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**SUBSIDY IN THE TRANSPORT SECTOR
OF THE ESCWA REGION**

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I. GOVERNMENT TRANSPORT POLICY AND SUBSIDIES

Subsidizing the transport sector is one of the principal means used by governments for intervention in transport policy. In a perfectly functioning market, the quantity, quality and price of transport services could be left to the free determination of consumer preferences, subject only to resource constraints. Since such an ideal situation does not exist, government action is necessary and is taken within the transport policy framework.

The transport policy affects four main areas:

- (a) Monopolistic ownership and operations (for example, railways);
- (b) Safety measures and environmental concerns, (urban traffic, air traffic, transport pollution, etc.);
- (c) Capacity control by licensing or by competition controls, (for example, truck licensing);
- (d) User-charges/pricing (tolls, taxes, etc.).

Through the government policy in the transport sector, public authorities control the quality and quantity of transport services; they also determine the structure and the organization of the transport industry and they ultimately influence resource allocation, hence the decisions on the share of each transport mode in total "transport sector's production (modal split). Within the above policy framework and particularly in the context of transport pricing, the major aim of subsidies for public transport is to secure optimum operating efficiency rather than to alleviate financial difficulties. Each case for subsidy must therefore be substantiated on the basis of:

- (a) Local conditions;
- (b) Efficiency; and
- (c) Congestion in each transport mode.

In each case for subsidies, transport policy makers should consider the alternative solutions (non-subsidy) and the practical drawbacks. A general subsidy covering financial deficits may create the risk of increasing financial irresponsibility rather than promoting efficient operation.

Since the gap between financial needs and available revenues in the transport sector is widening in most countries at an accelerated pace, subsidies are still envisaged among the "adequate" solutions. Political and social considerations make it very often extremely difficult to conduct a national transport policy that adheres to the strict rules of economic, financial and technical efficiency without any subsidy.

Sound pricing of transport services is a tool for resource allocation as a whole, while direct subsidies may be required and are more efficient for some transport modes; for example, subsidizing rail or bus services instead of charging private car users congestion prices. Direct or indirect subsidies for public transport can also be used to promote desirable services by

transport operators. This is mainly a social issue since public transport is considered a "public service".

Any system of subsidies needs to be integrated into the rest of the transport policy to ensure that pricing and investment policies are consistent, operators do not use subsidies to finance their operations wrongly and subsidies do not in themselves introduce a biased resource allocation in and for the transport sector.

Subsidizing the transport sector is justified on the following grounds:

- (a) The role of the transport sector in the development process;
- (b) The need to correct modal imbalances caused by transport modes not capable of meeting their true costs;
- (c) The need to correct the financial imbalance in some modes which must otherwise reduce their costs by cutting services or by raising fares;
- (d) Social considerations (equity); to provide the majority of people with mobility and/or accessibility (particularly in rural areas);
- (e) To reduce congestion (especially in large urban areas).

Subsidies for the transport sector can be capital subsidies or operating cost subsidies. While the former covers resource allocation for transport infrastructure and networks, the latter includes transport operations.

Forms of subsidy to any given transport mode (operation) could encompass:

- (a) Compensation for fare/tariff reductions: this includes amounts received from the state and local authorities as compensation for tariff reduction measures. The purpose of these payments is to offset the cost to the transport operator of the mandatory free and reduced fare travel concessions granted to certain user categories;
- (b) Freight: As part of its revenue from freight traffic, the operator may receive compensatory payments to cover the cost of providing services at rates set by the Government under conditions inconsistent with commercial interests;
- (c) Infrastructure: Subsidy payments towards the cost of infrastructure to ensure that the operator's rates are on a par with other systems of transport whose infrastructure is also provided by the Government;
- (d) Public service obligation grant: This grant finances the services required by the Government or local authorities or subsidizes fares set by them, which would be inconsistent with the operator's commercial interests. It also covers the development and maintenance costs of transport facilities and any surplus which the operator considers necessary for operational requirements;
- (e) Exceptional operating subsidy paid by the Government;

(f) Losses for the year (within the framework of budgeting and accounting of transport enterprises).

There are a number of transport policy issues that affect public transport subsidy:

(a) Transport demand and supply structure (markets);

(b) Market performance (success and/or failure; meaning there is neither physical shortage nor excess production and any production increase is commensurate with consumers' benefit and with cost reduction);

(c) Efficiency: Optimum allocation of goods and services among producers and consumers;

(d) Equity: Distribution of welfare, if it is not optimal, may lead to intervention;

(e) Service quality: Public and private transport services need to be quality-wise perfect. Issues such as waiting time, reliability, time spent for a trip, and time-savings are dimensions of service quality in the transport sector.

Within the transport policy context, the allocation of transport subsidies and their levels follow the above considerations.

II. PRICING OF TRANSPORT SERVICES AND SUBSIDIES

Pricing is considered one of the most powerful tools of transport policy for the achievement of efficient intermodal choice and economic utilization of existing and planned systems. For any particular transport mode or service, the price charged to the users (user charges) should not fall below the relevant economic cost of providing this service. Prices set below the relevant threshold would constitute subsidies.

As transport services are "intermediate goods" used in the production, distribution and consumption of almost all commodities and services in the economy, the prices of transport operations are particularly important for the entire economic activity in any given region or country.

The pricing of transport services is a major function of both the national economy and social policy, subject to relatively wide controls by Governments; therefore, pricing policies should be based on optimum cost/revenue approaches. Moreover, the following objectives and main issues are to be taken into account within the framework of pricing:

(a) Reduction of financial deficits of public sector transport operations by introducing user charges and actual price mechanisms which reflect "economic prices" in relationship to "economic costs";

(b) Coverage of own costs by the transport system itself;

(c) Avoiding "underpricing" in transport operations, i.e. costs should not exceed revenues, not only in economic but also in financial terms.

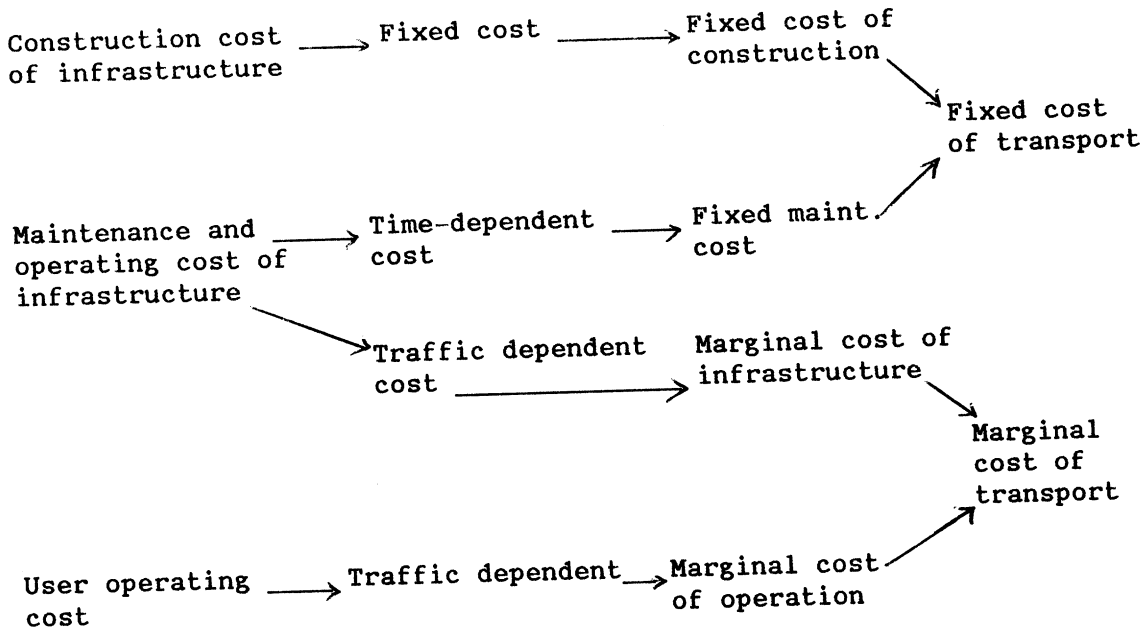
Moreover, there is a basic difference between the transport pricing problems in developed and in developing countries. This arises from the fact that, in a developed country the substitution in the form of competition among various transport forms (for example, rail versus road, inland waterways versus highways) dominates the transport sector, whereas the complementarity or the necessity for additional or new transport networks is essential for the transport sector's expansion in developing countries.

In the transport sector, general pricing principles include marginal and average costs. They essentially aim at different aspects of efficiency. Marginal-cost pricing optimizes the use of any given equipment while average-cost pricing optimizes the allocation of resources among various products.

Mixed pricing [the two-part tariff and the system of peages (levy or charge)] attempts to increase efficiency in different ways. Many public transport services can be priced according to this principle, whereby the users are charged the actual cost of variations in output and an additional lump sum, independent of the number of products, for any use of the transport service.

The starting point of the system of peages is marginal cost. Fixed costs are added to the marginal-cost component by additional levies, differentiated according to users. They may lead to quantity reaction against price, expressed in terms of "price elasticity".

The application of the pricing principles discussed above to the transport sector involves, above all, the establishment of an appropriate cost framework which would allow the definition of marginal and average cost structures. The following may illustrate this approach:^{1/}



"Apart from the allocation of fixed and variable costs of infrastructure as a whole, a further issue arises concerning the question of distributing these costs between different groups of users...Distributing the costs between the users raises the question to what extent the costs are caused by different vehicles (in various transport modes). Although interdependencies exist, the problem is usefully divided into construction and maintenance [of vehicles (rolling stock or carrying units)]".^{2/}

"Because the cost question has a direct influence on the charges levied for each group of vehicles, the issue has been the subject of bitter controversy",^{3/} especially in the highway sector, leading to further discussions on toll issues.

It is also worth mentioning that, where the market mechanisms are not working and other prices in the economy are also distorted, isolated rationalization of transport pricing, especially subsidies to certain socio-economic sectors made indirectly through the transport sector, may in fact produce undesirable economic effects beyond the transport sphere.

^{1/} United Nations Development Programme and the Economic Commission for Europe: "Trans-European North-South Motorway Project (TEM); Economic Evaluation of Highway Projects" (TEM/CO/TEC/4) (Geneva, 1985), p. 151.

^{2/} *Ibid.* p. 153.

^{3/} *Ibid.* p. 153.

In the specific case of road transport when the road-pricing system cannot lead to an optimal allocation of resources and where trips made by private transport could be made by public transport at lower resource cost, increases in elements of private-transport costs (for example, extra taxes) or subsidies to public transport could be envisaged. Here again the main issue is to reach feasible and appropriate pricing through subsidies whenever required.

Experience in many countries shows that a policy of indirect subsidies, to the rest of the economy or to individuals, through the transport sector is a dangerous course to follow. This is because it is difficult to keep such policies neutral with regard to the pricing of the various modes and because they may have different impacts on different sectors.

Furthermore, if the subsidy is necessary at all, it is usually more effective for the interests involved to receive them directly rather than indirectly via reduced transport rates. In this way, the cost of subsidy becomes better known to the policy makers. Transport subsidies, which must be considered as temporary solutions until the market forces become fully operational, are difficult to abolish, not only because of the financial interests created, but especially because the consumption and production structures may have become fully used to them.

When all parts of the transport sector are underpriced (i.e. costs are higher than revenues), both in economic and financial terms, the implementation of a policy of direct or indirect subsidies becomes even more difficult. That is why the reducing of financial deficits in given transport modes and the establishment of prices and tariffs to cover the financial costs of transport, including the maintenance and infrastructural costs, are necessary.

The gradual implementation of an economically and financially balanced pricing situation among the transport modes will certainly take considerable time. It is therefore recommended that transport policy makers adopt the necessary measures to tie subsidies to a well-established time-frame.

Problems created by subsidies depend upon the form of subsidies given. If the subsidy is for a specific transport service, then it may be seen as representing government demand for that particular service and its desire to treat it as a social service.

From a pricing-operational point of view, such subsidies are assimilated into standard economic models with relative ease. On the other hand, when lump sum subsidies are given to transport undertakings for general revenue purposes, problems arise in deciding upon the best methods of using the subsidy and the appropriate charge to levy on customers. In particular, it is difficult to devise pricing and operational objectives which ensure that the management uses the fixed subsidies efficiently to attain the welfare objectives for which they are intended. It can also be argued that commercial criteria (with profit-maximizing pricing) in this situation would lead to monopoly exploitation and be counter-productive in terms of the social objectives justifying the subsidy.

The following are the major subsidies in the land transport subsector: revenue subsidies, fuel tax rebates, excise duties, new bus (or other vehicle) grants, investment grants, concessionary fares, school travel, debt write-offs.

Sometimes, subsidies are given to specific transport modes, generally to railways and urban transport services, to offer incentives for transport users to switch to more socially desirable modes. The aim of such an action can also concern the reduction of environmental damage caused by these transport activities. Converting people and goods to the use of public transport may thus be a solution (among others) to environmental problems.

Cross-subsidization is also possible to balance profitable transport services against loss makers. This is frequently practiced when scheduled services have regular interval departures with differing load factors. The loss maker services are cross-subsidized by the fully occupied/used services during different departure times.

Revenue support subsidies given by the public authorities to passenger transport operators are designed to ensure the continuation of an unremunerative service that would otherwise be withdrawn or to improve service qualities such as the frequency of departures. A major disadvantage of subsidy payments is their tendency to discourage the financial disciplines of cost reduction and marketing which are inherent in the profit motive. This disadvantage can, to some degree, be overcome by a public authority making a revenue support contract with an operator.

Another problem with subsidies is that they may be terminated regardless of the operator's position. The decision to end payment of a subsidy may be a result of a political change, for example, in Government or local authority. In this case, the subsidy policy is not at all economically or socially motivated but is based on purely political preferences.

Revenue support subsidies have other problems as well. In fact, the application of a subsidy may tend to encourage inefficiency, or the decision to subsidize community needs compared to individual requirements may create further uncertainty as regards the justification of a subsidy. In these cases, the problem of social cost requires further consideration by the policy makers to balance the individual's needs and the community's wishes.

Various types of subsidies could be envisaged as well for the following inputs in transport sector infrastructure and operations:

- (a) Fuel and other types of energy (e.g. electricity) [motive power];
- (b) Capital:
 - (i) Grants, loans and other elements of finance policies;
 - (ii) Taxation and other elements of fiscal policy.
- (c) Land (mainly for land transport networks, for storage and for terminals);
- (d) Manpower (training and personnel policy);

- (e) Construction materials and equipment (networks, terminals, carrying units);
- (f) Spare-parts of rolling stock (including tyres);
- (g) Organizational inputs (management and institutions);
- (h) Packing materials and containers;
- (i) Specific inputs for environmental protection (this could be a combination of the previous inputs).

The size and type of subsidies are also affected by transport prices set without the control of countries or by transport prices imposed by international agreements. Standard instances of these prices are liner freight rates which tend to be adopted by liner conferences, or the internationally negotiated rates for air transport. These externally determined prices and freight tariffs may contain major irrationalities detrimental to the developing countries without serving international transport interests or monopolistic features which may harm the developing countries (including their own transport enterprises which may be obliged to charge those rates) and benefit foreign interests. Changes in these rates and in their structure at any one moment may have to be taken as given by the countries, thus leaving them with the problem of counteracting the effects on the economy and the national transport system, if this is possible. The methods of pricing and taxation which can be used to counteract undesirable effects of externally determined transport prices are a complex matter. In some cases, however, specific input subsidies could help to reduce the impact of externally determined transport pricing.

The pricing of transport services in any country is affected by transport prices and costs in other transit countries as well. Similarly, these transit countries lack control over prices and costs in countries to which they supply transport services. Demand for transport services from the receiving countries constitutes an additional claim on actual and future transport facilities. Measures of mutual control may become possible only if joint ventures are established and joint measures foreseen: For those countries heavily dependent on transit transport, transport pricing in the transit country is particularly relevant; therefore, any action taken within the framework of transport price policy (including subsidies) requires wider intercountry cooperation.

III. EFFECTS OF SUBSIDIES

In addition to the resource allocation effects of subsidies, which are directly related to pricing and costs in the transport sector, there also exist the following dynamic effects of transport subsidies:^{4/}

A. Efficiency effect

Efficiency in the transport sector mainly concerns transport operations and it means that the production of transport services perfectly matches consumer requirements. To achieve efficiency, the level of subsidy should be adjusted to the productivity level in transport enterprises. Subsidies can permit increases in service levels and may allow for fare reductions; however, they may also be associated sometimes with higher unit costs and lower service output. In these cases, subsidized services become particularly costly and financial discipline is required.

In specific cases of urban public transport, subsidies may lead to high wage rates and low levels of labour utilization that significantly increase costs, particularly in transit bus operations; thus, subsidies affect costs through their impact on wages and productivity.

There are also other direct and indirect effects of subsidies on costs. These effects can only be analyzed by examining subsidy levels (a) as consequences of decisions on service structures which are inherently costly or (b) as the cause of high costs. In this respect, detailed analysis to determine operating cost factors is necessary as well.

Capital subsidies and subsidies as revenue support act differently on costs. Where capital subsidy is available, it is likely that projects will be undertaken where the benefits exceed the costs incurred by the local decision makers except for social-benefit-oriented projects.

As regards revenue support subsidies, they can be derived from taxes specifically dedicated to transport and thus related to system performance. Subsidies, in these cases, are structured proportionally to public funding and their political accountability may thus be secured.

Subsidies affect transport technology uses as well. In particular, innovation requires initial protection from market pressures and this may need subsidy. On the other hand, there is concern that subsidy for existing transport operations may remove incentives to innovatory efforts. For example, specific subsidies such as new bus grants may offer effective inducements to change but their ultimate justification would remain in the welfare sphere.

^{4/} Parts of this chapter draw on the following publication: Transport subsidy, Stephen Glaister, ed; (Policy Journals, London, 1987).

B. Redistribution effect

Transport subsidies are sometimes used and justified as means of redistributing welfare in favour of specific target groups, in particular for those who have no access to private transport, e.g. children, pensioners or the unemployed, elderly people, etc. In these cases, public transport subsidy is mostly a form of negative indirect taxation and it is used instead of direct income supplement. The real effects of these subsidies can only be measured by comparing the relative importance of particular income groups in the consumption of the given transport service with their relative importance as contributors to the taxes that finance the subsidy. For different transport modes, journey purposes and localities, the proportion of expenditure undertaken by each income group should be taken into consideration.

The redistributive effects of concessionary fares must not be beneficial to some modes of transport or to some social target groups and counterproductive to the others. That is why, if the subsidies are utilized directly for redistribution purposes, it is preferable that they should take the form of price concessions to well-defined population groups. Moreover, the degree of taxation needed to sustain the transport systems with subsidies should be continuously monitored and modified.

C. Management effect

Subsidy given to the public transport sector should not lead to achievement of social benefit to the detriment of the financial balance. In extreme cases, in order to maximize social surplus, even a zero fare could be charged. Public transport subsidy should depend on the relative social productivity of funds allocated to this subsidy and to other public expenditure purposes. The subsidy financing agency must be consistent with its overall financial objective and the subsidy should not cause inefficiency of management.

Moreover, since subsidies apply differently in and for each transport mode, the maintaining of commercially motivated and financially sound management with appropriate social concerns must follow specific objectives for each and every mode of transport. A thorough examination of market segments and the consideration of subsidies as related to competing or interacting transport modes are the bases for a subsidy policy aiming at optimum transport management.

D. Environmental effect

Subsidies in the transport sector have environmental effects as well. Through capital subsidies (resource allocation for transport investment) and operating cost subsidies, transport policy makers can implement environmentally sound transport development processes.

By allocating specific subsidies for capital investments in given areas and for given transport modes, the environmental damage caused by specific transport operations in specific regions or localities may be reduced. Subsidies focusing on decreasing transport operation costs may also enable the transport operators to minimize the negative effects of their activities on the environment.

Specific subsidies could be foreseen for environmental impact analysis and for the elimination of transport pollution as well. As "externalities" arising from transport development, the environmental effects of the transport sector should be weighed against the socio-economic benefits emerging from transport infrastructure investments and from transport services. Subsidy policies should be designed within the above framework and according to the cost/benefit approach.

More and more, the pricing of the transport sector incorporates environmental approaches. The charging of a pollution price is becoming a normal practice for the containment of the external effects of transport. Moreover, the physical regulations of the transport infrastructure and rules concerning the rolling stock aim to contain the environmental effects of the transport sector. There is a wide range of inducements for transport investors and transport users to switch to more "environmentally desirable modes". Subsidies given to support the railways and urban transport services are largely justified on this ground. The subsidies to provide "environment friendly" transport facilities at relatively high prices may be more successful at attracting the transport users to public transport than cheap but poor-quality services (damaging the environment through transport pollution noise, vibration damage to buildings, visual intrusion and toxic gases, etc.).

IV. CONCLUSIONS

The subsidy issue in the transport sector is closely linked both to the pricing of transport services and to the financing of transport infrastructure and operations. The present study therefore emphasizes first the subsidies' role and place within the general framework of the public sector's transport policies. Based upon this premise, the second chapter of the document addresses the problem of the relationship between the transport sector's pricing and transport subsidies.

The introduction or the continuation of subsidized transport services requires a detailed survey and analysis of current and possible (planned) price structures as well as a thorough discussion of the economic and financial costs as regards transport operations. Subsidies, when applied in accordance with the optimum pricing and costing policies, should not lead to irrational situations where the transport sector becomes underpriced, inefficient and financially unsound.

Besides the effects on resource allocation, subsidies have efficiency, redistribution and management effects. In addition to these, capital, revenue or cost subsidies have environmental effects as well. The designing and the implementation of transport subsidy policies and actions should consider all these effects.

In order to provide an additional practical approach to the problem of subsidy in the transport sector, the present document is complemented by a case-study. This study, after discussing theoretical aspects of subsidies in the road transport subsector, focuses on the Cairo Transport Authority, reviews its activities, analyses the characteristics of subsidies provided and their operational impact on urban transport.

The recent market-oriented policies conducted in various ESCWA countries place increased importance on the development and on the promotion of private sector activities, mostly through privatization and deregulation. Within this context, the subsidy, which is one of the principal instruments for government intervention in socio-economic life, should be carefully scrutinized and its size, impact and future role redefined. Particularly in the transport sector, which is the main linkage among all social and economic sectors, the subsidies should become consistent not only with the government transport policies but also with the new liberalization and deregulation strategies. In this respect, the recent ESCWA Transport and Communications Division document on "privatization and deregulation of selected transport modes" may be relevant.

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Annex: Case-study

**SUBSIDIES IN ROAD TRANSPORT
(WITH SPECIAL REFERENCE TO THE CAIRO TRANSPORT AUTHORITY)**

This case-study was prepared by Mr. Abdel Kader F. Lashine, Ph.D.
Regional Advisor, Transport and Communications Division, ESCWA.

I. THEORY AND APPROACH

A. Introduction

Public transport subsidy is a significant item of public expenditure in most countries and is the subject of considerable controversy. The level of subsidy to the transport sector has reached alarming figures in many countries and has become a major political issue. Although the rail industry is the traditional mode of transport requiring heavy subsidy, passenger transport has also emerged over the past 10 years or so to require heavy financial support.

It has been a widely accepted concept that it is right to subsidize public transport. Such an approach appeared to be sensible because to do so would, in the case of road transport, alleviate traffic congestion by discouraging private car use, besides the benefits to those of limited income and the disadvantaged. In particular, subsidy is thought to stem the decline of services in thinly populated areas, thus preserving the right of mobility of those without access to private cars.

It is assumed that those who produce public transport services will do so at minimum cost, so that the increased subsidy is fully applied to either improving services or reducing their cost to users. However, if subsidy has the unintended effect of weakening the incentives to minimize costs, then increased costs will greatly reduce the benefits. As with any form of public expenditure, money spent on public transport subsidy is either money diverted from alternative public expenditure or extra tax revenue. These "disbenefits" must of course be set against the benefits of the subsidy.

Many countries in the ESCWA region are advocating more liberal economic policies. This would mean allowing a bigger role for private operators as well as reducing financial support to public transport operators. Many economists now believe that there are real disadvantages associated with subsidy and do not accept the equity argument for subsidy as self-evident.

The impact of such policies on both transport operators and transport users will be immense. Transport undertaking to run with due regard to efficiency and economy would mean that it should be run to break even. Hence fares would have to be raised to a level estimated to correspond to breaking even in terms of revenue.

The present paper examines this issue in more detail. The first part covers the theory and approach to road transport subsidy while the second part deals with a case-study on the Cairo Public Transport Authority.

B. Types of subsidy

Subsidy may be defined as the difference between costs of production and receipts of direct sales to final customers. It may be applied to a range of goods or to the whole activities of a producing firm. Accordingly, government payments for specific transport services, or as global sums for the maintenance of a network or as supplemental payments related to the carriage of passengers at concessionary rates, count as subsidy. Subsidy thus does not

necessarily represent a lack of value in the product, but may result from a political decision that a valued product should be paid for in a particular form. Subsidy as such takes different forms as explained in the following paragraphs.

1. Direct subsidy

This represents the total sum of financial support from the Government or local authority given directly to the transport agencies concerned to offset deficits between revenue and expenses as may appear in the annual financial budget. This type of subsidy, either to commodities or to services, is declared in value in the national budget of each country.

However, the level of loss declared by a public enterprise will depend on the accounting conventions used. The declared loss will depend on the level of prior changes such as the payment of interest on debts.

2. Indirect subsidy

This type of subsidy usually occurs when certain commodities or services are sold below their economic cost. The most apparent example is that related to fuel prices.

For many years, the price of diesel, which is the main fuel used by buses and trucks in Egypt, has been kept very low compared with its economic cost, contrary to gasoline, used mainly by private motorists, which is being priced at its economic cost.

Diesel fuel is presently being sold at just above 40 per cent of its economic cost. The transport sector in Egypt consumes about 1.0 million tons of diesel fuel annually, a large portion of which is imported; with the current low prices, this creates a major burden on the budget.

3. Cross-subsidy

Cross-subsidization exists where one activity does not meet its full costs and is supported by another more profitable activity. This cross-subsidization can exist at many levels: a bus service at certain times of the day or on certain days of the week may be cross-subsidized by a profitable operation from other items or days on the same route. Whether the peak period cross-subsidizes the off-peak or vice-versa partly depends on whether the prime purpose of the service is seen as providing an all-day service or matching peak demands. Thus, the form of cross-subsidization will depend upon the costing methodology adopted. At more aggregate levels, there may be cross-subsidization of certain highly trafficked routes by busier routes, particularly if these have a uniform rather than peaked demand.

4. Hidden subsidy

This is sometimes referred to as "unintended subsidy". If an activity is priced below its true cost, then the result may be that the activity is over-demanded. In transport terms, this could mean that the modal split is distorted or, alternatively, if transport as a whole is underpriced, then the

pattern of land use may be excessively transport-intensive. It is considered that heavy trucks bear too little of the costs of the road network in relation to their use of, and damage to, the road surface. Thus, road transport is underpriced compared to the true cost of the resources used. In consequence, the demand for road freight transport is higher because of the lower price, and freight may be diverted from other modes such as rail.

Road transport is associated with substantial uncompensated externalities such as noise, vibration, pollution, damage to buildings, visual intrusion, etc. Many of these externalities are difficult to price. Therefore, unless some attempt is made to correct the imbalance of modal costs caused by uncompensated externalities, modal choice will be distorted.

C. Justification

When considering the justifications for subsidizing the transport sector, three main reasons usually appear:

1. The role of transport in development

Transport is a large and labour-intensive industry. In the United Kingdom (1980) the transport labour force comprised about 9 per cent^{1/} of the total working population. In terms of fuel consumption, its share was about 25 per cent, and its contribution to the gross domestic product was about 5.2 per cent. Transport enables trade to take place on a larger scale which would increase the well-being of the society. Improving the means of carrying goods would facilitate exports, improve the balance of payments, and help to create modern industries and to decrease transport costs. Transport is indispensable to economic growth, and without transport, economic activity is restricted to hand-to-mouth subsistence levels. The demand for transport services increases with the extension of the input-output relationship of the economy and the provision of transport services can be an important determinant of the pace and locational pattern of development.

2. Correction of modal split

The second reason is to correct the modal imbalance caused by one mode not meeting its true cost. This is usually the case in circumstances where true internal costs are not being met as in the case of the road transport industry or when true social costs are not being met.

Taking the case of private car use in peak hours as an example, private cars in these circumstances can cause congestion. As a result, the private motorist imposes costs in terms of additional journey time on other road users, including bus passengers. The private car user is not required to compensate other road users for the costs he imposes on them or on society as a whole for the general impact of noise, pollution, visual intrusion and accidents. Also, he probably feels that whatever the ideal solution, from the society's point of view, a unilateral decision to abandon the use of his car

^{1/} G. Bell, D.A. Blackledge, P. Bowen, The Economics and Planning of Transport, Heinemann Publishers, London, 1983.

will make little impact on the problem as a whole. The increase in the journey time has three effects. The first is to raise the generalized cost of making a bus journey which could result in modal transfer. The second effect is that slower running times of buses result in less efficient use of the vehicles and their crews. More resources are required to provide the same capacity. Congestion also results in decline in service reliability which may require additional spare vehicles to correct. Thus, the second effect is an increase in operating cost. The third effect is loss of patronage as a result of increased journey times reducing the revenue whilst attempts to maintain reliable service increase the costs. Thus, the financial position of the bus operators deteriorates. This is the beginning of the fare increase/service cut/passenger loss spiral. Without subsidy the bus operator has only two choices to correct the financial imbalance. It can either attempt to reduce costs by cutting services (which in turn is likely to increase waiting times, increase generalized cost and therefore cause passenger and revenue loss) or raise fares which, given some price elasticity of demand, will result in passenger loss. The consequence of this spiral is usually a steady modal shift from public to private transport, a decline in the route structure and frequency of public transport operation and an increase in the social costs associated with private transport. Not all of this, of course, is due to the congestion effects which were taken as an example but rather to the change in relative modal costs.

If society takes the view that the social costs of this change in modal split are unacceptable, then it can attempt to internalize for the motorist some of the social costs incurred, perhaps by some form of road pricing which takes into account the congestion. Whilst this is technically feasible, Governments have shown themselves to be unwilling to accept the political consequences. The alternative then is to alter the relative costs of the modes by reducing that of public transport. This can be done by improving service frequencies and journey times and by reducing fares. All these measures require financial support for the bus operator.

3. Equity

The third argument consists of a range of social considerations which can be grouped under the heading of equity. Whatever the level of car ownership, there are groups who are unable to be car drivers: the young, the elderly, various groups of disabled people and people unable to afford cars. Even car drivers within car-owning households do not necessarily enjoy ready access to a car.

Thus, a majority of people may be denied mobility or at least mobility comparable to that of the car drivers unless public transport is available. These people may not be able to pay the full costs of the public transport they require, particularly as increasing car ownership increases the cost burden on remaining public-transport passengers as well. However, the inability to pay does not necessarily mean the absence of need.

Under the same heading of equity, the concepts of accessibility and mobility can also be included. People need access to workplaces, schools, hospitals, shops and recreational facilities. Such access may be easily achieved if these facilities are located nearby. However, with the vast expansion of metropolitan areas, more people are experiencing major difficulties in reaching these facilities.

Thus, in the absence of public transport, a substantial percentage of the society may become subject to mobility deprivation. Therefore, it has become one of the major elements of transport policy in many countries to provide some basic level of mobility through public transport and to subsidize it where the revenue falls behind costs.

D. Opposition to subsidy

Subsidy to the transport sector in general, and to urban public transport in particular, has become a major controversial issue, especially as the financial burden of subsidy is increasing at high rates. Opposition to subsidy and to the urban transport operation concentrate on two particular issues.

1. The "leakage hypothesis"

In the idealized model of perfectly competitive markets, a firm must operate at the lowest possible cost if it is to survive. Otherwise the inefficient firm would incur losses and be replaced by efficient firms. Inefficiency can only be sustained in the long run if barriers to competition, monopoly power, or external financial support cushion the firm. Only in such circumstances can management work at less than full stretch and labour not ask for superior terms.

Public transport operators have been given a degree of monopoly protection by regulation for many years and recently they have received subsidies. It has been argued that the ready availability of subsidies diminishes the incentive towards management efficiency and makes it more likely that "extravagant" wage demands will be granted. Specifically, the leakage hypothesis is that a proportion of increased subsidy will leak into higher costs rather than lower fares or improved service. If so, whatever benefit a subsidy might produce will then be greatly reduced.

Several investigations have tested the leakage hypothesis; and although not conclusive, the weight of evidence supports it. Two comprehensive studies^{2,3/} using data from 16 countries and 117 cities and towns over the period 1965-1982 suggest that if an extra 10 per cent of operating cost is covered by increased subsidy, then costs per vehicle-mile would rise between 1.3 per cent and 3.0 per cent.

More recent research^{4/} using data on British towns from the TRRL (Transport and Road Research Laboratory, a UK Government research body) study has confirmed that there appears to be considerable leakage, with every 10 per cent rise in the proportion of total costs covered by subsidy having raised average operating cost by almost 5 per cent.

^{2/} P.H. Bly, F.V. Webster and S. Pounds. "Subsidization of Urban Public Transport", TRRL Report SR 541, (1980).

^{3/} P.H. Bly and R. Oldfield. "Relationship between Public Transport Subsidies and Fares, Service Costs and Productivity", TRRL (1984).

^{4/} C. Turk and P. Sullivan. "Effects of Subsidy on Bus Operating Costs", Transport subsidy. S. Glaister, ed. (Policy Journals, 1987).

It is clear that cost increases of this magnitude would have a substantially deleterious effect on the economic rates of return, providing that the conventional view is accepted that the increased cost leads to economic loss.

2. Shadow prices of public funds

While public transport subsidies provide benefits, they also impose costs. These costs are likely to exceed the nominal costs of the subsidies themselves. Some of these costs will be administrative, but the more significant sources of costs are likely to be the marginal excess burdens or deadweight losses from raising additional taxation.

In other words, an extra \$US 1 of public expenditure devoted to public transport subsidies is likely to exceed \$US 1. Hence the benefit-to-cost ratio for a marginal increase in public transport subsidies must be compared with this shadow price of public funds and must exceed it for the increase in subsidy level to be justified.

This subject is to a great extent technical and the estimates obtained depend on the particular circumstances of the tax and of the economy that are assumed to prevail. A recent study in the UK^{5/} has suggested a loss of 10 per cent to 18 per cent for each Pound Sterling levied by indirect taxation. However, tax systems affect the whole economy of markets in a complicated manner and general equilibrium methods are required to study the secondary effects.

E. The role of the Government

1. Reasons for government involvement

There are perhaps four areas where the market mechanism has a fundamental flaw:

(a) External effects

In order to remedy the resulting misallocation of resources, the Government may wish to use a tax or subsidy.

(b) Public goods

For the market mechanism to work properly, the purchase of a commodity by one customer must preclude anyone else from consuming it. It is unlikely that one person would purchase any part of the public transport infrastructure and allow everyone else to use it at no cost. Examples in transport include such facilities as maritime navigation and street lighting. These are called public goods and are provided by Governments.

^{5/} J. Dodgson and N. Tophon, "Shadow Prices of Public Funds: A Survey", Transport subsidy, S. Glaister, ed. (1987).

(c) Inadequacy in perception

Road congestion is caused partly because motorists are unaware of the true cost of their journeys. This inadequacy in perception is again a serious threat to the efficient working of a market economy, and road congestion is merely one example of the misallocation of resources.

(d) The problem of indivisibilities

Investments in the transport infrastructure are so large that the private sector would be unlikely to participate in them without government involvement, regardless of political views on the desirability of free-market forces.

2. The Government and market forces

Firms in monopolistic positions can exploit these positions, leading to serious misallocation of resources. The Government may feel that it should protect the consumer from such exploitation. There are many examples of government involvement to prevent the growth of monopoly even in most developed countries. Such actions have been considered necessary by Governments because the market economy has failed to prevent firms from attaining such a position of dominance that they can control the market instead of remaining at its mercy.

Another type of government intervention is the attempt to prevent wasteful competition between operators, which is characteristic of low capital cost industries as in the case of freight and/or passenger transport services. With smaller profits, operators are tempted to cut costs, which may lower safety standards. In addition, it is argued, there would be a waste of resources as too much traffic chasing too little demand results in spare capacity.

The final area in this section involves government concern with income distribution by, for example, taxing the rich and giving benefits to the poor. In transport, a subsidy for bus operators might be a good example, as a greater proportion of the poor travel by bus.

3. Practical considerations

Governments usually intervene to change the way transport is operated in order to ensure that the minimum safety standards are met to protect operators, users and third parties. Laws are introduced and enforced in the interests of safety. Similar rules exist for environmental reasons such as those for controlling noise and exhaust fumes. The aim of these rules is to control the quality of operations rather than their quantity.

4. Means of government influence

In the transport sector there is a wide range of measures that have been used by different Governments to influence this sector. Of these measures, three will be examined here: state ownership, control by means of licensing, and financial provision and planning.

(a) State ownership

Transport operations may be put under government control because they are considered essential to the nation's interests and because if they were not state-owned they would not survive or because the Government wants to ensure that they follow what it considers to be the correct policy. The most extreme type of such control would be to make the operation part of the Government as in the case of railways. In Egypt, such government control takes three forms:

- (a) National organizations: Railways - Metro;
- (b) Authorities: Cairo/Alexandria passenger transport;
- (c) Public sector: Intercity passenger and freight transport.

(b) Licensing control

In many countries, anyone wishing to run a transport business needs an operator license. The rules and regulations governing issuance of these licences would normally differ from one country to another and from one mode to another.

In Egypt, for instance, in the field of urban and interurban passenger transport, there is a monopoly for both the Cairo Transport Authority and the four intercity public transport companies. Private-owned taxis are permitted to operate provided that they meet traffic police requirements in terms of standards and seating capacities. In the case of the freight transport industry, which includes five public transport companies, it is also permitted to operate privately-owned trucks as long as the operator is a member of the Trucking Cooperative Society. In general, there are two obstacles barring entry into markets: the type of company and the seating capacity of the vehicle.

(c) Government finance

In all the States of the ESCWA region, the necessary financing for the transport infrastructure comes directly from the national budget. The roads will compete for funds with other modes, particularly rail; and lowering motoring costs will have a marked effect on passenger and freight modal split. The financing of transport industries may take different forms. In the case of the railways, the external finance has to cover both the cash required for operating deficits and the cash required for investment.

Another financial provision for transport industries is the new fleet grant which is given towards the purchase of new buses (or trucks) as well as the subsidies to passenger transport industries to offset deficits in financial performance resulting from low-fare policies.

F. Conclusions

The present paper has dealt with the issue of road transport subsidies, which has become a major concern to bus operators and to government organizations. Subsidies to the road transport industry can take different forms: direct, indirect, cross and hidden subsidies. The paper gave brief descriptions of each.

The views favoring and opposing subsidies were examined, and there seems to be no unified opinion among economists regarding subsidy policies. There are some grounds for believing that subsidies can result in the diminution of incentives for managerial efficiency and in possible higher wages.

In spite of the strong tendency in many countries to minimize the role of government intervention in the transport industry, it seems that there is still an important role for Governments to play, especially for the purpose of maintaining safety standards, reducing pollution, easing congestion and ensuring mobility for those groups of society with no access to private cars.

In view of the continuous increase in the level of subsidy to the transport sector at a time when resources are diminishing and other sectors are soliciting more funds, accompanied by the belief that there is a margin for transport management efficiency to be increased, it seems appropriate that new road transport subsidy policies should be formulated on the basis of maintaining mobility for the transport user at a reasonable cost and at an appropriate level of operating efficiency.

II. CASE-STUDY ON THE CAIRO TRANSPORT AUTHORITY (CTA)

A. Introduction

Subsidy is a major component of transport policies, especially in railway transport and urban passenger transport, and to a lesser degree in interurban passenger transport.

For the transport sector, the issue of subsidy assumes a large political and socio-economic dimension, as transport, particularly for developing countries, has always been a major catalyst for national socio-economic development. Thus, the activities and projects of the transport sector are measured not only by their profitability, but also by the services rendered as a contribution to strategic objectives of the country. Hence, the Government intervenes heavily in setting fares, particularly in urban and interurban passenger transport services.

It is important to know that subsidizing the transport sector is not limited to developing countries; it is an established practice in several Eastern and Western countries. For example, the annual revenues of various transport corporations in European cities range from 35 per cent to 75 per cent of total expenditure (see annex table I). The difference is covered by various government agencies, however, at a lower rate than the deficit between revenues and expenses.

For the transport sector in the Arab Republic of Egypt, the issue of subsidies assumes a large dimension, as the State controls several transport corporations, such as the railway authority, urban passenger transport authorities, cargo carriers and river transport companies. The present study will focus on the situation in the Cairo Transport Authority.

The study was prepared on the basis of data contained in a detailed three-part study on public transport in Greater Cairo^{1/} made by the ESCWA Transport Regional Advisor through three missions to the Egyptian Ministry of State for Administrative Development.

B. Rationale for subsidizing the urban passenger transport sector

The urban passenger transport sector differs from other transport sectors in the fact that most of the trips are office/school-bound. This sector, therefore, is closely linked to the daily life of city dwellers and accordingly affects the socio-economic characteristics of the city. Hence came the principle of intervention by the proper authorities in policy formulation, planning and tariff-setting, even in operational affairs. In general, the principle of subsidizing this sector has been accepted at all levels, both locally and globally, for a number of reasons, of which the following are the most important:

^{1/} See Public transport in Greater Cairo, vol. I: In relation to energy costs (1990 [no document symbol]); vol. II: Family spending in certain groups (E/ESCWA/TCD/91); and vol. III: Transport fares and the role of the private sector (E/ESCWA/TCD/1992/8). All are in Arabic.

1. Optimizing the utilization of the available infrastructure (roads, bridges, etc.).
2. Reducing problems arising from traffic congestion on main urban transport roads.
3. Reducing environmental problems related to air pollution from vehicle fuel combustion.
4. Maintaining the pleasant look of the cities by reducing private-car requirements (elevated roads, multi-level car parks, etc.).
5. Helping to optimize land utilization in terms of horizontal expansion of urban physical planning.
6. Rationalizing energy utilization, as mass transit modes (buses) provide the same service while using less fuel.
7. Increasing revenues to the national economy in view of the higher cost of operating private cars compared to mass transit.
8. Providing mobility to the larger segment of the population that does not own private cars.
9. Creating job opportunities for large numbers of workers.

If the above factors are considered in the economic assessment of any mass-transit project, the result is usually in favor of such a project, regardless of the direct financial deficit anticipated from the operating outcome (due to setting transport tariffs on a non-economic basis). Profitability, therefore, is not necessarily a goal for a project in such services.

C. Subsidy-related problems
(Cairo Transport Authority)

Despite the above-mentioned reasons and justifications for subsidization, especially of urban passenger transport, the application of such a principle has several negative aspects which were dealt with in section I of the present study.

The policies of subsidizing and tariff-setting are interrelated. Through its intervention in setting transport tariffs, the Government also contributes to compensating this sector for its operating losses. Continuation of such policies, however, has caused CTA many other problems which can be summarized as follows:

1. Inability of the transport sector to strike a balance between revenues and expenses.
2. Dependency of the sector on the Government to finance investments; inability of the sector to finance itself, coupled with inadequate government investments, which ultimately lead to:

- (a) Inability to modernize the transport fleet according to standard requirements;
- (b) Inability to expand services;
- (c) Deterioration and irregularity of services;

3. Continuous losses by the transport sector have had major negative effects on personnel (and management), leading to inability to pay incentives or bonuses, which have prompted competent personnel to quit their jobs and contributed to the deteriorating performance of existing skilled labour.

D. Subsidy target groups (public-transport users)

A subsidy-related issue frequently raised is the fact that subsidy usually misses its target groups, and that subsidy to a given product or service goes to the eligible and non-eligible alike. Deregulated subsidy provided directly to operators gives rise to sloppy management, due to lack of incentives to improve productivity. Many countries have regulated subsidies to various transport corporations. In the United Kingdom, for example, the Government determines in advance the amount of subsidy provided to the railway sector, provided that the sector achieves certain operating goals.

In Egypt, government subsidy to CTA aims at reducing its budget deficit, since passengers, as a rule, do not pay the actual cost of journeys. Two million passengers in the Greater Cairo area benefit from this subsidy. In addition, CTA provides various kinds of subsidy to certain population groups:

1. Free transit permits for CTA personnel and dependants, as well as for personnel from other transport subsectors.
2. Free transit permits for police personnel.
3. Half-fare transit permits for military personnel.
4. Reduced seasonal tickets for students.
5. Reduced seasonal tickets for government and public-sector personnel.

Passengers riding free of charge amount to 18.7 per cent of total CTA ridership. Seasonal ticket holders amount to 18.8 per cent of total ridership. Thus, full-fare passengers amount only to 62.5 per cent of total ridership.

E. The situation of public transport and mass-transit users

CTA provides about 40 per cent of the total daily motorized trips in the Greater Cairo area (approximately 10 million trips). These services are provided by a fleet of 2,210 buses, 500 mini-buses, 24 river-transport units and 98 tramway cars.

The Greater Cairo Bus Company, which owns about 412 buses, provides about 752,000 passenger trips daily.

The fare on CTA bus lines ranges from LE (Egyptian pounds) 0.10 to 0.25/trip for regular buses, and from LE 0.25 to 0.50/trip^{2/} for mini-buses.

A survey on a sample of limited-income groups (governments and public-sector employees) was conducted in 1991 to examine characteristics of daily home-to-work trips. The results were as follows:

1. Spending by a civil servant on daily commutes (round-trip) ranges from LE 8.00 to 16.60 per month.
2. Spending on daily commutes ranges from 3 per cent to 16 per cent of an individual's net monthly income.
3. Family spending on daily office- or school-bound commutes ranges from 5 per cent to 22 per cent of its net monthly income.
4. Newly appointed young civil servants are likely to spend more of their income on transport simply because they live in remote areas.
5. Bimodal commuters amount to nearly 22 per cent of the total sample surveyed, of which 3 per cent are tri-modal commuters.
6. The average length of a trip amounts to 8.6 km (spatially measured).
7. Despite facilities provided by CTA in terms of seasonal tickets, holders of such tickets amount only to 5 per cent of the total sample surveyed.

F. The financial situation in the Cairo Transport Authority (CTA)

CTA publishes detailed yearly reports on the financial, operating and traffic situation of the facilities operated by it. To begin with, CTA final accounts for the last 10 years will be considered. In preparing its budget, CTA applies accounting methods based on the Standard Accounting System--a system traditionally used by public-sector institutions in Egypt. This system differs in certain aspects from that concerning financial analysis of operating-cost calculation in commercial enterprises. The impact of this difference will be discussed later.

Annex II gives a detailed account of the development of revenues and expenses of CTA, graphically represented in figure I, over the past 10 years.

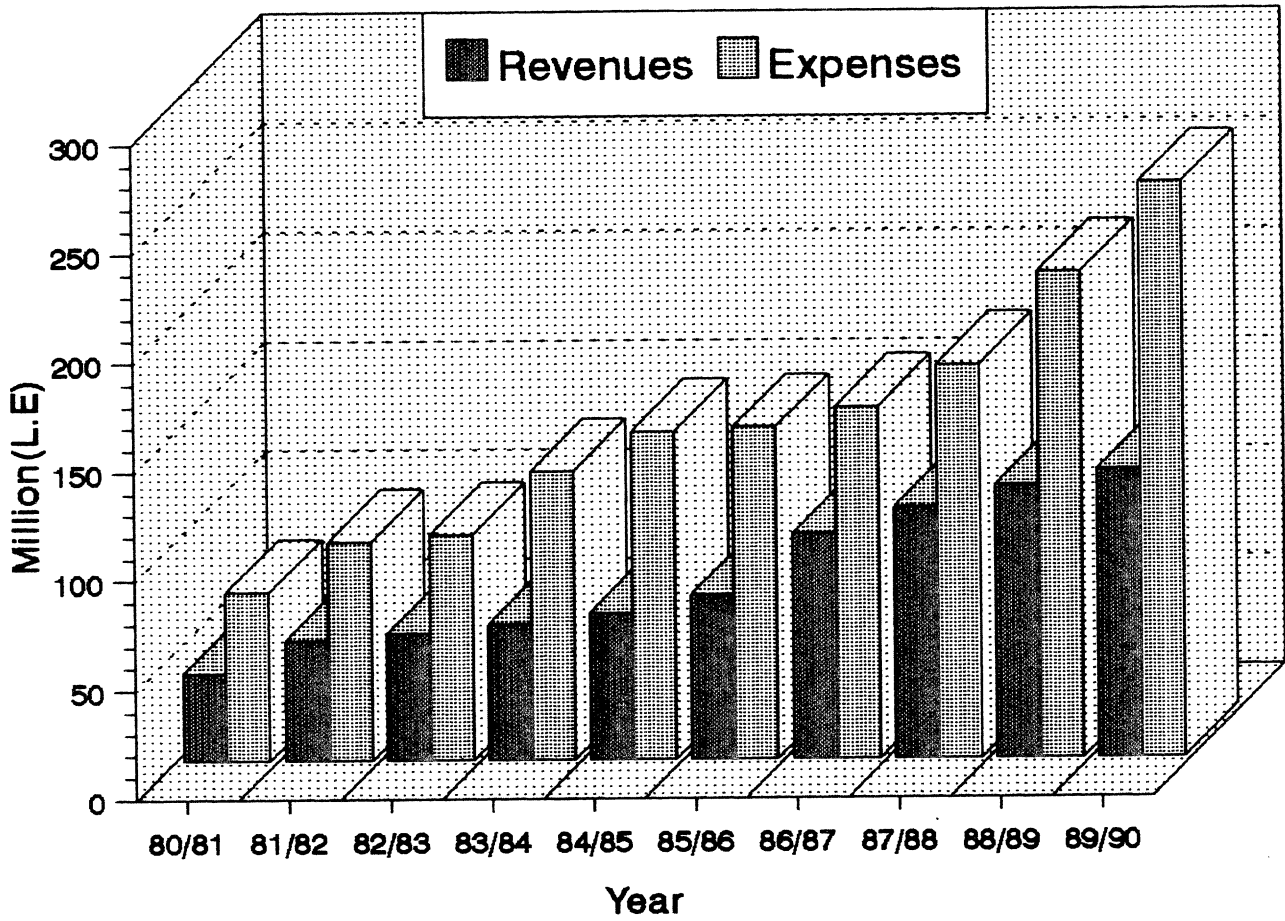
The analysis of data on CTA revenues and expenses over that period reveals the following:

1. Revenues

CTA revenues have been increasing steadily. During the last 10 years, they have increased by almost 360 per cent despite no relative change in daily ridership. In other words, there has been a steady rise in the transport tariff charged on CTA bus lines. The rise, however, was uneven during that period; it witnessed two peaks: one in fiscal year 1991/1992 and another in 1986/1987, where it exceeded 37 per cent. During the past four years, the increase was about 7.8 per cent a year.

^{2/} \$US 1 = LE 3.32 (1992).

Figure I. Development of revenues and expenses of CTA



Source: Public transport in Greater Cairo, vol. I: In relation to energy costs (ESCWA, 1991), from CTA annual reports.

2. Expenses

CTA expenses were on a continuous rise during the last 10 years (approximately 400 per cent). This rise, however, was at uneven rates; it fell to a minimum in two consecutive years: 1.2 per cent in 1985/1986 and 2.6 per cent in 1986/1987. Since then, and during the past four years, there has been a steady increase in expenses at a yearly rate of around 16.5 percent. The main items of expenditure are: wages, depreciation, spare parts and fuel. The impact of each of these factors will be discussed in section G of the present study.

3. Revenues versus expenses

The revenue-to-expense ratio varied from year to year, between 45 per cent and 60 per cent, with an average of 53 per cent for that period. The largest ratio was registered in 1986/1987, when a peak was witnessed. During the last three years, this ratio began to decrease gradually and is expected to fall considerably during fiscal year 1991/1992, due to the large rise in the cost of operating factors (vehicles, spare parts, fuel, wages, etc.), with only a limited increase in revenues.

4. Financial deficit in the CTA budget

In 1980/1981, the financial deficit in the CTA budget amounted to LE 35.6 million. The deficit continued to grow to LE 160 million in the 1990/1991 budget, i.e., an increase of about 450 per cent for that period. The revenue-to-expenses ratio at the beginning and the end of that period remained almost unchanged (45 per cent to nearly 50 per cent). The major element was the amount of the deficit and the burden it placed on the national budget (figure II).

Considering the yearly rates of financial-deficit increase, the figures for the last three years can be a major source of concern; they averaged around 30 per cent. This means that if the increase in revenues and expenses remained at the present rates during the coming period, the CTA financial deficit could triple within a period of four years to LE 500 million.

This large increase in expenses can be attributed mainly to a corresponding rise in the cost of operating factors (wages, depreciation, spare parts and fuel). The main aspect that governs the cost of operating factors is the US dollar/Egyptian pound exchange rate. The following discussion examines the impact of some of these factors.

G. Operating costs

1. Wages

In fiscal year 1989/1990, CTA personnel totalled around 32,600, of which 25,800 were assigned to operating buses at a rate of 11.7 workers per bus. In that year, CTA personnel wages totalled LE 99 million, with an average of LE 2,727.0/worker/year.

Annex table III gives a detailed discussion of the development of wages versus expenses during the last 10 years, as shown in figure III. A review of CTA wages reveals the following:

(a) During the last 10 years, wages increased from LE 30.3 million to LE 99.0 million, or by more than 225 per cent. The rate of increase in total expenses during that period, however, amounted to around 400 per cent. In other words, rates of wage increase are generally lower than those relating to the cost of other operating factors;

(b) In 1980/1981, i.e. the beginning of the reporting period, wages accounted for around 40.5 per cent, while in 1990/1991 they represented only 33 per cent of total operating expenses;

(c) Despite a large increase in CTA labour, with a consequently greater number of personnel per vehicle, which far exceeds standard rates, wages account for only one third of total operating costs. This ratio is far lower than corresponding ratios in other countries; it is also lower than that prevailing in inter-governorate passenger-transport companies of the Ministry of Transport;

(d) During the last five years, the yearly rate of wage increase ranged from 7.2 per cent to 13.4 per cent, at a yearly average of 10 per cent, a rate which falls below the average inflation rate during the same period.

2. Vehicle depreciation and spare parts

Within the framework of operating costs, vehicle depreciation accounts for 20-25 per cent of total operating costs. Spare-part expenses account for 15-20 per cent of operating costs, depending on vehicle type, depreciation time, operating conditions, etc.

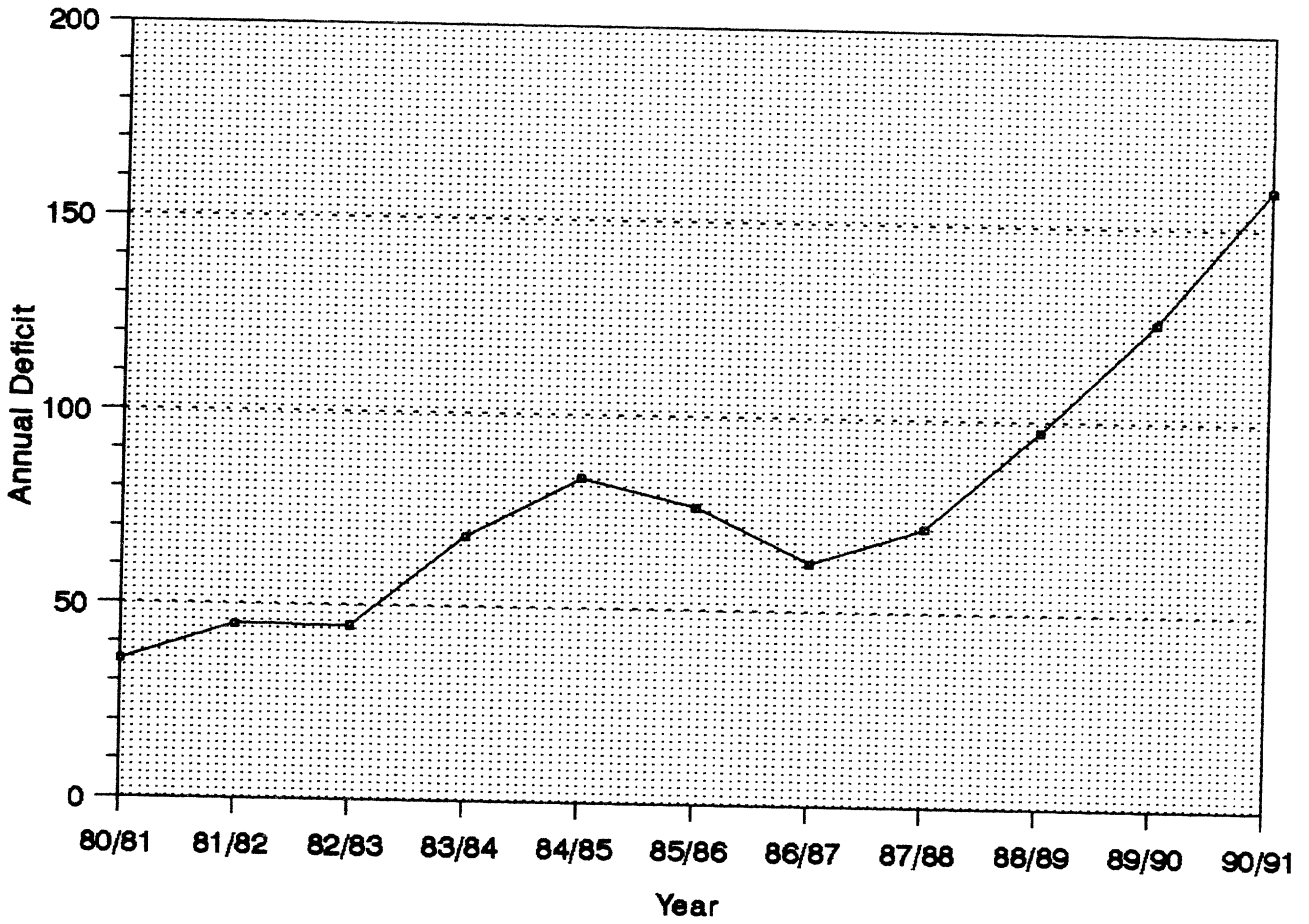
The main problem is that vehicles (buses), although a product of Nasr Motors Company (NMC), depend heavily on foreign components with a limited domestic input. Spare parts are 100 per cent imported. The continuous rise in vehicle and spare-part prices at the international level is charged directly to the consumer.

Another problem facing CTA, among other agencies, is the devaluation of the Egyptian currency versus the US dollar. In 1979, the dollar/pound exchange rate was approximately 1:1. During the reporting period, however, this rate tripled, reaching around 1:3.33. The consumer (CTA) incurred the difference.

Annex table IV describes the development of NMC-vehicle cost over a period of more than 10 years (both in Egyptian pounds and US dollars). The relationship is graphically represented in figure IV, which shows that vehicle costs in Egyptian pounds have increased six times since mid-1983, or at a steady annual rate of 22 per cent. Spare-part costs were no exception.

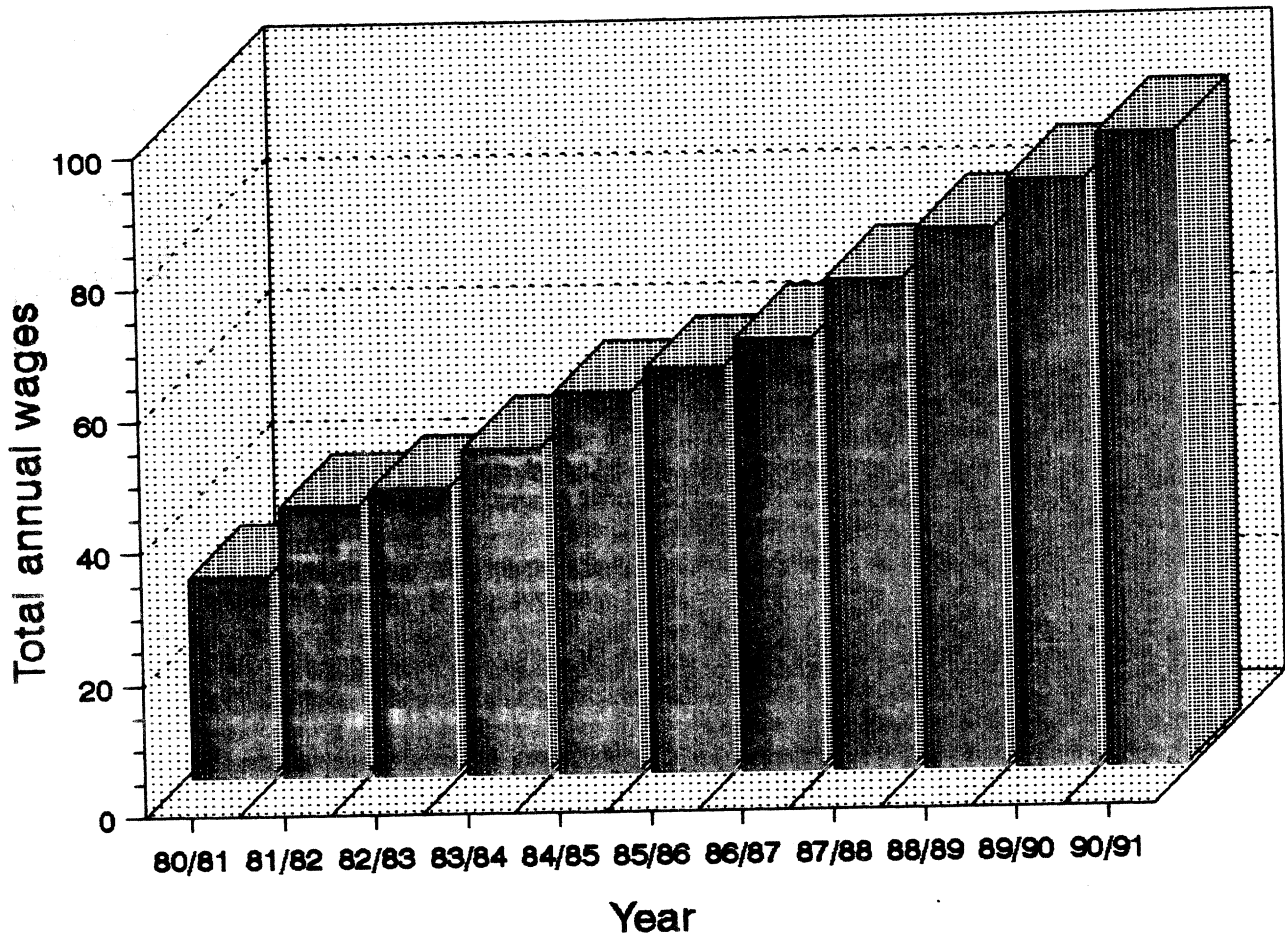
The figure also shows the rate of increase for vehicle and spare-part costs to be 1.5 times higher than total operating costs. Cost increase at such a high rate constitutes a heavy burden for CTA. The latter is obliged to deal with NMC, which sets prices for its vehicles--a situation in which CTA has no say.

Figure II. Development of annual deficit of CTA
(Millions of Egyptian pounds)



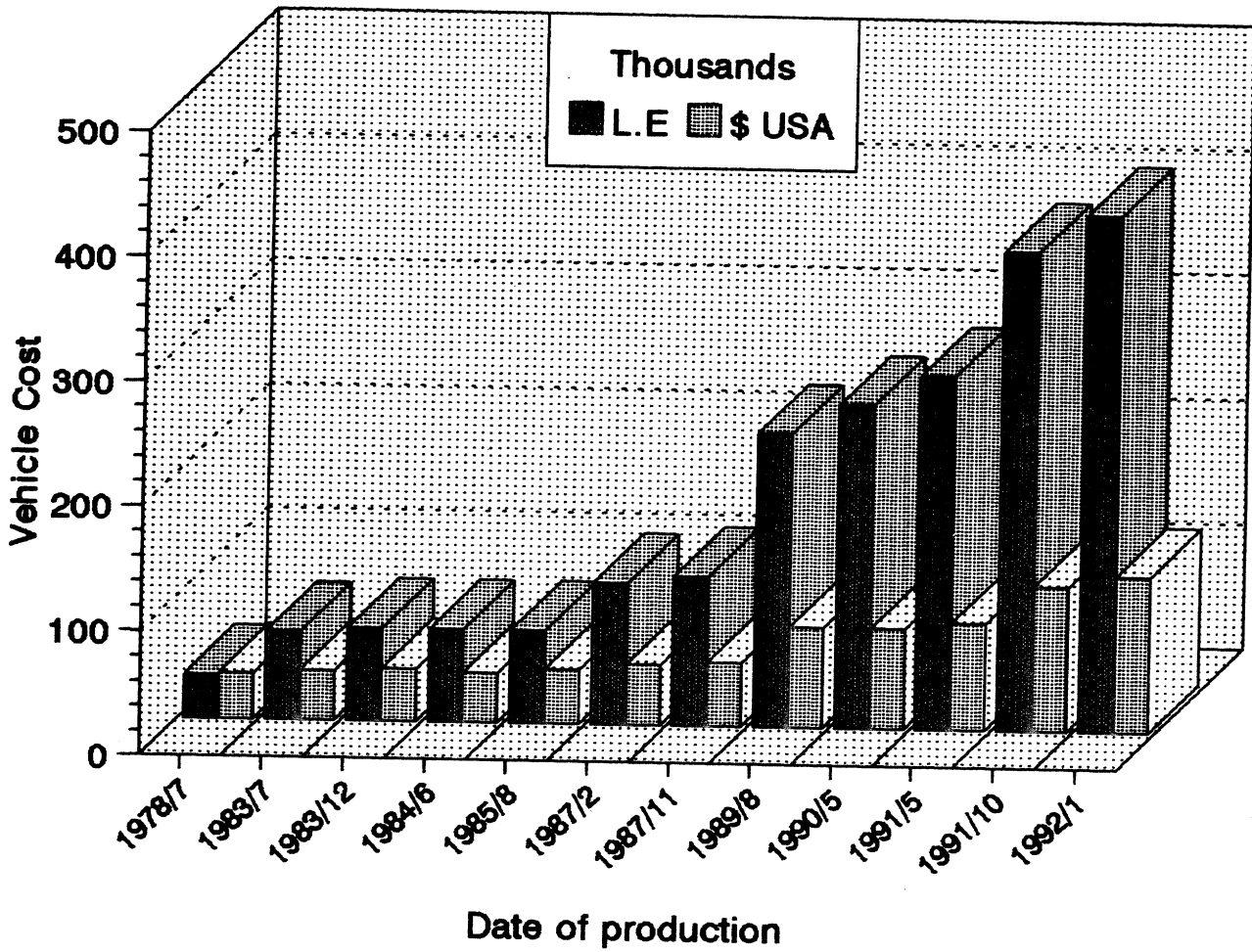
Source: Greater Cairo Transport Authority (annual reports).

Figure. III. Development of total annual wages at CTA
(Millions of Egyptian pounds)



Source: Greater Cairo Transport Authority (annual reports).

Figure IV. Variation of vehicle cost with time



Source: Greater Cairo Transport Authority (annual reports).

3. Energy (petroleum/electricity)

The cost of consumption of petroleum derivatives (fuel, oils and lubricants) generally accounts for 4 per cent to 12 per cent of total operating costs. This wide range is attributed mainly to varying fuel prices among countries of the region. The established practice in most of these countries is to sell fuel, particularly diesel, used by large vehicles (trucks, buses), below cost.

For CTA, the total yearly consumption of fuel (diesel) amounts, according to table 1, to nearly 100 million litres.

Table 1. CTA total consumption of petroleum derivatives
(1989/1990)

Vehicle	Derivatives		
	Diesel (millions of litres)	Oils (tons)	Lubricants (tons)
Buses	89.5	3 056	38.3
Mini-buses	7.2	333	7.1
River buses	1.5	30	0.9
Total	98.2	3 419	46.3

Source: CTA annual reports.

During the same year (1989/1990), total consumption of electricity by tramways was on the order of 19.6 million kwh, where related costs amounted to LE 12.4 million of total CTA expenses for that year (LE 256.4 million). In other words, energy-consumption cost accounted for 4.85 per cent of total expenses.

On the other hand, costs are on a continuous rise, particularly for fuel, as shown in table 2:

Table 2. Development of fuel sale price to the transport sector
(Piastres*/litre)

Year	Gasoline (benzene)	Diesel
1981	13	3
1986	30	3
1987	40	5
1989	60	10
1991	80	20
1992	100	40

Source: CTA annual reports.

* One piastre = LE 0.01.

H. Revenues

1. Shares of individual transport facilities

CTA revenues come mainly from operating a variety of transport facilities. Its 1991 revenues are given in table 3.

Table 3. CTA revenues in 1991

Facility	Ridership (percentage)	Revenues ^{a/} (LE million)	Revenues (percentage)
Tramways	5	5.105	3.6
Buses	85	107.695	75.8
Mini-buses	10	29.443	20.6
Total	100	142.243	100

Source: CTA annual reports.

a/ Excluding river-bus revenues, whose value is negligible (less than LE 0.5 million) in the present analysis.

Table 3 shows that buses are the backbone of CTA transport operations. They carry 85 per cent of total ridership, while contributing only 75 per cent of total CTA revenues.

2. Transport tariff in CTA (Annex table V)

Of the total CTA bus lines (273), 219, or around 80 per cent, charge a standard fare of LE 0.10 per journey regardless of distance. The rest of the lines charge LE 15-50/journey. Ridership of standard-fare bus lines, however, accounts for 78 per cent of total bus ridership. Revenues earned by such bus lines constitute 60 per cent of total bus-line revenues. Mini-buses operate on 64 lines, of which 48, or 75 per cent, charge a tariff of LE 0.10-0.30/journey. The fares on the rest of the mini-bus lines range from LE 0.35-0.50/journey. Revenues grossed by the higher group account for 59.2 per cent of total revenues, with a 59-per cent ridership. Thus, in terms of fare structure, there is a balance between ridership and revenues for various mini-bus lines. On average, the bus fare amounts to LE 0.125/journey, while the mini-bus fare is on the order of LE 0.293/journey.

The transport tariff structure for buses is based on the Administrative Divisions of Greater Cairo. Within each Division, bus-line fares are standard (LE 0.10/journey). Between Divisions, however, bus-line journeys are longer, and fares are higher.

3. Comparative review of transport tariffs in the ESCWA region

Annex table V gives details of public (government) transport tariffs in cities of certain ESCWA countries. It shows that a passenger-transport tariff

is not related, in general, to operating costs; mostly, it is a socio-political, and not economic, tariff.

From an economic point of view, bus operating costs should presumably be approximate for this group of countries. This is true except for one item, namely wages. Urban-bus costs are approximate, and so are most of the operating components (spare parts, tyres, fuel, etc.).

Thus for different public transport operators in the region, 60 per cent of total operating costs should, presumably, be more approximate. In terms of wages, CTA has excess labour (11.7 workers/bus), while the Gulf States suffer a corresponding shortage (around 4.3 workers/bus). If wages in the transport corporations of the Gulf States were ten times those in the CTA, total economic operating costs in the Gulf States should be twice those of CTA.

In reality, compared to tariffs in the CTA, transport tariffs in the Gulf States and Jordan are 5-10 and 2.8 times higher, respectively. In Damascus, however, the transport tariff is 0.70 of that for CTA.

Considering transport tariff versus per-capita income, IMF data indicate that per-capita GNPs in 1991 for Egypt, Jordan and Saudi Arabia were \$US 600, \$US 1,340 and \$US 7,050 per annum, respectively, or at a ratio of 1:2.2:11.7, which is more or less consistent with prevailing averages of urban bus fares in these three countries.

Normally, average income is not a major determinant of transport tariffs. The fact, however, is that tariffs based on socio-political rather than economic considerations take these factors, perhaps unintentionally, into account.

4. Impact of tariff increase on bus passengers

In an effort to close the gap between CTA expenses and revenues, restructuring of the existing transport tariff was considered. Thus, the LE 0.05-0.25/journey bus-line fare was raised by LE 0.05 to LE 0.10-0.30/journey, while fares for the rest of the bus lines were raised by LE 0.10. Mini-bus-line fares were similarly raised. This revised tariff is reflected in higher transport fares at a rate of 20-50 per cent.

On the other hand, the proposed tariff structure (assuming consistent ridership) means an increase in total CTA revenues from LE 142 million to LE 195 million per annum, or at a rate of 37 per cent within one year. Ridership, however, can drop, which means cancellation of a number of journeys. Thus, the increase would be on the order of 30 per cent.

For commuters, the newly revised tariff structure means more spending on transport, amounting to LE 5.00/month. A large segment of the work force (newly appointed employees) would thus spend around 21.8 per cent of their monthly income on commuting. This ratio may increase if a commuter supports a family.

I. Balancing revenues with expenses and the transport policy

Given the existing circumstances, correcting the imbalances in the CTA budget and balancing revenues with expenses in the near future seems to be a

difficult task. Government subsidy of the transport sector is expected to continue for a long time.

While there is no dispute, in principle, over subsidizing the urban passenger-transport sector by the Government, a policy framework should be established in order to stop the deterioration of the current situation.

The main components of such a policy framework are:

1. Gradual increase in transport tariffs (revenues):

To increase the transport tariff by a yearly rate of 30 per cent for five consecutive years while maintaining the rate of operating cost increase over the same period (at 17 per cent a year) would allow the revenue-to-expense ratio to reach 75 per cent.

2. Minimizing the increase in operating costs (expenses):

This will depend on:

(a) Improving the labour/wage policy;

(b) Opening the door to competition with a view to securing a better fleet, curbing the increase in the cost of locally-produced vehicles;

(c) Rationalizing the consumption of spare parts, fuel, etc.

3. Continued subsidization of the urban passenger-transport sector by the Government:

In CTA, a gap will always exist between expenses and revenues. The Government should continue to subsidize this sector, as long as it achieves the operating objectives set by the Government.

4. Improving and diversifying services (private/mixed sector)

This implies allowing the regulated private sector (or the mixed sector) a greater role in providing higher level, profit-oriented, urban public transport services to the upper-middle-income groups. Here, cross-subsidy should be accepted, as revenues from such services could partially offset losses by regular bus-line operations.

5. Transport-facility users

It is important to compensate a certain sector of society (limited-income groups) for any sharp increases in the transport tariff, which may entail spending a substantial part of their monthly income on essential commutes.

J. Summary

The present study discusses the main aspects of CTA subsidization to reduce the continuous deficit between its revenues and expenses.

The study focuses on two issues: the first deals with reasons and justifications for the universal acceptance, at all levels, of subsidizing public-transport services. The study also reviews the situation in the CTA, subsidy target (low-income) groups and their spending on their daily work trips versus their monthly incomes.

The second issue is the CTA financial situation and development of revenues and expenses over a period of 11 years starting in 1980/1981, which shows an increase in the annual financial deficit. Although the revenue-to-expense ratio during that period remained at around 50 per cent, the financial deficit grew from LE 35.6 million to LE 160 million over the same period.

While wages--as a percentage of the operating cost--dropped during that period from 40.5 per cent to 33 per cent, vehicle cost tripled over the same period. There was also a steady increase in the cost of all operating items. Despite a steady rise in CTA revenues, expenses were always much greater, particularly during the last three years, when the annual rate of increase for expenses averaged 17.8 per cent, while the corresponding figure for revenues stood at 7.8 per cent. The reasons for such a rise in CTA expenses were beyond control (universal rise in the cost of all operating components).

The main reason for the drop in CTA revenues is the low fare charged on all bus lines (an average of LE 0.125/journey). To reduce the revenues expenses deficit to 25 per cent, the study suggests a 30 per-cent yearly increase in the transport tariff for a period of five consecutive years, while keeping the level of increase in the cost of operating components at 17 per cent.

The study also discusses the main features of the policy framework proposed for passenger transport in Cairo in order to reduce problems arising from the existing situation.

Annex table I. Revenues of passenger transport corporations in certain European cities
(Percentage)

City	<u>Passenger-derived revenues/operating cost percentage^{a/}</u>	
	1971	1979
Glasgow	97	76
Greater Manchester	97	75
Merseyside	108	59
London	106	75
South Yorkshire	<u>b/</u>	35
Tyne and Wear	<u>b/</u>	68
West Midlands	<u>b/</u>	76
West Yorkshire	<u>b/</u>	75
Barcelona	101	38
Berlin	55	39
Brussels	56	30
Dublin	108	58
Frankfurt	54	50
Hamburg	81	67
Helsinki	52	49
Lyon	94	59
Milan	<u>b/</u>	29
Munich	87	52
Paris	65	44
Rotterdam	47	28
Stockholm	62	43
Stuttgart	72	50
Zurich	88	65

Source: J.E. Allen, Public Transport: who pays? Nottingham University (conference paper), in Public transport in Greater Cairo, vol. I: In relation to energy costs (ESCWA, 1991), annex 8 (in Arabic).

a/ Excluding capital costs and depreciation.

b/ Data unavailable.

Annex table II. Development of CTA revenues and expenses

Fiscal Year	Revenues		Expenses		Revenue/expense ratio	Difference between revenues and expenses (LE millions)
	LE millions	Annual percentage	LE millions	Annual percentage		
80/81	39.3	--	74.9	--	52.6	35.6
81/82	53.8	37.0	98.6	31.6	54.6	44.8
82/83	58.8	9.3	103.5	5.0	56.8	44.7
83/84	62.4	6.1	130.5	26.1	47.8	68.1
84/85	66.7	6.9	150.3	15.3	44.4	83.6
85/86	75.6	13.3	152.1	1.2	49.7	76.5
86/87	103.9	37.4	163.3	2.6	63.4	62.4
87/88	112.0	7.8	183.7	12.3	61.0	71.7
88/89	122.8	9.6	220.0	19.8	51.3	97.2
89/90	131.0	6.7	256.4	16.4	51.0	125.4
90/91	140.4	7.2	300.5	17.2	46.7	160.1

Source: Public transport in Greater Cairo, vol. I: In relation to energy costs (ESCWA, 1991), Annex 9 (in Arabic), from CTA annual reports.

Annex table III. Development of CTA wages versus expenses
(Millions of Egyptian pounds)

Year	Expenses	Wages	Wage increase (percentage)	Wages/expenses ratio
80/81	74.93	30.3	--	40.5
81/82	98.57	40.9	35.0	41.5
82/83	103.45	43.5	6.4	42.0
83/84	130.50	49.4	13.6	38.0
84/85	150.30	57.6	16.6	38.2
85/86	152.10	61.1	6.1	40.2
86/87	162.27	65.5	7.2	40.3
87/88	183.25	74.3	13.4	40.5
88/89	220.00	81.7	10.0	37.2
89/90	256.38	89.0	8.9	34.8
90/91	300.50	99.0	11.2	33.0

Source: Public transport in Greater Cairo, vol. I: In relation to energy costs (ESCWA, 1991), Annex 9 (in Arabic), from CTA annual reports.

Annex table IV. Development of NMC vehicle cost

Date of manufacture	Sale price (LE thousands)	Percentage	Sale price (Thousands of US dollars) ^{a/}	Percentage
7/1978	35.5		37.4	
7/1983	71.0	100	40.5	100
12/1983	75.0	106	42.9	106
6/1984	75.0	106	40.5	100
8/1985	79.0	111	43.9	106
2/1987	114.0	160	49.2	121
11/1987	120.0	169	51.8	128
8/1989	236.0	332	81.0	200
5/1990	260.0	366	81.0	200
5/1991	284.0	400	86.1	213
10/1991	385.0	542	116.7	288
1/1992	415.0 ^{b/}	584	125.4	310

Source: Public transport in Greater Cairo, vol. III: Transport fares and the role of the private sector (E/ESCWA/TCD/1992/8), Annex 2 (in Arabic).

a/ Sales tax included.

b/ According to the exchange rate for US dollars versus Egyptian pounds.

Annex table V. Transport tariff on public transport facilities in capital cities of certain ESCWA countries

Country	City		Fare ^{a/} (in local currency)	Average Fare (in \$US)
Saudi Arabia	Riyadh	SRL	2.00	0,53
United Arab Emirates	Abu Dhabi	DH	1-2	0,41
Kuwait	Kuwait	KD	0.15	0,53
Jordan	Amman	JD	0.10	0,15
Egypt	Cairo	LE	0.10-0.25	0,053
Iraq	Baghdad	ID	0.10	0,01 ^{b/}
Syrian Arab Republic	Damascus	LS	1-2	0,036
Yemen	Sana'a	YR	2-5	0,08
Oman	Muscat	RO	0.100	0,29

Source: ESCWA, and various international sources.

a/ For service taxis operated by the private sector.

b/ According to exchange rates in practice.

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