparable to the others in this column.

^d Data for Bogota were estimated separately for buses and *busetas*, based on general information about the number of passengers per day per unit and the proportions of buses and *busetas* in each company's fleet. The number of employees per vehicle includes contract personnel working in areas such as independent maintenance shops. The information was not generated by the project, but rather by the National Planning Department, as part of an analysis to determine the desirability of liquidating the Bogota trolleybus company.

^e Data for 1991.

The indicators in table 6 are not very sophisticated. As already mentioned when referring to intercity comparisons of service quality, there is little sense in trying to calculate sophisticated measures from unreliable data. However, even the relatively crude indexes presented cannot always be taken at face value as a just measure of the operating efficiency of one company compared with that of another, for reasons such as those mentioned in previous paragraphs.

In general, the nature of the basic company data makes intracity comparisons more valid than those between cities. In both tables, the statistics referring to publicly owned companies are underlined. In the following paragraphs, a comparison will be made of the efficiency of public and private companies for cities where both kinds operate.

1. São Paulo

In some ways, this is a good case to study, since the available statistics are relatively reliable and both public and private operators provide the same types of services with the same types of buses. Moreover, all companies in the city employ fare collectors.

In São Paulo in 1988, the municipally owned CMTC employed 8.6 people per operating bus, as against an average of 5.5 for the private companies. The latter figure is relatively high in comparison with other Latin American cities, due to the employment of fare collectors and the use of relatively large buses. These are mostly single-deck rigid-chassis vehicles, although CMTC operates some locally built double-deck buses. Excluding fare collectors, the private companies employ 3.25 staff per operating bus, a figure of the same order of magnitude as that for private operators in Buenos Aires, which is the normally accepted model for efficiency.

However, 18.4% of CMTC employees were engaged in tasks not directly related to the operation of the company's buses, such as controlling concessions granted to the private companies, administering the city's transport museum, etc. Excluding these people, the company had 7.0 employees per operating bus,

which was still 28% higher than the private companies. CMTC employed 2.9 drivers and 2.8 fare collectors per operating bus, as against 2.1 and 2.3, respectively, for the private companies. This probably reflects the greater susceptibility of the municipally owned company to trade-union pressure or better compliance with labor and social legislation.

On the other hand, CMTC employs fewer people for maintenance, 0.44 per operating bus as against 0.66, in spite of using buses that are slightly older, on the average, than those of the private companies. This helps to explain the lower availability of buses in CMTC, which has 80.4% of its total fleet in operation as against 90.4% for the private companies. All bus companies in São Paulo are required by municipal regulations to maintain 10% of their total fleet as a reserve, over and above what is needed to comply with required frequencies on routes operated. What happens in practice is that buses undergoing maintenance or repair are counted as being in reserve.

The mean age of CMTC's fleet in 1988 was slightly greater than that of the private companies, 5.9 years versus 5.4. However, certain private fleets considerably exceeded the mean age of CMTC's fleet. Two companies had buses that averaged ten years old, some of which dated from as long ago as 1971. In general, the authorities in large Brazilian cities do not have to require private bus operators to withdraw elderly buses from service. The companies do so voluntarily, because of the higher maintenance costs of older vehicles.

The buses that CMTC really operates cover 5,900 km a month, as against 6,500 km for the private companies. These figures are thought to include only revenue mileage. CMTC runs as much as 15% of its total bus mileage on non-revenue-earning work, one reason being that its routes are spread over the whole city area. In contrast, each private company concentrates on a specific geographic slice of the market and can consequently locate its garages closer to its routes. CMTC buses also carry fewer passengers per day than the private ones. To some extent, this is because its routes have, on the average, a lower rotation of passengers in 1988, the year to which the statistics refer. In this respect, the situation of CMTC compared with the private companies was reversed in the mid-1980s.

Under *ceteris paribus* conditions, CMTC would probably be slightly less efficient than the private companies, but in 1988 the difference was only about 10%.

2. La Paz

In La Paz, Bolivia, the publicly owned company compares badly with the private companies. Its major problem is getting its buses onto the road. Once there, they seem to operate reasonably well.

During its short life, the Empresa Municipal de Transporte Automotor (EMTA), together with its nationally owned predecessor, Empresa Nacional de Transporte Automotor (ENTA), La Paz branch, has fallen victim to many of the ills that can afflict publicly owned bus companies in Latin America. EMTA owns a fleet of 120 buses. The only ones actually operating in early 1991 were between 20 and 30 out of 88 full-size, rigid-frame, 33-seat, Argentinean-built FIATs. Counting only the FIATs, between 67% and 77% of the fleet was nonoperational. None of EMTA's buses of other makes (Mercedes Benz and Dodge from Brazil), were in operating condition. For the fleet as a whole, the unavailability ratio thus reached approximately 80%, an exceptional figure even for a publicly owned bus company in Latin America. No comparable figures are available for the privately owned buses in La Paz, although their availability ratios are undoubtedly much higher.

The causes of the alarming situation regarding the availability of EMTA's buses are various:

(i) The buses were all bought hurriedly in 1984 and 1985 without much attention being paid to their suitability. The overwhelming political priority at the time was to get ENTA (as it then was) working [ECLAC, 1987a].

(ii) The haste with which the company was formed meant that its La Paz branch did not have any garage facilities to give its buses more than routine maintenance. This is still the case under municipal ownership.

(iii) The company suffers from excessive political interference. For instance, one problem early in 1991 was that the Municipality of La Paz, to which the company belongs, wanted to switch EMTA's base from El Alto to La Paz itself. This makes little sense from the operating point of view, since the most convenient place to park the buses overnight is in El Alto, where the vast majority of the passengers live. The Municipality of El Alto also objected to the move on the grounds that the base in El Alto provided employment to local residents.

(iv) The company's workers exert excessive influence over management. For instance, it is generally recognized that the bus drivers pocket a significant portion of the fare revenue. To stop this practice, management started to fit the buses with turnstiles, but had to abandon the idea due to pressure from the drivers. In a letter to the Mayor of La Paz in January 1991, the workers demanded the replacement of the current general manager within 48 hours as a prerequisite for their collaboration. The workers' influence of is out of proportion to the extremely limited role that EMTA plays in the city's transportation.

EMTA's financial performance is aggravated by other factors, which also have an impact on the technical efficiency of the company. For example, (i) as mentioned, not all the fare money paid by passengers finds its way into the coffers of the company; (ii) the company operates routes with low passenger turnover, essentially as a social service for low-income workers in El Alto who commute daily to La Paz; and (iii) the nature of demand makes for acute peaking. These factors restrict the volume of resources available to fund bus repair and other potential rehabilitation projects.

The buses that EMTA does get onto the road cover an average of 4,750 km a month, a low figure even when compared with other publicly owned bus companies in Latin America. Nonetheless, it is substantially higher than the average calculated from the statistical returns reported by the private bus syndicates in La Paz. Their vehicles cover only around 2,000 km per month, which is very low by any standards. One cause of the extremely low productivity of private buses is that they run largely over congested streets within the city of La Paz itself. In contrast, EMTA buses operate almost exclusively between a point just beyond where the congestion really begins and suburbs and satellite towns further out (El Alto and Viacha). Another cause is the fact that the private bus owners only operate when they choose to do so. This would normally be in the peak periods, but some owners make a point of not operating at such times precisely to avoid getting trapped in the prevailing congestion.

EMTA and the private companies both report carrying about the same number of passengers per day per operating bus. However, since EMTA's vehicles are larger and cover more than twice the daily distance, they should carry more. In fact they do, since EMTA's statistics do not include passengers –estimated to be 30% of the total– whose fare revenue is usurped by the drivers. On the other hand, most of EMTA's routes have an intrinsically low passenger turnover. Management stresses the company is not profitable because it is not intended to be profitable. Its purpose is to operate socially desirable but commercially unattractive services.

EMTA employs 5.5 people per operating bus, which is not an exceptionally high figure in a general sense. In this case, however, appearances are largely deceptive. EMTA does not carry out more than routine maintenance, even though it employs 46 people in maintenance activities. Fare collectors are not used in buses in La Paz, and indeed EMTA does not need them, since passenger turnover is low. If it did, the staff per operating bus ratio would increase to about 7.76, approximately the same as in the publicly owned companies in Mexico or São Paulo.

The operational problems experienced by EMTA in getting its buses into service have parallels with certain ex-ENTA urban bus divisions in other Bolivian cities. However, one bright spot is Cochabamba, where the municipally owned Transporte Municipal Masivo (TMC) managed to operate 18 of its total fleet of 32 buses and had another 12 ready to enter service once it could finance new tires and paint. The necessary funds were to be obtained by selling a surplus bus. EMTA in La Paz started auctioning off unneeded equipment, but this was halted on suspicion of irregularities in the bidding process.

3. Lima

The Lima division of the State-owned Empresa Nacional de Transportes Urbanos (ENATRU) is another bad example of a publicly owned bus companies. Like EMTA, it has a serious problem getting buses onto the road, but also gets quite good mileage out of those it does succeed in putting into service. On the other hand, it is more heavily overmanned than EMTA.

In 1988, ENATRU had a total fleet of 1,220 buses in Lima, all single-deck and mostly rigid-frame models except for 65 articulated vehicles. Of this total, 582 were officially classified as being under repair, although in fact they were not. It would be fairer to say they were laid aside for lack of parts. Of the remaining 638, 523 normally operated on any given day, i.e., 82% of the 638 vehicles in what might be termed the service fleet, but only 43% of the total fleet. The average age of the buses in the service fleet was 7.5 years in 1989.

Privately owned buses in Lima are generally older than ENATRU's, in some cases much older, but the companies report better availability ratios. For instance, one (San Miguel) whose 25 buses averaged nearly 30 years of age operated 88% of them daily, the rest being stopped for maintenance or repairs. Part of the cost of keeping such elderly buses going is the employment of a large number of maintenance staff, i.e., 1.6 per operating bus. No breakdown of ENATRU staff by function is available; although in other cities, ratios of between 0.5 and 1.0 are the norm.

Of the private-sector companies surveyed in Lima, all had availability ratios of 80% or above, and almost all ran fleets with average ages significantly greater than that of ENATRU.

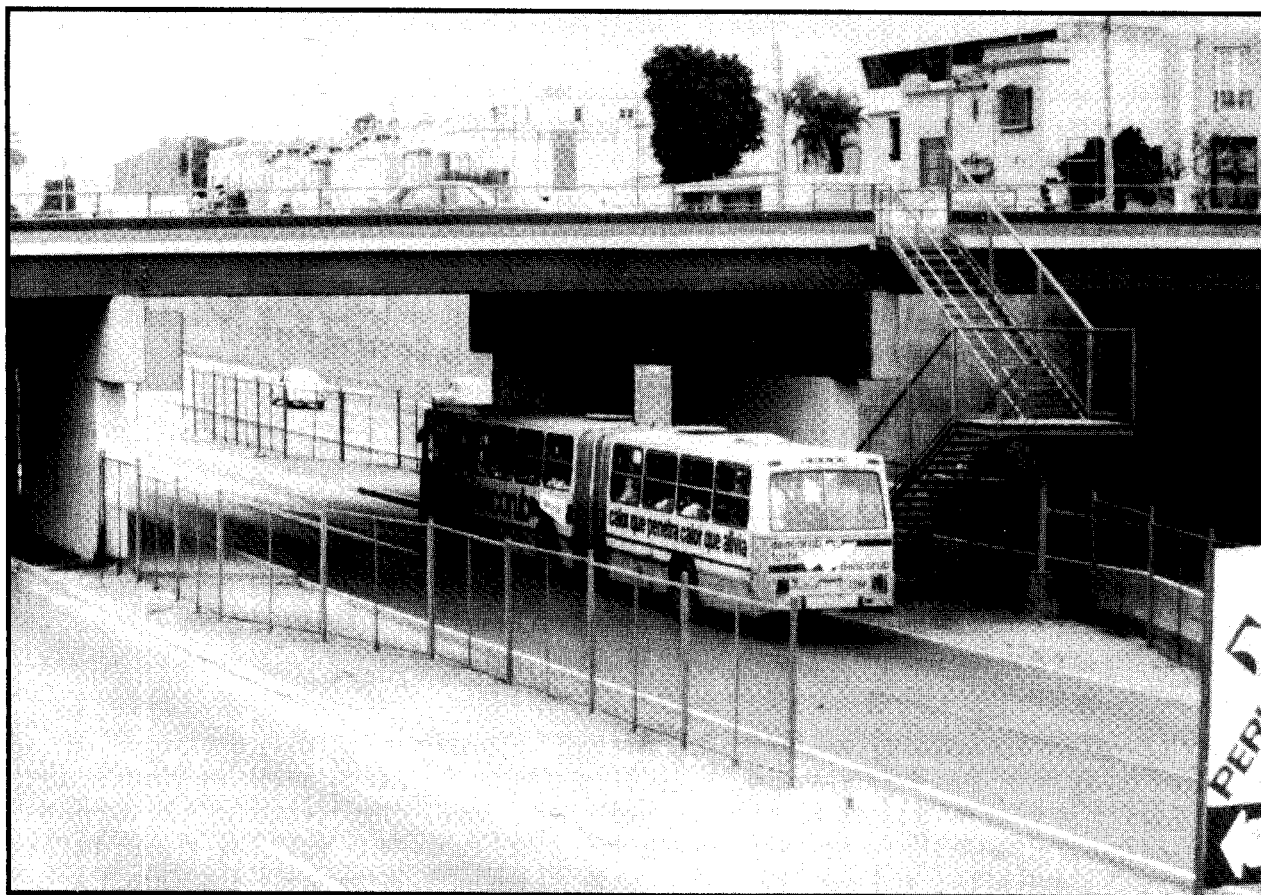
ENATRU's Lima division employed a relatively high 8.6 people per operating bus in 1989. The number of people on ENATRU's nationwide payroll shot up from 3,356 in 1985, to 3,839 in 1986, and to more than 6,000 in the following year, following a change in the national government.

Comparable staff-to-bus ratios are not available for all private companies in Lima, some of which are associations of individual owners, each responsible for their own maintenance. However, San Miguel owns both buses and maintenance facilities, and employed 5.9 people including 1.3 fare collectors per operating bus. A comparable company, Lima Metropolitana, employed 5.7 people. The private companies all employed fewer staff per bus than ENATRU in spite of using fare collectors, which ENATRU only does on its articulated buses.

Each ENATRU bus actually operating in Lima averaged 7,500 km a month, quite a respectable figure although slightly lower than the average for the private companies. Although congestion is not as acute in Lima as it is in many other cities, ENATRU enjoyed a significant advantage compared with the private companies in that it had exclusive use of the median strip of the Paseo de la República, along which its buses reached speeds of over 70 km/hr and averaged about 40 km/hr, including stops [Dell'Orto, Barriga, and Vásquez; 1979; and ECLAC, 1985]. This is double the speed of buses on the regular road network in the same corridor. ENATRU ran three express services along this strip, which carried 15% to 20% of all its passengers.

ENATRU is a publicly owned company, some of whose operating indexes are not much inferior to those of private operators in the same city. However, on analyzing the situation further, the company seems to be wasting resources. Its indexes should not be somewhat inferior to the private operators'; they should be markedly superior, due to ENATRU's advantageous situation. The government finances its buses, which are thus much more modern on the average than those of the private companies. Despite this advantage, ENATRU gets a lower proportion of them into service than do the private concerns. It employs more staff per bus, in spite of one-man crews (apart from the articulated vehicles) and running more modern vehicles that should require less maintenance. The buses it does manage to operate do not achieve the high mileages to be expected from fairly modern vehicles running over relatively uncongested streets, with a significant proportion on an exclusive busway from which private-sector buses are barred.

Given these conditions, it was not surprising that the new national government which took office in 1990 decided to privatize ENATRU. By early 1992, a plan had been drawn up whereby the company's own workers would be invited to purchase the buses.



One of ENATRU's articulated buses stops at a station on the busway in the median of Lima's Paseo de la República.

4. Mexico

In Mexico's Federal District (Mexico City), all bus services except trolleybuses are provided by one State-owned company known as Ruta-100 (R-100). Because there are no competing private services with which to compare, it is difficult to evaluate the efficiency of R-100. Nonetheless, all indications lead to the belief that it suffers from the same ailments as ENATRU and EMTA. According to data from the late 1980s, it is probably overmanned and is certainly incapable of getting a reasonable proportion of its buses onto the road. However, like the publicly owned companies in Lima and La Paz, it apparently gets quite respectable mileage out of those vehicles it does succeed in placing in service.

R-100 employed 7.6 staff per operating bus in 1988, despite not using fare collectors. It employed the extraordinary number of almost four drivers per operating bus. Among the cities surveyed, this figure was only equalled in the municipally owned company in Quito, which, with only nine buses in its fleet in 1988, was probably unable to reach an efficient scale of production. More than half of R-100's buses were out of operation. Figures for a week in June 1988 reveal that only 35% of the buses operated on any one day. For an unexplained reason, the weekday turnout averaged 28%, while on Saturday and Sunday, when demand falls off, 51% were in service. On weekdays in October, November, and December, when the total fleet size had been reduced, presumably by withdrawals, 47% were actually operating. The estimated figure for the whole year was 42%.

By early 1991, R-100 had reacted to these very low availability ratios by proposing to dispose of buses it had no hope of repairing and returning to service. This would effectively cut the total fleet in half. The remainder would be only new or reconstructed vehicles.

Each bus in service operated an estimated 8,850 km per month. This is higher than in most other cities, but conditions in Mexico City are not the same as those elsewhere. Many of R-100's routes operate in exclusive lanes on highway axes created by municipal authorities to enable nonlocal traffic to avoid the worst congestion. Use of these lanes improves bus productivity. On the other hand, ridership shows sharp peaking. For instance, the peak hour is 07:00 to 07:59, when 5.5 times as many people are carried as between 11:00 and 11:59. Comparable data are not available for more than a few companies in a limited number of cities, but a ratio of two or three to one seems normal. If service frequencies are adapted to the temporal variations in passenger demand, the mean mileages achieved by buses would tend to be lower than would otherwise be the case.

The national and Federal District governments were planning to reorient the subsidized R-100 route structure so that it concentrate on serving lower-income families in noncentral zones. Main routes on the highway axes were to be tendered out to private companies, which would be required to operate superior services for fares set to cover all their costs with no need for a subsidy.

5. Havana

As in Mexico City, bus transport in Havana, Cuba, is provided entirely by a sole State-owned, municipally controlled company known as the Empresa de Omnibuses Urbanos de La Habana. Just as in comparable cases, this company's buses have low availability (69%) but those which are put onto the road achieve reasonable mileage figures (7,250 km per month). Some complaints are heard that the company's buses, which it has to acquire from specific countries or have assembled locally from parts provided by the same countries, are technically unreliable. Certain high-ranking government officials responsible for urban transport would prefer to be able to source buses elsewhere, but transport in the city is subject to international trade policy.

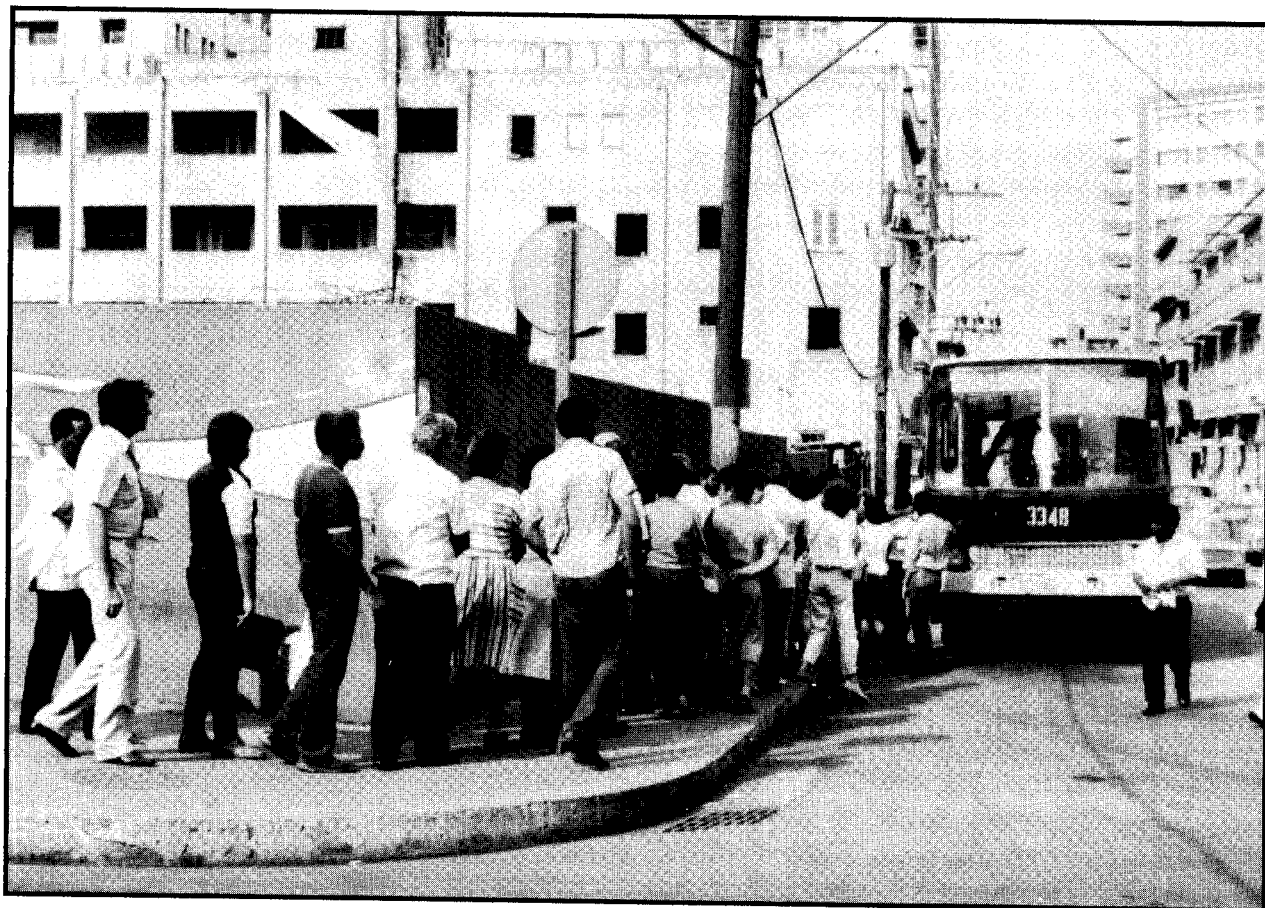
Fares are collected by the drivers. Even so, the ratio of 7.8 staff per operating bus ratio is very high.



A Ruta-100 bus picks up passengers at a stop on an exclusive lane on one of Mexico City's main highway axes.

As in Mexico City, buses in operating condition were in short supply in Havana, compared with the passenger demand in 1988, and even more so in 1991. Each bus in service thus had to carry an exorbitant load of approximately 2,400 passengers per day in each case. Heavy passenger loadings cause excessive wear on engines, transmissions, brakes and suspensions, thereby aggravating maintenance problems. The 1991 service cutbacks caused by fuel shortages must have made these problems even worse.

The financial situation of the company, and its ability to pay for bus repairs from its own resources, would improve if it received fare revenues from all passengers, an estimated 25% of whom travel without paying. Boarding passengers are expected to deposit the correct coins in a box, but since there are no tickets, it is impossible to determine who does not pay. This problem is by no means unique to Havana. As mentioned, it also occurs with EMTA in La Paz.



Havana's bus passengers form long queues at stops

6. Brasilia

Data deficiencies complicate the making of a worthwhile comparison between the publicly owned company TCB and the three private companies that operate in Brasilia. The latter probably inflate the number of staff really assigned to regular bus services, as opposed to charter services, in order to make their costs appear higher than they really are as a form of pressuring for higher fares. No figures are available on the percentages of the bus fleet which are operated. However, TCB's monthly mileage of 5,600 km per bus is lower than the 6,000 to 7,100 km of the three private companies, and its buses are considerably older.

7. Quito

In Quito, a municipally owned company operates alongside a number of private route associations. Data for the municipal company were collected as a part of the case study proper, for the period up to 1988. At that time, it operated just nine buses, six of which were the only imported double-deck urban buses found anywhere in Latin America. It employed 8.7 people per operating bus, perhaps because it was unable to achieve scale economies.



Passengers board one of Quito's double-deck buses at a stop on the Amazonas Avenue. These buses are too high and too long to use streets in the city center.

Subsequently, further data were obtained pertaining to 1991, by which time the total fleet had increased to 70 vehicles, which included the same six double-deck buses owned in 1988, 40 new Ikarus (Hungary) articulated buses with Cummins (United Kingdom) motors, and 24 locally produced rigid-frame single-deck Botar vehicles.

Although the mean age of the entire fleet was little more than two years in 1991, only 77% of the buses owned were operated on any one given day. The company's managers complained both of the cumbersome and bureaucratic procedures for importing spare parts, and of the quality of some features of the Ikarus buses, particularly brakes and the body shell. The company's income from fares was not covering operating costs, and it had a negative cash flow that in turn reduced its autonomy regarding the acquisition of spare parts, for which separate financing had to be arranged. The situation in this regard resembles that in La Paz.



When new, EMT's Hungarian-built articulated buses looked like this, but inadequate maintenance soon put many out of service.

The staff-to-bus ratio had declined by 1991 to a more reasonable 6.5, including three drivers. Monthly mileage had risen to an acceptable 8,500 km per bus, due in part to the relatively free-flowing traffic conditions found on some of the routes. On the most productive route, mean commercial speed was 25 km/hr, and buses assigned to it were covering a very high 12,000 km each per month. The number of passengers per operating bus had declined from 1,572 to 1,333 per day, while staff productivity in terms of bus-km per staff member had more than doubled.

Compared with private buses in Quito, municipal buses had lower availability ratios in spite of being much newer. Many more staff per bus were employed, which to some extent was due to the publicly owned company complying more closely with labor laws, and allegedly being stricter about paying social security contributions on behalf of employees. More people were carried per bus, which is related to the considerably greater unit capacity of the publicly owned buses.

The higher mileage per operating municipal bus per month, as compared with the privately owned buses, is related to traffic conditions on the routes plied. Furthermore, private bus mileages are relatively low compared with those in other cities, in part because these buses do not normally run after 20:00 hours. This custom seems to go against economic logic. Most buses are rented by their owners to the

drivers, who pay a fixed amount per day. Fares are low, probably the lowest among all Latin American capitals in April 1991 (the equivalent of 0.06 dollars per ride), and drivers maintain that they must carry 1,000 passengers just to cover costs. In 1988, the reported number of passengers per private bus fell short of this figure, although conditions at that time might have been different and there might well have been significant underreporting of the number of passengers carried. Still, drivers do not normally work after 20:00 hours when, although the number of people wishing to travel would be relatively low, the revenue earned would accrue directly to the driver as net income. Apparently, after working through from the beginning of the morning peak period, drivers prefer leisure to money.

8. Bogota

In the case of Bogota, only private operators are recorded in tables 5 and 6. However, the Empresa Distrital de Transporte Urbano (EDTU), a company belonging to the Special District of Bogota (equivalent to a municipality) runs trolleybuses and a few diesel-engined regular buses. The Special District is considering closing this company, on the basis of a study which concluded that it was inefficient compared with private operators. For instance, the study found that EDTU employed 11 people per bus, versus three for private operators (a figure which is thought to include outside maintenance staff contracted by bus owners when needed).

B. CONCLUSIONS REGARDING THE RELATIVE OPERATING EFFICIENCY OF PUBLICLY OWNED COMPANIES

In general, the figures indicate that the biggest problem experienced by publicly owned bus companies in Latin America is that of getting their vehicles onto the road. Once there, they often perform respectable mileages, frequently better than those of private buses. The relatively satisfactory volume of work obtained reflects the very fact that there are too few of vehicles in service, requiring that each one on the road be worked intensively in an attempt to fulfill programmed frequencies. In some cases such as Mexico and Havana, this leads to their carrying an undesirably large number of passengers per day. Intensive use of those buses actually operating means they require more frequent maintenance. This in turn increases the consumption of spare parts, whose delivery is sometimes delayed by cumbersome bureaucratic ordering procedures. In the meantime, buses needing parts cannot be used, availability ratios sink even further, and pressures mount on those which do operate.

Sometimes, a bus taken out of service for lack of parts is cannibalized to keep others of the same type running. When this happens, the likelihood that the bus will never again be returned to service increases markedly.

Maintenance problems are probably further aggravated by the fact that buses owned by public companies are driven, for the most part, by any number of drivers during the course of the week or month. Drivers are assigned according to rosters that do not normally allocate them to the same bus for any length of time, and hence they do not naturally treat the vehicle that happens to be assigned to them with any particular care and attention. In the larger privately owned companies, especially in Brazil, the situation tends to be the same. In the kinds of associations of bus owners traditional in Spanish-speaking Latin American countries, however, buses are usually driven most of the time by the same driver, who might also be the owner. Although impossible to quantify, this probably tends to reduce the amount of time a bus spends out of operation for repair and maintenance, while lengthening its economic life. A private company that won a concession to operate premium-quality bus services in Guatemala City, as from April 1991, began by rotating drivers among buses on productivity-maximizing rosters. After a couple of months, it decided to assign just two drivers to each bus, to encourage treating the vehicle with care.

In the countries belonging to the Organisation for Economic Co-operation and Development (OECD), the situation regarding bus availability in publicly owned companies and the use obtained from those buses actually operated is the reverse of that in Latin America. In 1983, the availability ratios of buses in Berlin, Chicago, London, and Paris were 85%, 93%, 88%, and 87%, respectively. On the other hand, monthly mileages were only approximately 2,975, 3,125, 5,050, and 3,550 in those same cases [World Bank, 1986, table A-2]. The reasons for this inverse situation in the developed countries are various, including: (i) spare parts are often made locally, which reduces delivery delays; (ii) lower off-peak passenger demand reduces the need for buses to operate outside peak hours; (iii) management techniques are often better and preventive maintenance is carried out more frequently; and (iv) there is less political meddling in bus company administration.

Staff employed per bus operated definitely tends to be high for publicly owned companies in Latin America, sometimes ridiculously so. It is very difficult to understand, for instance, why each bus operated by R-100 in 1988 needed almost four drivers. Of course, the situation really had more to do with a scarcity of available buses than with a surplus of drivers. Public companies sometimes have quite respectable ratios of staff per bus in the fleet, including those which are not in operation. In the case of the same Mexican company, for instance, the number of staff per bus in the fleet was 3.18 in 1988, compared with 7.57 per bus in operation. Labor laws limit the ability of publicly owned companies to rid themselves of excess staff, and the political repercussions of any mass layoffs worry the government-appointed directors. People elect governments and buses don't, which makes it easier to get rid of unused buses rather than unused employees.

Another way to provide gainful employment to currently excess staff is to expand operations. However this option has not been frequently used by publicly owned bus companies in Latin American during recent years. Apart from the prevailing world political climate being against it, existing private-sector operators would object to a publicly owned company being set up, or expanded, to compete with them.

One exception to this rule is Ecuador, where the municipal bus company in Quito is expanding, in spite of objections from private operators. But this expansion is not motivated by any need to utilize staff more productively, although this did happen. A public-sector bus undertaking is even being initiated in Guayaquil.

Publicly owned bus companies sometimes report quite low daily ridership figures, due in certain cases to their operating routes with low passenger turnover. Some companies, such as the Empresa Municipal de Transportes in Quito, have as an objective the supply of bus services to low-income suburbs, which sometimes results in low passenger turnover. The Empresa Municipal de Transporte Automotor in La Paz operates long routes to and from low-income zones in the neighboring municipality of El Alto, with few passengers getting on or off at intermediate points.

In La Paz, bus operations seem very inefficient, not only due to the ineffectiveness of EMTA but also to the very low mileages achieved by private buses. The topographical constraints and the inadequate nature of the city street network contribute to this situation, but over and above this, there seems to be some sociological reason which leads bus owners to prefer not to run their vehicles very intensively. The same phenomenon sometimes occurs elsewhere in the region. For instance, in the early 1980s, the collective taxi owner/drivers of Caracas often took their vehicles out of service early in the evening peak period, once they had earned what they considered to be a reasonable amount of money, forsaking the opportunity to earn even more in the latter part of the period. The same phenomenon is observed in the case of Quito private-sector buses.

The relative inefficiency of private-sector buses in La Paz, compared not so much with those of EMTA as with private sector buses elsewhere, is also probably related to the principles used for fare fixing, which apparently make operating *trufibuses* significantly more profitable than regular buses, whose

owners reportedly have bought *trufibuses* on a large scale. In early 1991, fares were realigned in such a way that higher increases were granted to buses than to *trufibuses*, in an attempt to stimulate the supply of the former relative to the latter.

C. THE CAUSES OF INEFFICIENCY IN PUBLICLY OWNED BUS COMPANIES

There are no grounds for concluding that publicly owned urban bus companies cannot be reasonably efficiently run. For instance, in 1988, the CMTC in São Paulo was probably no more than 10% less efficient than private operators in the same city. Its large deficits were mainly due to other factors. Nevertheless, some publicly owned companies are undoubtedly inefficient. Is it possible to identify the causes of their inefficiency, in the hope of avoiding making same mistakes again?

In two cases, ENTA/EMTA in La Paz and R-100 in Mexico, a fundamental cause of the inefficiency was the hasty formation or over-rapid expansion of the company. In Bolivia, the extremely hurried formation of ENTA left little time for developing a logical management structure or for ordering the most suitable buses. ENTA acquired a fleet of new full-sized FIAT buses from Argentina, where they are rarely seen, and Renaults from France, which are very scarce in all parts of Latin America. Maintenance problems occurred with both types. The FIATs were ordered with spare parts, but the kinds of they were sent with were not the ones most needed.

In Mexico, R-100 was a small publicly owned company which, towards the end of 1981, suddenly found itself operating bus fleet for the entire Federal District. It could not –and should not have been expected to– cope with this situation.

Other causes of inefficiency are the spreading of resources over too wide an area, and the control by national governments of local urban bus undertakings. ENTA did not concentrate its resources in just the largest cities of La Paz, Cochabamba, and Santa Cruz. It also maintained a presence in Oruro, Potosi, Sucre, Tarija, Trinidad, Cobija, and Villazon, undoubtedly for political reasons. To the latter two towns, ENTA assigned three and two buses, respectively, which must have been virtually useless as a means of transportation and would have required the allocation of staff, garage space, spare parts, etc., out of all proportion to the utility derived from any services actually provided. Some municipalities, such as Santa Cruz, have ceased operating the buses assigned to them. In certain others, opinion at high levels favors doing the same. In La Paz, EMTA continues to operate, providing some useful services but in an inefficient manner. In Cochabamba, the management of the ex-ENTA affiliate, if not its political masters, has succeeded in raising levels of efficiency.

ENATRU operates not only in Lima, but also in Arequipa, Cuzco, Trujillo, and other cities, most of which are of reasonable size. However, it makes little sense to run a company from the national level when it has independent operations in various cities. The only important potential benefit would be derived from large-scale ordering of buses of standard design, but one model is not always appropriate in cities of differing sizes. The administrative structure of such a company is likely to be bloated, with unnecessary levels of management, bureaucratic methods, and an undesirable degree of centralization. In Bolivia, the nationally owned ENTA was dismembered and its buses and facilities handed over, free of cost, to the municipalities where they happened to be stationed.

The excessive spreading of operations also produces inefficiency at the city level. For instance, CMTC in São Paulo runs too much unproductive mileage as a result of moving buses from its garages to the terminals of routes distributed geographically over the whole city. One independent observer has even commented on the time wasted by bus crews trying to find their vehicles in CMTC's vast parking areas.

Political meddling affects the efficiency of publicly owned bus companies in other ways as well. The Empresa de Omnibuses Urbanos de La Habana would probably succeed in operating a greater proportion of its buses if it were allowed to buy them where the best combination of price and quality is offered. Instead, it must acquire vehicles from sources dictated to it by the government, which is concerned about the shortage of hard currency. ENATRU in Peru is not allowed to freely choose its buses, but must accept those purchased by the national Ministry of Transport, to which they legally belong.

Efficiency is also probably adversely affected by the company being involved in activities outside its prime business of running urban buses. In Bolivia, ENTA operated interurban trucking services between Cochabamba and Santa Cruz, and ordered vast quantities of tires, not only for its own use but also for resale. CMTC runs the municipal transport museum. ENATRU charters buses to agencies which have no need to benefit from the subsidy it receives. The municipal company in Quito operates car parking lots. Such ancillary activities divert scarce management resources away from the activity for which the company was usually created and for which it is subsidized, i.e., operating mass transport services for low-income city dwellers.

For a publicly owned bus company to be reasonably efficient, the following conditions are necessary:

- (i) it should be dependent on the city government, rather than on a central or provincial government authority;
- (ii) it should have clear objectives, which need not be solely financial (indeed, if they were, forming a publicly owned company to serve them might be open to question), and management should be paid by results;
- (iii) management should be free to pursue those objectives, without political meddling but subject to strict norms of public accountability;
- (iv) blanket, deficit-covering types of subsidies should be avoided, and any subsidies conceded should be directed to specific ends in a way that permits cost-reducing incentives to be maintained;
- (v) it should not be required to do anything that could be done by private enterprise, since the chances are that the latter could do it better.

D. THE NEED FOR PUBLICLY OWNED COMPANIES

The need for publicly owned urban bus companies is not proven. It is clear that natural market mechanisms may not always generate the full array of transport services the community may consider to be socially desirable. This does not mean that publicly owned companies should be formed to provide them, but rather that some form of public intervention is desirable. The evidence is that private companies, almost universally, provide services with fewer resources, in terms of both vehicles and staff.

A need exists to ensure that the cost-cutting potential of the private sector is not usurped for the benefit of entrepreneurs, but rather passed on to the community. This entails some form of regulation, since the experience of Chile suggests that collusion and oligopolistic practices among operators are real threats. However, the kind of regulation needed has not hitherto been successfully applied in Latin America.

In cities where publicly owned companies have been broken up, it is undeniable that the quality of bus transport services has improved as a result. Prime examples are Buenos Aires and Santiago. However, such improvement is not automatic, but rather depends primarily on the existence of the political will to ensure that it takes place. The extent to which it occurred in Santiago is such that the increase in service quality has been embarrassing for the authorities and ultimately counterproductive, because the marginal benefits of services to users are almost certainly outweighed by greater marginal costs to the community as a whole.

Service improvement of the kind seen in Santiago even casts doubt on the opinion of most experts that the private sector cannot be relied upon to provide all socially necessary services. It was thought in Chile that the State might have to intervene to ensure that low-income suburbs had adequate transportation, provided either by a scaled-down version of the preexisting publicly owned company or by putting services out to tender and inviting bids from the private sector. As it turned out, neither of these measures was necessary, and all services deemed to be required were in fact supplied by the market.

If the market does not provide all necessary services, any that are lacking can be put out to tender, as in the United Kingdom. Another possibility is to distribute bus-ticket vouchers to low-wage earners, as in Brazil. Neither of these two schemes is particularly simple in the administrative sense, but they work well enough in their countries of origin.

E. STATE SUBSIDIES TO BUS COMPANIES

Although there are a few cases of subsidized private-sector companies, such as those in Brasilia and Guatemala City, most of the bus companies which are openly subsidized by the State in Latin America are publicly owned. Where public and private companies operate side by side, the former are normally subsidized by the State, while the latter are not.

Although sharply oscillating exchange rates, inflation, and fare levels created an inherently unstable situation during the 1980s, the most highly subsidized urban bus companies among the cities studied were CMTC in São Paulo and R-100 in Mexico. The latter received the highest absolute subsidy in 1988, while the former had the highest subsidy per passenger carried.

In 1988, CMTC incurred an operational deficit equivalent to 63 million dollars (at the average of the free and official exchange rates). The total deficit was 187 million dollars. These figures correspond to 0.11 and 0.33 dollars per passenger, respectively. The World Bank estimated the 1983 operating deficit to be 84 million dollars, although it is not clear what exchange rate was used in the comparison [World Bank, 1986, table A-2]. In 1988, operating revenue covered 73% of operating costs, whereas the ratio had been 41% five years earlier. There seems to be no clear trend in the amount of subsidy paid, although it has generally tended to increase over the years. It depends to a considerable extent on the political leanings of the current municipal government. Had the mayor's 1990 proposal to provide free bus transport been approved, the subsidy would obviously have increased to 100%. The increase would have been financed by property taxes.

R-100 in Mexico receives a budgeted subsidy and then, in addition, normally has its annual deficit made up from public funds. In 1986, the sum of these two forms of subsidy amounted to 212 million dollars, or 0.10 dollars per passenger. The operating deficit, estimated by excluding the items "Financial costs" and "Depreciation and others" from the total, was 155 million dollars, equivalent to 0.07 dollars per passenger.

Just as in the case of CMTC in São Paulo, R-100's subsidy fluctuates from one year to the next. However, in Mexico, the subsidy has much more to do with an explicit policy of offering low-cost public transport to city dwellers than is the case in São Paulo. In the latter city, private operators can cover their costs, including an adequate return on capital, at the prevailing fare level. In Mexico City, there were no private bus operators, but had there been, none could have hoped to cover even operating costs at the fare level of approximately 0.013 dollars prevailing in 1986. Since then, R-100's real fare level has increased, although it is still only about one third of that charged in São Paulo.

At average exchange rates, CMTC's 1988 bus-km costs were slightly greater than one dollar, whereas in 1986, R-100 costs were 0.75 dollars per bus-km. CMTC's are inflated by the general administrative functions that the company performs, and from the accounting data available, it is impossible to estimate the precise extent to which the subsidy it receives is due to such burdens that are not directly related to operating buses.

The Lima-based operations of ENATRU were deficit financed by an amount equivalent of 6.3 million dollars in 1988. In addition, buses were provided free by the Ministry of Transport. This implied a further subsidy of approximately five million dollars. The operating deficit corresponds to 0.03 dollars per passenger and the total subsidy is estimated at 0.05 dollars per passenger.

In Quito, EMT has its buses provided free and, in addition, runs an annual operating loss. The latter is not easy to estimate fairly, since the company operated only a handful of buses until the late 1980s, and then expanded rapidly. The provision of buses free of charge would imply a subsidy per passenger of approximately 0.02 dollars per passenger.

In La Paz, EMTA runs a small operational loss, but its buses are provided free. The implied subsidy would be of the same order as that of EMT in Quito.

In Havana, using as in the other cases an average of the official and market exchange rates, the urban bus company was subsidized to the extent of 7.9 million dollars in 1988. However, it paid taxes to the State, being probably the only publicly owned urban bus company in Latin America so to do. Crediting to it the taxes paid, the subsidy falls to 3.8 million dollars. At the official exchange rate, these dollar equivalents would be much more. Per passenger, at the average exchange rate, subsidies were minimal, being considerably less than 0.01 dollars per ride.

In all cases, the need for a subsidy is to some extent due to inefficiency. However, in most cases, this is compounded by other influences. CMTC's loss results partially from having responsibilities over and above simply operating buses. R-100 is also an inefficient company, but even if it were not, it could not be expected to cover costs at the fare levels fixed for it. ENATRU's loss can be more wholly attributed to inefficiency, for the company possesses various advantages that are denied unsubsidized private-sector companies. In Havana, the urban bus company's loss would be wiped out were all passengers to pay their fare.

F. IMPLICIT SUBSIDIES

Overt State subsidies are not the only kind possible. A mildly covert type is the free provision of buses to companies such as ENATRU, EMTA, and EMT. ENATRU's sole rights to use the exclusive busway in the median strip of the Paseo de la República in Lima, which it lost through deregulation, was a more covert form. The operating-cost benefit to ENATRU represented by just this section of busway amounted to approximately 400,000 dollars annually [Comisión Multisectorial de Lima, 1985]. Adding in capital cost savings, the total benefit probably reached half a million dollars a year. Since the end of the 1980s, bus lanes for private as well as ENATRU buses have been installed in other streets in Lima. However, since these streets were previously uncongested anyway, neither bus users nor operators benefit from them very much, if at all.

In various other cities such as Bogota, Mexico, Quito, São Paulo, and Santiago, buses benefit from the exclusive use of bus lanes on congested inner-city streets. This too could be considered a kind of subsidy, paid for in this case by other road users (car drivers and trucking companies, or by the consumers of the products transported by trucks). However, it would not generally be fair to treat the use

of exclusive lanes as a subsidy. Buses do not normally cause the congestion from which the lanes separate them, but rather are caught up in congestion generated primarily by other vehicles. Allowing buses to use exclusive lanes is thus simply a way of partially correcting the situation.

The impact of bus lanes on implicit subsidies is a complex matter. If buses get caught up in car-generated congestion, bus users (and, to a lesser extent, bus operators) subsidize car users. If exclusive bus lanes are installed, this effective subsidy can be reduced or eliminated. The installation of bus lanes should be accompanied by fare reductions to ensure that cost savings are passed on to passengers and not usurped by bus operators.

Not having the right to use exclusive lanes could be considered as a negative subsidy to bus users. However, the situation varies from one case to another. In some cities, taxes of different kinds paid by car users on fuel and the vehicles they use go a considerable way towards covering the infrastructure and congestion costs they cause, although it is true to say that car users are normally effectively subsidized by the rest of the community in heavily congested inner city conditions.

Having sole rights to operate a certain route or corridor might also be thought of as a kind of implicit subsidy provided by the passengers, who might pay lower fares or benefit from better service levels were there to be more competition. However, this point is debatable. In Santiago, competition led to higher fares, as well as to an increase in service levels so great that it was probably counterproductive, in the sense that the buses sometimes got caught up in their own congestion. While passengers traveled in less crowded conditions within buses, travel times were probably longer than necessary. Were there to be economies of scale in the provision of urban bus transport, free competition might be counterproductive on this ground too, but it is doubtful whether such economies do in fact exist, beyond very low levels of production.

Bus operation, be it provided by public or private companies, is also affected by negative implicit subsidies. These may be paid by passengers (which is the usual case), by bus companies or their employees, or by those companies or employees who would be engaged in the sector if the negative subsidies had not discouraged them. The impact of undertaxed car and truck traffic has already been mentioned.

One form of negative implicit subsidy common in Latin America is the requirement to carry special groups of persons, such as school children or elderly people, free or at cut-rate fares, without the government providing any compensation. The requirement may or may not be reflected in the fares fixed by the competent government agency. If it is, the fare paid by regular passengers will be greater. Bus company profitability will be little affected, and it will be the regular passengers who effectively subsidize the special categories. Regular passengers are unlikely to have a price-demand elasticity for travel of exactly zero, so some of them are likely to be deterred from traveling by the higher fares they are asked to pay.

If the low or free fare for special groups were not recognized in the fare-fixing procedure, supply would be restricted in order to maintain adequate profitability. Most of the burden would be carried, as before, by regular passengers, but by means of more crowded and less frequent services rather than by higher fares.

In most cities, both private and public operators are required to offer services on routes or at times of the day when, on normal commercial grounds, they would prefer not to. In some cities where regulation is both strong and strongly enforced, such as Montevideo and São Paulo, there are implied cross subsidies from certain groups of users to others. These are both high-fare cities. In low-fare cities such as Quito, it becomes impossible to enforce all such regulations, and the regular bus supply dries up in low demand periods.

G. BUS OPERATING COSTS

For various reasons, few really meaningful bus-operating-cost comparisons can be made between different companies. One reason is that cost information in the various cities covered, and sometimes for different companies within the same city, comes from different sources. In some cases –e.g., Santiago– confidential information for this study was obtained from a bus operators' association. In other cases such as Bogota or the private operators in São Paulo, the source was official cost calculations made for fare-fixing purposes. In still other cases like that of CMTC in São Paulo, the source was accounting data for a publicly owned company. In the case of private operators in La Paz, the source was a bus-cost model developed by a research institution.

Rightly or wrongly, private-sector bus companies normally consider that the calculations made by official bodies for fare fixing purposes tend to underestimate real costs. On the other hand, official bodies usually consider that financial reports presented by private companies tend to overstate true costs. The accounting data for CMTC in São Paulo is confused both by high monthly inflation rates and by delays in making and receiving various payments. Assuming that good and comparable figures in local currency could actually be obtained from all companies, there would remain the problem of converting those figures to a common base via a suitable exchange rate. Even if they could be converted to a common base, they still could not be used to compare the efficiency of companies from one city to another, due to differences in mean route length, labor legislation, traffic congestion, etc.

The amount of useful cost information is thus extremely limited, and effectively confined to the case of Lima where costs, in dollar equivalents at the mean of the official and the free exchange rates, have been estimated for a small selection of companies including the State-owned ENATRU. The only comparable costs exclude depreciation. In 1988, ENATRU's costs were 2.62 dollars per bus-km, while those of three private operators (TLMEPS, San Miguel, and San Judas Tadeo) varied between 1.03 and 1.43 dollars. These costs are all high compared with those in other cities, converted to dollar equivalents using the same average exchange rates. It is noteworthy that ENATRU's costs are approximately double those of the private operators. However, it would be foolhardy to draw any general conclusions from this single case.

Chapter VII

THE BENEFITS AND COSTS OF DEREGULATING URBAN BUS TRANSPORTATION IN LATIN AMERICAN CONDITIONS

A. THE CONCEPT OF DEREGULATION

Deregulation normally means the repealing of laws and regulations covering the economic or quantitative aspects of an industry — in the present case, urban bus transport. It does not normally extend to laws or regulations governing technical or safety aspects, since there is general agreement that these are worthwhile even among most ardent proponents of deregulation.

In the urban public transport field, as noted in chapter II, the norm in Latin America — as indeed in the rest of the world — is regulation. There is, however, great interest in the subject of deregulation.

This interest has two separate origins. One is in the urban transport sector itself. In some cities, concern exists that the current regulated market does not do a good job of serving the transport needs of the community, basically due to faults in the development or application of existing regulations. In some parts of Latin America, for instance, there has been concern that overly strict control of fares tends to reduce transport quality and supply (e.g., before deregulation in Lima in 1991), or that existing operators grow complacent and inefficient if they are excessively protected from competition (e.g., São Paulo). Deregulation is seen as a way of allowing innovation and freeing the market from overburdening restrictions that limit its flexibility.

Interest in deregulating urban bus transport can also stem from the current general interest in neoliberal economic policies as a means of encouraging economic growth, reducing subsidies, stimulating innovation, reducing the cost of providing goods and services, etc. Such interest does not always reach as far as the urban transport sector, which is sometimes considered an extreme case, to be deregulated only after dealing with other sectors. In the United States, for instance, transport deregulation has affected trucking, railways, and airlines, but suggestions that it be extended to urban public transport are very rarely heard. The urban bus deregulation carried out in Chile and in the United Kingdom can be said to have been applied “from above” by neoliberal politicians, rather than at the behest of the transport sector itself. In neither country was it favored *a priori* by most urban transport economists.

Within the region, deregulation had only been thoroughly implemented in Chile prior to 1991. Partial deregulation had been formally adopted in Bolivia and unofficially in other countries. In Peruvian cities such as Lima, where informal and unregulated services had been effectively tolerated by the authorities, there had been what might be termed “deregulation by default,” which was made official in 1991. An interesting case is that of Buenos Aires, where unauthorized operators helped alleviate the effects of a strike by railway workers in the first half of 1991, and seem to have won some official sympathy, if not support, as a result. Outside the region, a formal deregulation policy has been applied in the United Kingdom, excluding London.

B. THE EFFECTS OF DEREGULATION IN SANTIAGO

The main results of the deregulation process in Chile are evaluated below. More details are presented in another ECLAC report. The results obtained in Chile do not necessarily reflect those which would be obtained were the same kind of deregulation applied elsewhere, for the following reasons:

(i) Before the deregulation process had been completed, the Chilean economy fell into a deep, although relatively short, recession. This was unexpected by many economic agents, including people who bought or ordered buses on the assumption that the prerecession boom would continue. The arrival of buses ordered at the end of the boom, and the sharp decline in demand as the recession deepened, resulted in a relative oversupply of services that the deregulation policy permitted (but did not cause).

(ii) The deregulation process in the urban transport field followed a macroeconomic deregulation, which included the ending of physical restrictions on the import of buses. Buses, together with almost all other goods, could be freely imported upon paying a 20% import duty, since reduced to 11%.

(iii) The associations of bus owners colluded, and tolerated hardly any price competition.



The sign below the windshield of this Santiago bus reads, "Ride with us and win prizes." This is not just to attract passengers from other bus lines, but also to encourage riders to make certain the driver gives them a ticket, rather than pocketing the fare.

(iv) However, within most associations, competition is intense, so that individual bus owners and/or drivers effectively compete with each other for passengers, even on the same route.

An evaluation of the results obtained in Santiago must take into account the city's physical environment, especially the propensity towards chronic air pollution in winter months.

The first and most obvious result of the deregulation policy was an expansion of the bus supply. Between 1979 and 1988, Santiago's population grew by 34%. During the same period, the static capacity of the fleet of full-size buses increased by 93%, and that of the smaller "taxibus" fleet by 135%. The demand for bus travel increased at a lower rate than population, due to the expansion of the shared taxi and metro networks and to greater car ownership, which increased annually at more than 2% per capita from 1979 to 1988. The average utilization of each regular-sized bus (i.e., kilometers operated per bus per year) declined but that of each taxibus increased. While the number of routes operated by regular-sized buses grew by only 11%, the number of taxibus routes increased by 126%. In short, the static and dynamic capacities of both types of buses increased absolutely and on a per capita basis, but the growth rates for the smaller type of vehicle were much greater than those for the larger bus.

The second important result was, therefore, a switch to smaller buses. There was also a switch to taxis, both of the individual and shared varieties.



Shared taxis waste space on the principal street in the center of Santiago by moving along slowly, looking for passengers.

The **third** noteworthy result was the marked increase in fares. Between 1979 and 1988, real fares rose by 158% on regular-sized buses and by 87% on taxibuses.

The **fourth** important result was that government-established differentials between regular bus and taxibus fares and between daytime and nighttime/Sunday/public-holiday fares vanished. Thus, by the time the deregulation process was complete, virtually all buses on all routes charged the same fare at all times.

The **fifth** result was that occupancy factors fell universally and that the smaller taxibuses ended up carrying more people each day, on the average, than the larger buses. From 1979 to 1988, the number of passengers carried daily by each regular-sized bus fell from approximately 670 to 295, and by each taxibus from 490 to 340 (see figure 1 on p. 16).

The **sixth** result, based upon estimates, was that the profitability of regular bus operations changed little from 1979 to 1987. Taxibus profitability increased somewhat during the same period, since higher fares more than compensated for the decrease in passengers.



Santiago has a serious air pollution problem caused by topographical and meteorological conditions. This photograph was taken at 11:00 on a day in June in the mid-1980s, before strict control measures were imposed.

The **seventh** result was the creation of very significant bus-generated congestion, especially in exclusive bus lanes on the main avenue (Bernardo O'Higgins) approaching the center of Santiago, as well as in some other areas. In contrast to the situation in other cities, the principal traffic control problem on Bernardo O'Higgins Avenue is not keeping cars out of the two reserved bus lanes, but rather keeping buses in them. During off-peak hours, the owners of individual buses continue to run them, even though they carry few passengers. Under such conditions, it is even possible that each bus passenger is responsible for higher congestion costs than each car occupant.

The growth in the bus supply and in bus-generated congestion aggravated Santiago's serious air pollution problem and encouraged the government to impose certain *ad hoc* measures aimed at limiting the size of the fleet and the volumes of bus traffic. These measures included the forced withdrawal of older buses; a largely unsuccessful attempt to limit the number of buses allowed to use city-center streets; and a scheme based on the final digit of the number plate to restrict a certain amount (normally 20%) of all vehicles, including buses, from using the city's streets on weekdays. Such measures increased the profitability of bus operators, since the same number of passengers was effectively carried by fewer vehicles traveling in less congested conditions at lower cost. The operators themselves asked the Minister of Transport and Telecommunications to impose a 50% restriction over weekends, again based on the final digit of the number plate. This request had nothing to do with either congestion or air pollution, but rather was to alleviate the adverse effects on bus profitability of the huge increase in the bus supply. By increasing profitability, the number-plate restriction system runs the risk of encouraging further increases in fleet size and aggravating the oversupply problem.

C. AN EVALUATION OF DEREGULATION IN SANTIAGO

From the users point of view, bus deregulation resulted –especially at first– in a better supply of bus services. However, from the mid-1980s on, the expansion in supply was almost certainly counterproductive in and near the city center, inasmuch as users would have been better off in welfare terms if fewer buses had been operating in more free-flowing conditions. The government attempted on different occasions to improve the situation. In the early 1980s, it tried to freeze the bus supply in the city center, while at the beginning of the following decade, it proposed putting out to tender the use by buses of central-area streets. The tendering proposal will, almost by definition, result in less bus traffic on these streets, provided it is correctly enforced. Its implementation was delayed by the insistence of the Ministry of Transport and Telecommunications that the route associations reform themselves into genuine companies, which the route associations were reluctant to do. Nonetheless, it was expected to take effect in August 1992.

In exchange for better service, users had to pay higher fares. The lowest-income groups would probably have preferred to pay lower fares for inferior service, which the market did not offer. After fare differentials disappeared, the same high rate was paid by all users at all times. It was set to cover the costs of the least efficient operators, thereby permitting the most efficient ones to earn high profits.

Advocates of deregulation generally claim that it produces an array of different services at different prices, to cater for all tastes and budgets. This did not happen in Santiago. No luxury buses appeared of the kind encouraged by the regulatory authorities in cities such as Bogota, Buenos Aires or Rio de Janeiro. Instead, there was a proliferation of shared taxis, which were hardly ever seen in Santiago before the introduction of the first deregulation measures. Shared taxis provide the only kind of public transportation attractive to middle-income residents of suburbs not served by the metro system. Even so, they have been heavily criticized on the grounds that they increase congestion on Bernardo O'Higgins

Avenue. To some extent, this was due to the government's banning them from the bus lanes on this avenue. They (and individual taxis as well) were forced to use the lanes closest to the median, onto which their passengers disembarked. In 1991, the government rerouted all shared taxis away from the part of this avenue that passes through the city center.

D. DEREGULATION ATTEMPTS IN LA PAZ

The only other city studied in which deliberate attempts were made at deregulation prior to 1991 is La Paz, Bolivia. However, the attempt made there had no appreciable impact on the supply of bus services, due to the requirement that new routes not duplicate existing ones for more than 60% of their length, as well as to the strength of the bus owners syndicates. Deregulation was introduced as much to take away the monopolistic privileges previously enjoyed by these syndicates as to improve public transport. In this respect, the case of La Paz is exceptional.



A trufibus leads a colectivo along a street in the Cementerio suburb of La Paz.

Whereas the governments that introduced deregulation in Chile and the United Kingdom were of neoliberal economic tendencies, the one that implemented the policy in Bolivia placed more faith in interventionist policies. Although entry to the sector was freed, subject to the duplication restriction mentioned above (the consequences of which may not have been fully realized *a priori*), fares were still controlled. This was bound to lead to conflict in a country where inflation soared to more than 10,000% in 1985. Low average fares, continuing confrontations between operators and authorities over fares, the prohibition of route duplication, and the combined strength and coherence of the syndicates effectively discouraged would-be entrants. In fact, the only significant new entrant was the State-owned Empresa Nacional de Transporte Automotor (ENTA).

However, public transport supply in general did increase, in the form of shared taxis, fixed-route shared taxis (*trufis*) and minibuses known as *trufibuses*. As in Santiago, the mean size of public transport vehicles declined and the authorities began to look for ways to reverse the situation. One measure taken in early 1991 was to limit taxi, *trufi*, and *trufibus* fares compared with bus fares, in the hope that this might encourage bus-fleet expansion while discouraging the other types of vehicles. This could turn out to be counterproductive, if rising bus fares cause consumer preference to shift in favor of the smaller vehicles with lower fares.

E. OTHER CASES

In the United Kingdom, deregulation also encouraged a shift towards small public transport vehicles. In 1985, when deregulation was introduced in cities other than London, there were approximately 300 urban minibuses in operation in the entire country. By the end of 1988, there were approximately 7,500 [Watts, Turner and White, 1990]. Deregulation in Lima in mid-1991 quickly brought about a proliferation of minibuses with excess capacity, even during peak periods.

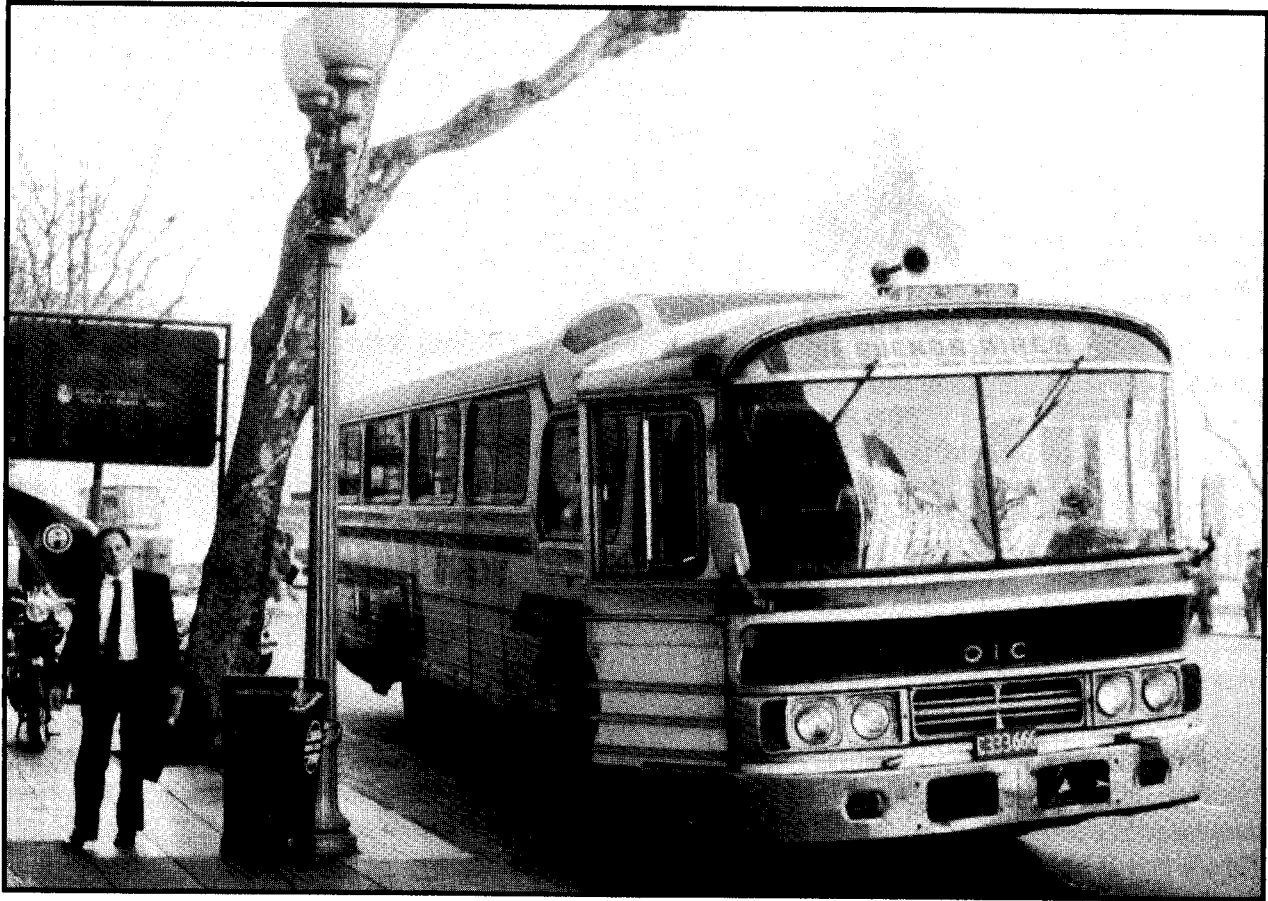
Unregulated bus services have appeared in many Latin American cities due to the inability of the formal regulated services to satisfy consumer demand. The unregulated services are almost always illegal at the outset, and tend to expand rapidly as the result of a specific event such as a strike against authorized operators. As time passes, they are normally either legalized (e.g., Caracas) or banned (e.g., Rio de Janeiro). The vehicles used are sometimes small passenger-carrying vans, as in Lima or Bogota, and sometimes larger vehicles such as genuine buses — off-duty school buses in Quito, or buses retired from long-distance service in Buenos Aires.

F. THE NEED TO DEREGULATE AND THE BEST WAY TO DO IT

Regulated markets can provide good bus services, as is proven, for instance, in Argentine cities including Buenos Aires. However, experience in Latin America has shown that political meddling, corruption, rapid growth in city size, bus companies which deliberately distort statistical returns on costs and ridership, and other phenomena make good regulated markets the exception rather than the rule. The case for loosening regulations over urban bus transport supply is thus particularly strong in this region.

In the United Kingdom, deregulation of urban bus transport was advocated on the following grounds:

- (i) innovation would be encouraged;
- (ii) costs would be cut and the need for subsidies reduced;
- (iii) fares would be reduced, services improved, and a greater variety of services offered;
- (iv) the number of passengers would increase.



A bus retired from long-distance service that carries commuters to downtown Buenos Aires each morning.

It was only partially successful. There was significant innovation (e.g., the proliferation of minibus services), costs and subsidies were cut, services were improved, and a greater variety of services was offered. But fares did not decrease, and the number of passengers fell. In reality, these two objectives were unrealistic in the first place. As explained later in this section, there are fundamental reasons to expect that fares will not to fall with deregulation. Reversing the decline in bus usage in a developed country with relatively high and increasing car ownership and a generally quite dispersed population probably needs direct action to limit car usage, rather than a mere improvement in the quality of bus transport.

The experience of the United Kingdom is not necessarily very relevant to Latin American countries. More pertinent is the experience of urban public transport deregulation in Chile, which on the whole was successful despite the major difficulties of probable collusion between operators in some cities, and the congestion generated by shared taxis in the centers of others. Its application in the larger cities has been severely criticized due the way it was carried out and, in the case of Santiago, to the city's peculiar environmental problems. The negative impact on congestion and air pollution caused by the generous supply of bus services in Santiago has tended to hide some of the positive results of the deregulation policy. Nevertheless, deregulation should be applied with great care in large cities.

Political meddling in public transport of the kind found in many other Latin American cities was largely absent from Santiago during the period of maximum deregulation. For instance, politicians did not try to fix fares at unremunerative levels (since they had no control over fares). Corruption was controlled, because eliminating the need to charge a particular fare or to run a certain frequency, or to acquire a license to operate a given route, also eliminates the temptation to bribe government employees to obtain the necessary permission. Requests to extend routes into new suburbs on the outskirts of the city do not get bound up in bureaucratic tangles, since bus operators are free to provide any service they wish. They have no need to try and confuse the authorities regarding their costs and ridership, since they have nothing to gain by doing so.

This study –cautiously– recommends deregulation, but only if it is implemented in the way proposed below.

Deregulation does not have to be total, nor does it have to be applied in the form of one “big bang.” It is possible, for instance, to liberalize fares fixing while maintaining control over entry to bus operation, or vice versa. The first option would almost certainly lead to an initial escalation in fares, since existing operators would exploit their monopolistic situation. This happened in the case of interurban bus transport in Chile [ECLAC, 1987b]. The second option would tend to lead to increased supply of bus services if the fare level were high enough; higher revenues generally lead to increased supply. If the fare were set at a low level, and if withdrawal as well as entry were permitted, supply could even decrease. This effectively happened in La Paz during the mid-1980s [ECLAC, 1987]. In Lima also, at the end of the same decade, at least one company (Lima Metropolitana) was withdrawing from urban routes and reorienting its activities towards short-distance interurban services where fare control was less oppressive. The same tendency could be observed in Quito.

Partial deregulation can involve one or more of the following:

- (i) allowing routes to be established freely;
- (ii) allowing routes to be abandoned freely;
- (iii) allowing frequencies to be modified;
- (iv) withdrawing controls over bus types or ages;
- (v) allowing fares to be set freely;
- (vi) ending requirements to carry certain categories of persons free or at reduced fares;
- (vii) repealing measures requiring that service be maintained when demand does not warrant it

Complete deregulation, as in Chile, involves all of these and possibly more, depending on how much regulation there was in the first place.

In Chile, freedom of entry preceded fare decontrol. Fares were liberalized in stages, which was probably the best way to go about it although it resulted in large fare increases. This was partially due to the peculiarities of the Chilean case and partially to influences likely to occur anywhere. The causal factors peculiar to the Chilean case included:

- (i) particularly strong collusion between bus operators associations;
- (ii) successive fuel-price increases over the 1981 to 1984 period, and the tendency for owners to pressure their associations for fare increases each time this occurred;
- (iii) a partial regulation imposed by the government to limit the number of buses passing through the city center, which, though largely ineffective, probably reinforced oligopolistic tendencies;
- (iv) passive acceptance of the increases by the traveling public;
- (v) the tendency for associations to extend routes into the suburbs, or to introduce new route variants, basically to provide work for the increased supply of buses, even though it raised costs per passenger.



Buses in Chile have the fare displayed on the front and side of the vehicle, so people will know before boarding how much they must pay.

It is noteworthy that, in the 1980s, fares in Santiago increased more than the prices of any of the main inputs for the provision of bus services.

Some of these factors would probably prevail in other cases as well. But there are also underlying reasons to expect that deregulation applied anywhere will lead to increases in both fares and capacity. The mechanism by which this is achieved is explained below.

Once fares are freed, albeit in stages, existing operators will tend to raise them, especially in peak periods when most people want to travel. They can do this even though there might be genuine competition among them, because users do not –and probably cannot– possess adequate information on arrival times of buses at stops, on fares charged, and on occupancy factors, so as to be able to make rational choices. People waiting at a bus stop, especially in the rush hour, tend to board the first bus with space available that can take them where they want to go, with the fare charged being very much a secondary consideration, within limits. They are in no position to know how long they would have to wait for the next bus which both: (i) charges a lower fare, (ii) goes to where they want to go, and (iii) has spare capacity. So they board the first one which comes along. This gives operators freedom to raise fares, regardless of the competitive situation.

Higher fares lead to higher profitability, which encourages entry into the business. This in turn leads to lower occupancy factors, higher costs per passenger, and pressure from bus owners for further fare increases. If there is genuine competition between operators, further increases will be difficult to obtain. An attempt to do so can lead to price wars, as happened in a few instances for limited periods in both Chile (e.g., Valparaiso) and the United Kingdom (e.g., Torquay). However, the mere fact that supply increases makes it more worthwhile for operators to unite to maintain high common fares, since they stand to lose by not doing so. If they manage to keep fares high but not to restrict entry, more and more buses enter the market, stimulated by the anticipation of higher profits. The result is high fares and a more-than-adequate supply of bus services. The situation would appear to be highly unstable but, in Santiago at any rate, there have been few price wars. The threat and application of various forms of violence has played a part in maintaining fares at high levels in the Chilean capital.

Deregulation should be carried out in such a way as to comply with the following three conditions:

- (i) supply does not increase beyond the point at which the marginal social benefits exceed marginal social costs;
- (ii) both operators and users (actual and potential in each case) have the maximum amount of information available on which to base their decisions;
- (iii) mechanisms exist through which additional services beyond those provided by the market can be supplied if there is a social need to do so.

First condition: Some kind of traffic restraint mechanism is required, which should preferably be price-based. The principal problem is that the incorporation of an extra service, assumed for simplicity to be added to an existing route, generates the following benefits:

- (i) reduced waiting times;
- (ii) greater on-board comfort;
- (iii) other benefits from trip generation, such as traveling at a more convenient hour.

The corresponding extra costs are the following:

- (i) the operating costs of the additional service;
- (ii) changes in the operating costs of other vehicles, and;
- (iii) other marginal social costs, such as air pollution, noise, and accidents.

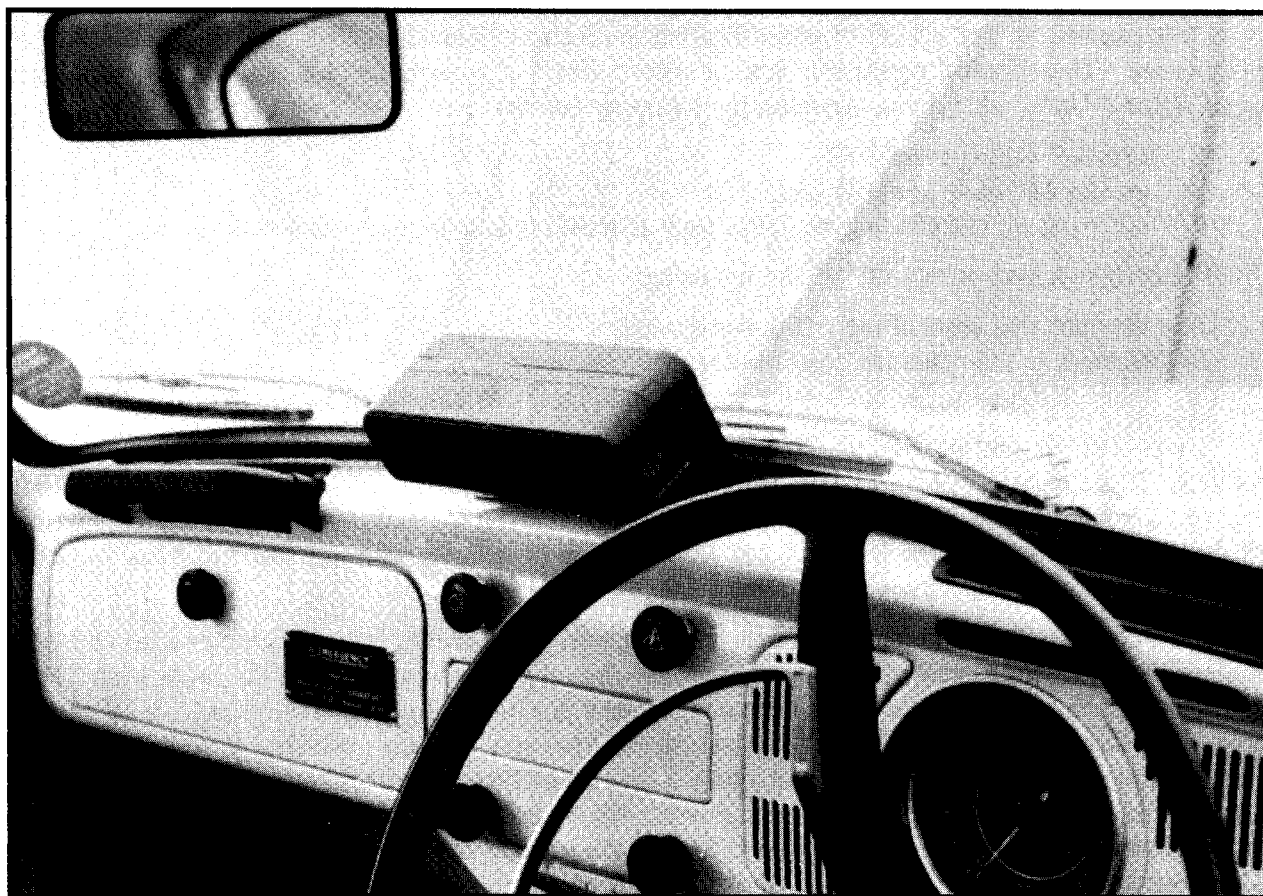
A bus operator will provide the extra service if the cost of doing so is less than the expected fare revenue. If the route is operated by an association of individual owners, all of whom compete with one another, a potential new associate will weigh the cost of running the additional service against revenue likely to accrue from it, even if this comes from existing passengers who are attracted away from the buses of other owners operating on the same route.

The outcome will be different in the case of a company, which will operate the additional service only if the expected revenue comes from new passengers who otherwise would not use the route at all. Furthermore, if demand is inelastic and the company holds a monopoly, it will operate the additional service only if existing buses have insufficient physical capacity to carry the new travelers. It will consider excessive waiting time by passengers at stops only to the extent that this makes some people decide not to travel on its buses. The amount of service offered will be less than in the Santiago case of competing individual owners, who offer more service as long as the revenue accruing to any one of them covers the added operating costs, ignoring the effects on other buses on the same route.

What neither the Santiago bus owner nor a genuine bus company takes into account are the changes in the operating costs of other vehicles and in other marginal social costs such as pollution of various sorts (see the model on route associations developed in the next chapter). Unless operators include these effects in the cost analysis, they are likely to provide a service whose total costs exceed the corresponding

benefits. They are also likely to operate buses that are smaller than optimal from the social standpoint. The most efficient way to take such external impacts into account is to require buses to pay tolls whose value reflects the marginal social costs that each service generates. Since it would be socially unjust for car drivers and other road users not to pay the same tolls, deregulation ought to go hand in hand with traffic restraint, preferably by means of urban road pricing.

Second condition: As mentioned, one fundamental reason why deregulation tends to result in high fares and excess supply is that passengers do not have adequate information about fares charged, expected arrival times, and the degree of overcrowding (if any) of approaching buses. By means of sensors, electronic data transmission, and screen displays at bus stops, it is possible to conceive of information systems which transmit to waiting passengers the fares and arrival times of buses on routes that serve their needs. London Transport is trying out such a scheme on one of its routes. Systems of this type are costly to develop and install, and are susceptible to damage by vandals, but they can be implemented with existing technology. It would be more difficult to convey to users information on the occupancy factors of approaching buses. The present difficulties with such information systems does not mean that deregulation is not desirable, just that its potential benefits are less than they might be.



Ideally, urban public transport deregulation should be accompanied by the introduction of some form of road pricing, the most advanced versions of which involve equipping cars with electronic responders.

Third condition: Under deregulation, the market may not offer services which the relevant public authorities consider to be socially desirable, such for low-income or low-density suburbs or at night. Under regulated conditions, the operation of services for social reasons can be required as part of the contractual agreement between the authorities and the bus operators. This generally implies cross subsidies, which tend to force costs up or quality down, and at the margin can convert a commercially viable service into one that is nonviable.

Under deregulation, socially desirable services can be provided in several ways. The most interesting are those adopted in the United Kingdom and Brazil.

The clearest way to describe the British approach to the problem is to imagine that, upon deregulation, operators offer a certain array of commercially viable services. Local authorities generally do not always consider that these "commercial" networks provide all the services desirable on social grounds. Therefore, if they identify any such service, they have the legal power to put it out to tender. The bid requiring the lowest subsidy is accepted. Competition between bidders ensures that funds available for subsidization are not wasted, and has also proven to be a useful way of enabling new operators to get a foothold in geographical areas previously dominated by traditional companies. The final network is the superimposition of subsidized and commercial services. Frequently, the former are evening or weekend extensions of the latter. The British system has administrative complexities, such as the procedures set in motion if an operator decides to abandon a "commercial" service, which requires a reevaluation of the assessed needs for subsidized services. Nevertheless, the system has worked satisfactorily since being introduced in the mid-1980s.

The Brazilian approach is to encourage employers to give vouchers for urban bus travel to their low-income workers. The employers can discount the cost of these vouchers from their corporation tax payments, and the bus companies can exchange them for cash. Theoretically, this scheme makes socially desirable services commercially viable from the viewpoint of the bus operator. To achieve this goal, however, it would not be sufficient to grant vouchers just to low-income formal-sector workers. The scheme would have to be extended to school children, elderly or retired people, the unemployed, and workers in the informal sector. This would transform a procedure which is already administratively quite complex into a bureaucratic nightmare.

On balance, the British system appears to be the more suitable for Latin America. It is one of the options being considered for application in Colombia.

Chapter VIII

WHAT TO DO WITH ROUTE ASSOCIATIONS

A. WHAT IS A ROUTE ASSOCIATION?

Route associations dominate urban bus transport throughout Spanish-speaking Latin America (but not in Brazil).^{*} Their detailed characteristics vary from one city or country to another, but basically they conform to the specifications explained in the following paragraphs. In this chapter, and generally throughout this report, the word "association" is used generically, and embraces other descriptors such as "syndicate" (*sindicato*, used in Bolivia), "committee" (*comité*, in Peru) or "society" (*sociedad*, in Argentina).

In some Latin American cities, the word "bus" is reserved for large vehicles, often run by public-sector companies. However, in this chapter the word is used in a less restricted manner, meaning any vehicle for public transportation having more than 15 or 20 seats. In most Latin American cities, bus transport arose spontaneously and grew in an unplanned manner. In certain cities such as Buenos Aires and Mexico City, buses actually developed from taxis. Individual owners of vehicles big enough to be used for public transportation decided to operate services along particular routes, charging passengers one by one rather than hiring out the whole capacity of the vehicle as in the case of a regular taxi. In Venezuela, they were actually given the name *por puesto*, meaning "by seat." After awhile, the owners operating on common routes grouped together to coordinate their activities and to try and protect their interests against those of "outsiders" who might invade their territory. This grouping is what is known as a route association.

Normally, the groupings started out as informal organizations which had no legal status and in many cases were technically illegal. Eventually, often through the insistence of the public authorities, most became legally constituted as associations or cooperatives.

The process did not occur in just one particular period of time and then cease. Nobody can be absolutely sure when the first embryonic associations were formed. As far as can be traced, it happened in Mexico City in 1916, when taxi owners decided to operate in a collective mode during a tramway-workers strike. As from 1918, the city government gave permission to operate to any group of shared-taxi or minibus owners that asked. In the following decade, the same kinds of associations began to be formed in Buenos Aires, this time not as a result of a strike but due to an economic recession which created a shortage of passengers willing to pay normal taxi fares. Other cities joined in later. The process still continues, and route associations are to this day being formed in the outlying suburbs of some cities in the region.

Some route associations are more developed than others. At the least developed level, about all they do is act as pressure groups to defend their territory, by trying to prohibit others from operating the same route, at least without paying an entry fee. At the most evolved level, found only in Argentina, each bus effectively constitutes its owner's voting share in an association. In these cases, the owners elect a board of directors, which appoints a manager and staff to run the association and take responsibility for ordering and replacing buses, performing maintenance, receiving fare revenue, paying bills, coordinating

^{*} In this chapter, "Latin America" refers to the Spanish-speaking region, unless otherwise indicated.

schedules, handling relations with supervisory authorities, and distributing profits. Both in such well-developed variants and in others, the association also serves as a kind of social club for members. One reason why the Argentine associations work so well is that members (i.e., bus owners) make a habit of stopping by the offices and garage once a day, to check that their vehicles are well looked after.

B. A FUNDAMENTAL COMPARISON BETWEEN COMPANIES AND ROUTE ASSOCIATIONS

In this chapter, a more detailed analysis is made of the previously mentioned effects of bus services being operated by loosely bound route associations, rather than by companies. Tables 7 and 8 (pp. 100-103) show the results generated by a simple model developed to make an economic comparison of the levels of service that might prevail on a route under the alternatives of operation by a company or by a loosely integrated association. For the latter, service levels at maximum user benefit and maximum community benefit are also calculated in table 8.

Companies base the quality of service they offer on a comparison between the loss of revenue they would suffer were they to offer a lower level of service, and the cost savings they would thereby obtain. If there is high competition on the route, the quality of service provided is likely to be better because a company that reduces frequencies, operates life-expired vehicles, does not sweep out the bus after each trip, etc., is likely to lose passengers to the competition at a rapid rate. If competition is virtually nonexistent over much of the route, as might happen in the case of a monopolistic operator, there is an incentive to reduce service quality to socially unacceptable levels. This would make regulation (or public ownership) virtually obligatory, in an attempt to ensure adequate service. This finding is confirmed by the model.

In the case of a loosely bound route association, the competition needed to ensure adequate service levels would be automatically provided internally by the members of the association itself, as long as there is free entry — an important qualification. Only recently formed associations normally allow really free entry. In some other cases, it may be possible to form parallel associations, which amounts to virtually the same thing, but existing associations often exert enough influence to prevent this from happening. Usually, strict quantitative restrictions are placed on the incorporation of new members into an association, or entry fees are required of them. Restrictions that are similar but less onerous in their effects are normally placed upon an existing member who wishes to operate increased frequencies.

In the model, personal time spent waiting for buses is valued at non-working-time rates. Time during working hours is normally assessed at higher values, but travelers make comparatively few trips on their employers' time. Since most such trips are made in off-peak periods by relatively low-paid workers, they do not tend to raise the overall average value of time by any important amount. Furthermore, their effect is compensated by trips made by retired people and children.

The low value for operating costs used in case 4 means that only short-term costs are considered, with fixed costs being assigned to peak-hour service. None of the values for any case come from a real situation, although they are based upon representative Latin American conditions. For this reason, the fare is taken to be flat and fixed by the authorities, which is the regional norm.

A value of -0.5 is assumed for the elasticity between passenger volume and service headway. This means that, as the time between successive buses increases, the number of passengers carried decreases. The elasticity value is an average. On suburban sections, a lower absolute value might be appropriate, due to lesser competition between routes. However, on downtown legs where several routes compete for the same passengers, a higher absolute value might apply.

The model results for case 1 are explained below. Note that the variable t indicates a time interval equal to one half of the headway between successive buses — i.e., $2t$ indicates the headway.

Case 1 can be thought of as referring to a feeder route, operated by small- to medium-sized buses, connecting to a rail station in a large city or to a radial route in a smaller one. If a company operates the route, it will try to obtain as much profit as possible. Maximizing the function that represents the excess of fare revenues over operating costs shows that the company could earn 69.44 dollars per hour — see line 11 of table 8 — by running a service headway of 12.96 minutes — i.e., twice the value of t in line 10. This implies carrying almost 120 passengers per trip — line 12 — which exceeds the assumed limit for the type of bus operated. The company then decreases the headway, as long as by so doing it does not incur a loss. With the parameter values assumed, it is possible to improve headways to 5.76 minutes between buses — twice the value of t in line 14 — and still earn a profit. Buses carry maximum passenger loadings, and the company earns 52.08 dollars per hour — line 13.

If the route is worked by a loosely bound association, the headway adapts itself so that no (excess) profit or loss is incurred. If total revenue exceeds cost, new operators are attracted, while if cost exceeds revenue, operators abandon the route. In either case, the process continues until equilibrium is achieved. A headway of 3.24 minutes — twice the value of t in line 15 — ensures that each bus carries the precise number of passengers necessary to break even, i.e., to cover costs, including a reasonable return on capital, but no more. With the parameter values of this case, operation by a loosely bound association results in a headway between successive buses of less than half that which a company provides.

However, as the headway lengthens, the association does not explicitly take into account any corresponding increases in the costs of passenger waiting time, nor the consumer surplus lost through the inconvenience suffered by potential passengers who decide not to travel on the route being analyzed because they do not wish to wait. If the association receives a subsidy to offset the costs it incurs by increasing its frequencies so as to eliminate these losses to passengers, maximum user benefit results. The headway required to do this is 2.51 minutes — twice line 17. The average bus occupancy decreases from 60, which is the break-even passenger loading per trip without subsidies, to 52.81 — line 18.

Lines 19 and 20 indicate the headway (3.37 minutes) and the occupancy per bus (61.19 passengers) if, for each service operated, bus owners not only receive the subsidy described in the previous paragraph, but also pay a tax equal to the value of the congestion they cause. This situation maximizes community or social welfare, since it takes into account users of the street network in addition to those who travel by bus on the route being analyzed. Congestion costs generated by each vehicle vary markedly with traffic flow (in relation to street capacity), and also depend critically on the personal time values of road users. Therefore, the tax rates used in the model are not necessarily appropriate to any real situation. Theoretically, the costs of accidents, air pollution, and other external effects of urban bus operations should also be reflected in the assumed tax, but even less is known about these than about congestion costs.

Table 7
HEADWAYS, PASSENGER VOLUMES, COSTS, AND INCOME FOR AN
ASSOCIATION AND A COMPANY ON A HYPOTHETICAL PEAK-HOUR RUN

Headway between buses (minutes)	Traffic (passengers per hour)	Occupancy (passengers per trip)	Operating cost (dollars per hour)	Revenue (dollars per hour)	Profit or loss (dollars per hour)	Break-even headway (minutes)	Break-even operating cost (dollars per hour)	Additional waiting costs (dollars per hour)	Lost consumer surplus (dollars per hour)
1	2	3	4	5	6	7	8	9	10
1.0	2 000.00	33.33	900.00	500.00	-400.00	1.80	500.00	0.00	0.00
1.5	1 633.00	40.82	600.00	408.25	-191.75	2.20	409.09	8.17	0.82
2.0	1 414.22	47.14	450.00	353.56	-96.44	2.55	352.94	14.14	2.42
2.5	1 264.92	52.70	360.00	316.23	-43.77	2.85	315.79	18.97	4.27
3.0	1 154.70	57.74	300.00	288.68	-11.32	3.12	288.46	23.09	6.18
3.5	1 069.04	62.36	257.14	267.26	+10.12	3.37	267.06	26.79	8.10
4.0	1 000.00	66.66	225.00	250.00	+25.00	3.60	250.00	30.00	10.00
4.5	942.80	74.54	200.00	237.70	+37.70	3.82	235.60	33.00	11.85
5.0	894.42	74.54	180.00	223.61	+43.61	4.02	223.88	35.78	13.66
5.5	852.80	78.18	163.64	213.20	+49.56	4.22	213.27	38.38	15.42
6.0	816.50	80.00	150.00	200.00	+50.00	4.41	204.08	40.83	17.15
6.5	784.46	80.00	138.46	184.62	+46.16	4.59	196.08	43.15	18.83
7.0	755.92	80.00	128.57	171.43	+42.86	4.76	189.08	45.36	20.47

continues

Table 7, concluded

	Explanatory notes by column
Col. 1	Input range of possible headways.
Col. 2	Traffic based on an initial demand of 2,000 passengers per hour and an elasticity of -0.5 with respect to headway.
Col. 3	Derived from the values in columns 1 and 2, assuming a maximum physical capacity of 60 passengers per bus and a 33% passenger turnover during the trip.
Col. 4	Based on a hypothetical operating cost of 15.00 dollars per trip, at the service frequency implied by the headway in column 1.
Col. 5	Assuming a flat fare of 0.25 dollars per passenger.
Col. 6	Column 5 less column 4. With company operation, a six-minute headway will be offered, since profits are maximized subject to the constraint that no more than 80 passengers per trip may be carried.
Col. 7	Assuming the traffic from column 2 and a break-even service capacity of 60 passengers per trip, which is derived from the vehicle operating cost of 15.00 dollars per trip and the mean fare of 0.25 dollars. If the route is operated by an open association, the frequency of service will be that at which fare revenues equal costs. Note that the headway given in each line of this column is generally not in equilibrium with the passenger volume in column 2. Only with a headway of approximately 3.24 minutes does equilibrium exist between the break-even frequency and the demand function. If a higher frequency were offered, the number of passengers carried per hour would increase, but mean occupancy would decline below the break-even point, forcing some operators out of business. This would tend to reestablish equilibrium at a headway of 3.24 minutes. An open association would thus operate at this level of service.
Col. 8	Assuming the headways in column 7.
Col. 9	Personal time costs for passengers who choose to wait for a bus on the route being analyzed, assuming company operation. Only excess waiting time over that for a one-minute headway is counted. The calculation is as follows: Traffic at a 1.5-minute headway is 1,633 passengers per hour. Their average waiting time rises to 0.75 minutes, from 0.5 minutes at the base headway, for an excess of 0.25 minutes per passenger. The assumed value of their waiting time is 0.02 dollars per minute per passenger.
Col. 10	Estimated welfare lost by potential passengers who decide not to travel on the route being analyzed when headway increasing beyond one minute. For example, at a 1.5-minute headway, $2,000 - 1,633 = 367$ people decide not to travel. If they waited, the cost of their time would be as calculated in column 9. Since they do not wait, they incur a lesser cost penalty based on the inconvenience they suffer from using an alternative route that might—for example—leave them further from their desired destination. By applying a mathematical calculation involving integral calculus to the route demand function, the mean loss under these circumstances is found to be 0.0022 dollars per passenger.

Table 8

**ESTIMATED SERVICE HEADWAYS ON FOUR HYPOTHETICAL RUNS,
CONSIDERING FOUR DIFFERENT FORMS OF ENTREPRENEURIAL ORGANIZATION,
WITH INTERNALIZATION OF THE COSTS OF PASSENGER WAITING TIME
AND OF TRAFFIC CONGESTION**

Cases analyzed				
1. Peak hour, short route, and small bus. 2. Peak hour, long route, and regular-sized bus. 3. Off-peak hour, long route, and regular-sized bus. 4. Same, supposing that all fixed capital costs and crew costs are charged to peak-hour operations.				
Parameter values, or intermediate or final results	Case No. 1	Case No. 2	Case No. 3	Case No. 4
1. Bus operating costs (dollars/km) (<i>c</i>)	0.75	1.00	0.50	0.25
2. Route length (km) (<i>v</i>)	20.00	40.00	40.00	40.00
3. Passenger waiting-time costs (dollars/ hour) (<i>w</i>)	0.02	0.02	0.02	0.02
4. Number of passengers/hour when oper- ating headway is one minute (<i>k</i>)	2 000.00	2 000.00	750.00	750.00
5. Bus capacity (passengers) (<i>m</i>)	80	200	200	200
6. Fare (dollars) (<i>b</i>)	0.25	0.25	0.25	0.25
7. Traffic congestion costs (dollars) (<i>q</i>)	0.20	0.175	0.025	0.025
8. Function to calculate the number of passengers/hour	$1\,414.21t^{-0.5}$	$1\,414.21t^{-0.5}$	$530.33t^{-0.5}$	$530.33t^{-0.5}$
9. Value of <i>t</i> when passengers/bus = <i>m</i>	2.8802	18.0010	128.0074	128.0074
10. Value of <i>t</i> to maximize profits if bus capacity constraints are not observed ^a	6.4783	46.0678	81.8983	20.4746
11. Profit/hour at the value of <i>t</i> in line 10	69.44	26.04	14.65	14.65
12. Number of passengers/bus implied by the value of <i>t</i> in line 10	119.98	319.95	159.98	79.99
13. Profit/hour when passengers/bus = <i>m</i>	52.08	16.67	7.03	9.37
14. Value of <i>t</i> offered by a company that maximizes its profits ^a	2.8802	18.0010	81.8983	20.4746

continues

Table 8, concluded

Parameter values, or intermediate or final results	Case No. 1	Case No. 2	Case No. 3	Case No. 4
15. Value of t offered by an unsubsidized open association, without taking into account costs of passenger waiting time and traffic congestion ^a	1.6201	11.5207	20.4812	5.1203
16. Number of passengers/bus implied by the value of t in line 15	60.00	160.00	80.00	40.00
17. Value of t offered by an open association receiving a subsidy to compensate for operating frequencies that minimize the costs of passenger waiting time and lost consumer surplus ^a	1.255	3.415	4.235	2.405
18. Number of passengers/bus implied by the value of t in line 17	52.81	87.11	36.38	27.41
19. Value of t offered by an open association that is subsidized as in line 17, and is taxed to pay for the traffic congestion it causes ^a	1.685	3.855	4.385	2.625
20. Number of passengers/bus implied by the value of t in line 19	61.19	92.56	37.02	28.64

^aService headway equals twice the value of t .

C. LOOSELY AND STRONGLY BOUND ROUTE ASSOCIATIONS

Up to this point, the analysis has compared a company with a loosely bound association. Between these relatively extreme situations lies the strongly bound route association found in Buenos Aires (see below). A strongly bound association is managed like a company in many ways. For instance, it fixes frequencies in order to maximize the total profit received by all services considered together. However, since it remains essentially an association of individual bus owners, a link is maintained between each one's income and the revenue and costs generated by his own particular bus. This makes him ensure that his vehicle is not discriminated against, for instance by being given an excessive number of off-peak as opposed to peak frequencies, or laid up for an unduly long period for maintenance. This implies that availability ratios are better than with conventional bus companies, scheduled turnaround times tend not to be exceeded, programmed headways between successive buses on the route are usually respected, etc.

In contrast, a company knows that much of any revenue lost by one of its buses through slack operation will be picked up by another. For instance, if the bus which leaves the terminal at 08:00 hours gains upon on the 07:55 bus during the course of its journey, the company knows that the 08:05 departure will pick up many of the passengers who miss the 08:00 bus, and hence will not be unduly concerned. However, if the 08:00 bus is owned by an individual whose income depends on the number of passengers his particular vehicle carries, he will use his influence to ensure that headways are respected.

D. CONCLUSIONS FROM A CONCEPTUAL COMPARISON BETWEEN COMPANIES, LOOSELY BOUND ASSOCIATIONS AND STRONGLY BOUND ASSOCIATIONS

The tentative conclusions from this conceptual analysis are the following:

- (i) loosely bound associations offer more frequent service than companies;
- (ii) in comparable conditions regarding passenger demand and capacity of the bus fleet, strongly bound associations tend to offer services of the same frequency as companies;
- (iii) in strongly bound associations, incentives exist which favor greater efficiency at the operational level, compared with companies;
- (iv) in the normal situation where no subsidy is paid to offset the costs that would be incurred if frequencies were increased so as to eliminate both losses to passengers due to increased waiting times, and consumer surplus lost through the inconvenience suffered by potential passengers who decide not to travel on the route being analyzed because they do not wish to wait, loosely bound associations are more likely than companies to offer service levels closer to the optimum that would exist if such subsidies were in fact paid;
- (v) where congestion is a serious problem, and especially where it is aggravated by other undesirable effects such as air pollution or noise, service levels offered by loosely bound associations can exceed those corresponding to maximum community benefits;
- (vi) where various companies operate in conditions of limited competition between different routes, strict regulation may be necessary to ensure that headways between buses correspond approximately to the socially optimum situation.

Although these conclusions are necessarily tentative, many of them are supported by events in various cities at different times. In London and Buenos Aires in the late 1920s and early 1930s, the contribution of loosely bound associations (or very small competing companies, in the British case) to traffic flow perturbation was one of the major factors behind the creation of the public transport monopolies. In São Paulo 60 years later, private companies with exclusive operating rights in specific geographic areas are criticized for making passengers travel in excessively overcrowded conditions. Strongly bound associations are found in Buenos Aires, where they have come to be a model of efficient bus transport services. In Santiago, competition between associations has resulted in an exceedingly high level of service that nonetheless produces undesirable side effects in terms of congestion and air pollution which are arousing serious concern in both the government and the urban population.

E. PRACTICAL PROBLEMS OF ROUTE ASSOCIATIONS

Loosely bound route associations have a series of practical disadvantages which affect their efficiency, the most important of which are the following:

- (i) Individual owners carry out their own maintenance or contract it personally, which often means that it is not done very well. This in turn causes problems with service reliability and air pollution.
- (ii) Maintenance problems are aggravated by the tendency for each owner to keep his bus operating throughout the whole day, as long as fare revenue exceeds perceived marginal operating costs (which often amount to little more than fuel costs), and the bus does not break down. By running his bus with low occupancy factors, he effectively robs passengers from his associates on the same route, but this does not influence his behavior. The fact that each bus keeps running throughout the day means that little time is available for maintenance.



In Bogotá, buses are run by small operators who compete with one another. This situation created a severe challenge to the design of the Caracas Avenue busway.

(iii) Each owner buys an additional bus to replace a previous one or to augment his fleet, whenever he thinks the situation warrants this, without consulting his associates. The result is a route operated by a multiplicity of buses of different makes, years, models and sizes. This too aggravates the maintenance problem by reducing the commonality between vehicles.

(iv) The operation of buses of different sizes complicates any attempt to program departure intervals, since the owner of a vehicle of larger capacity could argue that it should follow the previous bus with a greater time difference than if it were smaller.

(v) Each owner has limited access to capital, which restricts his possibilities of investing to improve efficiency.

(vi) The independence of owners makes it unlikely that many of them will acquire adequate knowledge of bus maintenance, accounting, and other skills useful for bus operation.

(vii) The open competition among owners makes it unlikely that they will provide reliable statistical, cost, and revenue data to regulatory authorities, policy-making bodies, research institutions, or even to the association to which they belong.



In Curitiba, Brazil, where public transportation is strictly regulated, busways achieve a high level of efficiency and are renowned throughout the world.

(viii) Negotiations, conversations, and general communications between operators and the public regulatory agency are made more difficult.

(ix) Unit bus acquisition costs are higher than necessary, since the individual owner, negotiating separately with the importer, manufacturer, or distributor, has little or no bargaining power.

Such problems occur to a greater or lesser extent in most Latin American cities where route associations are found. The prime exception is Argentina, where many route associations have grown up to be professionally managed organizations. If a similar evolution took place in cities in other Latin American countries, the quality of bus transport would probably improve. The required changes would not entail any fundamental reorganization of the associations themselves, but rather the compression into a short period of time the development which took place in Argentina over many years.

F. HOW ROUTE ASSOCIATIONS ARE ORGANIZED IN BUENOS AIRES

The organizations which run bus services in Buenos Aires are required to be legally constituted as companies which have been granted permission, authorization, or a concession to operate services and to have the buses they operate registered in their names. These basic requirements are common whether the routes operated are subject to national, provincial, or municipal jurisdiction. Although the vehicles are registered in the name of the association (*sociedad*), they are really owned by one or more of the associates (*componentes*). The registration with the association is essentially done for formal purposes, to comply with Argentine law. The associate signs a contract with the association, assigning the vehicle to the latter.

One expert on bus transport in Buenos Aires defines this arrangement (*sociedad de componentes*) as "a group of carriers which, while maintaining individual commercial exploitation of their buses, agree to jointly operate one or more routes under an official concession, permission, or authorization, for which purpose they establish, and form part of, an organization to which they delegate, to a greater or lesser extent, the necessary resources." [Vicente, 1991]

The route association is legally responsible for providing bus services, yet the link between the owner and his bus is of fundamental importance. "Maintaining individual commercial exploitation" means that each owner receives the net revenue generated by his vehicle (or vehicles or part of one vehicle). Each also directly carries out some of the tasks related to the operation of his vehicle, while delegating to the association others such as fixing timetables which must intrinsically be shared or carried out jointly. The types of tasks delegated vary from one case to another, and it is important to realize that delegation is done essentially for convenience. The associations themselves also normally own garages, terminals, offices, stocks of spare parts (which they sell to the associates), etc.

There are instances in which the link between an owner and his vehicle is broken. One such case relates to premium (*diferencial*) services operated by buses that are relatively luxurious and expensive to buy and run. These services, which date from the mid-1980s, are normally operated by the associations in parallel with their regular services. The norm is that *diferencial* buses belong to the association rather than to individual members. Some regular buses may also belong to the association. A phenomenon which is occurring more frequently now than in the past is the sale of buses to the association. This often happens when elderly owners or the heirs of deceased owners lose interest in active participation in the business. It is possible, therefore, that associations represent merely an intermediate phase in the process started unwittingly around the year 1920 by owners of taxis and similar vehicles, who informally grouped together to operate common routes in cities such as Mexico and Buenos Aires. The final phase may be the formation of groupings more closely akin to normal closed companies than to strongly bound route associations.

The differences between centrally administered associations and less integrated ones show up in various ways, including the following:

(i) **Bus acquisition.** In most centrally administered associations, members finance the acquisition of buses from a fund formed by quotas they pay. Less integrated associations might guarantee loans taken out by members to buy buses, while the least integrated leave everything to the individual owners.

(ii) **Repair and overhaul.** These tasks are carried out in association-owned workshops in the most integrated groupings, and by individual owners in those least integrated. A spectrum exists between the two extremes, with tasks such as repairing seats or changing gearbox oil being carried out by the association in intermediate cases, while other tasks such as the calibration of injectors or renewal of piston rings are the responsibility of the individual owner, who normally contracts them out to a specialized

commercial workshop. In virtually all cases, the association carries out routine oil changes, greasing, tire changes, etc.

(iii) **Financial control.** In the loosest associations, each owner keeps the fare revenue collected by his bus and pays directly almost all its operating costs. In more integrated associations, the central administration collects all fare revenue and redistributes it among associates on the basis of bus-km, of bus-km adjusted by passenger-carrying capacity, or of bus-hours operated. The important factor to note –and this is crucial for the efficient operation of the system– is that each owner's income is related to the amount of work performed by his particular bus. This makes him anxious to ensure that his bus is kept in service, that maintenance work is carried out as quickly as possible, etc.

Costs are normally assigned to each associate on the basis of kilometers run (variable costs) and number of buses owned (fixed costs). Repair work other than that of a routine nature is specifically costed for each vehicle.

Taxes on profits are paid by the bus owner and not the association.

In essence, the route associations of Buenos Aires derive their characteristics from the desire of individual bus owners to maintain a close relationship with their vehicles, while grouping together to operate routes that can legally be run only by companies. This situation is by no means unique to Buenos Aires. It also occurs in Lima. In 1991, the Chilean Ministry of Transport and Telecommunications was trying to force individualistic bus owners to transform the route associations to which they were affiliated into legally constituted companies.

G. SOME CHARACTERISTICS OF ROUTE ASSOCIATIONS IN BUENOS AIRES

In chapter VII, a comparison was made between the efficiency of various bus companies in different cities. From this comparison, it is evident that the route associations of Buenos Aires achieve a high degree of efficiency. Of the route associations under national jurisdiction, for which data are available, 63% operate between 26 and 75 buses each [Vicente, 1991]. Comparable information about other cities is not available in comprehensive form, but the Buenos Aires associations are probably not significantly larger than elsewhere. In fact, the administrators of some of the better-developed associations feel that one with more than around 150 vehicles becomes virtually unmanageable. Only 9% of those in Buenos Aires surpass that number. In Santiago, almost 25% of the 39 route associations operating regular-sized buses in 1984 reached or exceeded that level.

Average individual ownership has been increasing over the years, and now stands at around 1.8 buses per associate. This growth has been attributed to low profitability, which makes the sector unattractive to owners of part shares in buses. Consequently, many of them have sold out. Owners generally take a strong personal interest in their buses to make sure that the treatment they receive with respect to route assignment, downtime for maintenance, and the like does not have an adverse effect on profits. This ensures both that management treats all associates fairly, and that it works efficiently. Buses may run more than 100,000 km per year, while the number of staff employed per bus rarely exceeds 3.5. In some cases, owners take a share in driving their vehicles. They may directly perform some maintenance or contract it out to commercial workshops, but even so, the employee-per-bus ratio is low. From a sample of 41 associations operating nationally controlled routes, the average number of employees is 2.91, of whom 2.17 are drivers [Vicente, 1991].

Normally, a driver is assigned to a particular vehicle, and he often takes considerable pride in looking after it.

Each association belongs to one or another of four federations, all of which are affiliated to the Argentine Federation of Motorized Passenger Carriers (*Federación Argentina de Transportadores por Automotor de Pasajeros — FATAP*). These federations negotiate wage agreements with staff, and fare levels with the national, provincial, and municipal governments. They also review applications by their member associations for route extensions or modifications, to ensure that the proposed changes will not adversely affect other associations.

H. WHAT MAKES THE ROUTE ASSOCIATIONS SO EFFICIENT

The prime ingredients indispensable for the efficient operation of the Buenos Aires route associations are the following:

- (i) the management of the association coordinates route operations;
- (ii) net earnings of bus owners depend not only on the average performance of all buses operated by the association, but also on that of the particular buses they own.

In other cities, route association management does not have the same power to control route operations as it does in Buenos Aires. This results in problems of the kind listed in section C of this chapter. If the companies were owned by shareholders, management, maintenance procedures, and compliance with schedules would tend to be less-well-carried out than in strongly bound associations with linkages between the income received by bus owners and the productivity of the particular vehicles they own.

The theoretical tendency of route associations to offer excessive headways between successive buses does not occur to any appreciable degree in Buenos Aires. Although each line may have little or no competition in outlying suburbs, closer in towards the city center, where overall demand is higher, associations compete with one another. This encourages each one to offer high frequencies, in order to minimize loss of passengers to competitors. The same phenomenon also occurs in many other cities, though not in all. Buenos Aires route associations often apply to the relevant regulatory agency for permission to increase frequencies. Sometimes they do so without permission.

I. ROUTE ASSOCIATIONS, DEREGULATION, AND BUS-PRIORITY MEASURES

Deregulation, if effective in the sense that its intended impact on competition is not negated by restrictive practices, tends to increase the absolute value of demand elasticity with respect to both price and service quality, from the point of view of any one company or route association. In other words, it tends to increase competition between the entities which operate different routes. It makes companies behave like associations.

In a regulated environment, a company or strongly bound route association will not program an additional service unless the revenue paid by the extra passengers (i.e., those who would not travel at all by its buses if the additional frequency were not operated) covers the cost of that service. Revenue switched from frequencies already operated to the extra one do not enter into the calculations, since such revenue accrues to the company in any case.

In a genuinely competitive unregulated situation, a company will not be able to assume that passengers and revenue not picked up by one of its buses will transfer to another one. If the company restricts supply in order to earn profits in excess of those needed to compensate the employment of capital and the risks involved, somebody else will step in to operate more frequencies or will cut fares until revenues

and costs come into balance. Fare cutting in peak periods is unlikely, due to relatively high waiting-time costs and to the problem of incomplete user information mentioned in the previous chapter. Therefore, in the extreme case, and as long as there are no scale economies, the same amount of service will be offered under deregulation whether buses are run by companies or by associations. However, genuine competition will make differential fares (by section) more likely than the flat fares typical of Latin American cities.

In Santiago, deregulation did not produce differential fares. The reason is usually attributed to collusion between operators, but it may have had as much to do with the Ministry of Transport and Telecommunications requiring "the" fare (daytime and nighttime separately) to be displayed inside and outside the bus, thereby effectively making non-flat-fare schemes impractical. If the Ministry had not insisted on this, collusion between operators would probably have meant that a common flat fare would have been charged in peak periods. However, some differentiation might have occurred on suburban sections during off-peak times. In fact, this does happen when a passenger pays the driver less than the advertized fare in exchange for being allowed to travel without a ticket, or with a ticket already used and returned to the driver by a previous passenger. Such fare discounting is more likely to occur with loosely bound associations than with companies or with strongly bound associations having centralized control.

In the real world, deregulation does not lead to a genuinely competitive situation. Nonetheless, the tendency for companies or strongly bound associations to offer less supply than loosely bound associations still applies.

In Santiago, the joint effects of an abundant supply of buses, mainly owned by members of loosely bound associations, together with intense, mainly nonprice competition between drivers both on the bus line and on different lines, make for inefficient use of exclusive bus lanes. The same effects also tend to disrupt traffic generally. For instance, buses regularly run through red lights, and pick up passengers in the middle of the street. These tendencies would be less likely with companies or more-strongly bound associations, partly due to the lesser total level of service which either of these two forms of organization would provide, and partly due to better scheduling and better adherence to schedules.

Strongly bound route associations of the type found in Buenos Aires probably represent the form of organization which has the least disturbing impact on traffic under deregulation. Owners apply pressure for better compliance with schedules than would be the case with companies. Assigning each driver responsibility for a single bus (except when it is stopped for maintenance or repairs), and paying him a fixed daily wage, tend to minimize dangerous driving habits.

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