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APPROACHES TO EVALUATE TRANSPORT COSTING IN INDIA – AN EXPLORATORY STUDY

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Dr. Mahesha, V

Assistant Professor Department Of Post Graduate Studies And Research In Commerce, Karnataka State Open University, Manasagangothri, Mysore – 06.

ABSTRACT

This research paper has made an attempt to study the background and strength of cost factor in transport sector. The analysis can be condense into three crucial issues which, depending on how they are handled in any analysis, together dictate whether or not transport measures will be deemed a more or less cost-effective route to carbon reduction. In short, these are the postulation about future costs and level of travel demand, the methods applied to compare policies for cost-effectiveness and the evidence base used in relation to different types and combinations of policy instrument. So in view of this, the present study assumes a great importance to put the light on transport costing.

INTRODUCTION

Transport is an essential service in any society and which plays a vibrant role in the growing economy. Goods transportation ensures that products can be shifted from factories to markets and passenger transport, both private and public - allows Indian's citizens to visit each other, go to work or school, and participate in a countless of economic and social activities. Increases in transport efficiency were an essential precondition to the industrial revolution and are still a driving force behind international trade and tourism. The benefits of transport are many and varied: an efficient transport system is a major contributor to exhilarate economic growth, competitiveness and employment.

All this explains why the growing realization that something is going wrong with our transport systems is so profoundly disquietening. Increasing transport delays have brought down travel speeds in a number of major Indian cities to levels which prevailed in the age of horse drawn carts. Air pollution problems (e.g. ozone) in summer are requiring that, on more and more occasions, citizens across India have to refrain from outdoor activities. It is estimated that thousands of Indian citizens die each year from just one form of air pollution (particulate matter) - according to some studies conducted earlier has pointed out that the air pollution from transport kills more than 683 people in the Karnataka alone. Road accidents kill some 87,560 annually in the Country and are the major cause of death for the under 40's.

Although some forms of pollution are expected to go down on the basis of current policies alone, overcrowding will increase to unparalleled levels if no further action is taken to initiate the level of pollution control. Whereas technical progress has made transport much safer and the total of road accidents is slowly declining due to the active involvement of statutory bodies under the super vision of government further, society is realizing that the cost in terms of human suffering, misery and lost productivity is unacceptably high.

All over India debates are going on about what is increasingly becoming known as the "transport problem" in general and transport costing in specific. And, whilst the nature of the problem differs across regions, the calls for policy action are intensifying everywhere. Member State governments have shown positive sign towards launching discussions and published consultation documents and a wide variety of institutions such as the State Transport Undertakings (STUs), Karnataka State Road Transport Corporation (KSRTC) and Andra Pradesh State Road Transport and the Committees formulated by the government and others have called for action. Also, the Cannes Council concluded that other measures should be adopted to establish fairer competition between modes of transport.

The Need to Rebalance the Policy Strategy

Clearly, many measures have already been taken on a variety

of levels and cities, regions Member States and the Union are each making important contributions.

For example, the Government has laid down progressively tighter standards for vehicle emissions, as a result of which tailpipe emissions of a new car are now 90% lower than in the early seventies. Also, in other areas - e.g. safety and noise - standards have forced improvements. However, many transport problems are related to decisions by individuals with regard to the choice of mode, route or timing. Congestion, for example, results from the fact that too many people decide to use private cars at the same time and in the same place.

Table 1: Rough estimates of the external costs of transport (expressed as percentages of gross domestic product)

Particulars	Percentage
Air pollution ^(a)	0.4
Noise	0.2
Accidents	1.5
Congestion	2.0

(a) excluding global warming

Source: Various studies and OECD (1994)

Estimates suggest that over 90% of these costs are related to road transport. External costs of railways and inland waterways are estimated at only a fraction of the total, although there are complicated infrastructure cost recovery issues to be dealt with. To date, less information is available for maritime and air transport, where the required policies are also likely to differ from those in inland transport due to the highly intercontinental nature of trade in these services. These findings explain why, whilst fully recognising that the principles developed in this paper should apply to all modes, it concentrates on road transport, without however, overlooking the other transport modes in relevant cases.

OBJECTIVE OF STUDY

The objective of this paper is to launch a discussion on how, as part of a multifaceted transport policy, pricing instruments can contribute to solving the most important transport problems with which the Government of India is currently faced. Different levels of policy making – local and national - are involved in such a strategy and their respective competences will have to be defined.

The Externalities of Transport

Transport externalities refer to a situation in which a transport user either does not pay for the full costs (e.g. including the environmental, congestion or accident costs) of his/her transport activity or does not receive the full benefits from it.

Any transport activity creates benefits to the people and as well as society in terms of costs. However, not all of these costs and benefits accrue only to those who pay for this transport

activity (i.e. the transport user). Some of the costs fall on other persons or on society as a whole. One can therefore distinguish between the so-called "internal" or private costs, those that are borne by the person engaged in the transport activity (e.g. time, vehicle and fuel costs) and the so-called "external costs", i.e. those that accrue to others. The sum of both types of costs is called "social costs". In general terms, externalities arise whenever the well-being of an individual is affected by the activities of others who ignore this "spillover" when taking their decisions.

Approaches to Evaluate Transport Costing



Table 2 presents a breakdown of total social costs of transport in external and internal costs for a number of cost items.

Table 2: Cost Classification and Approaches to Transport Costing

Cost Categories	Social Costs	
	Internal Costs	External Costs
Transport Expenditure	fuel and vehicle costs; tickets/fares	costs paid by others (e.g. free provision of parking spaces)
Infrastructure Costs	- user charges, vehicle taxes and fuel excises	uncovered infrastructure costs
Accident Costs	costs covered by insurance, own accident costs	uncovered accident costs (e.g. pain and suffering imposed on others)
Environmental Costs	own disbenefits	uncovered environmental costs (e.g. noise disturbance to others)
Congestion Costs	own-time costs	delays/time costs imposed on others

Source: Not known

Importance of Transport Externalities

The critical importance of transport externalities arises from the fact that, in a market economy, decisions are heavily dependent on market prices. However, when market prices fail to reflect existing scarcities (clean air, absorptive capacity of the environment, infrastructure etc.), the individual decisions of consumers and producers no longer add up to an outcome that provides maximum benefits to society as a whole. Thus, pricing on the basis of full social costs is a key element of an efficient and sustainable transport system in the whole.

Externalities impair the efficient distribution of resources across sectors and activities. For example, if the use of a certain vehicle type entails significant air pollution and road damage costs which are not charged, then the demand for this vehicle type will be "too" high and the demand for cleaner

and less damaging vehicles "too" low. This represents an inefficient use of resources and it leads to increasing of costs. Externalities imply that individual transport decisions no longer lead to an outcome that is desirable from the point of view of society as a whole. Moreover, the external costs are paid by others: tax payers implicitly end up footing the bill of road maintenance and health care due to damage from air pollution, whilst damage to buildings and crops resulting from acidification and other forms of pollution is paid by house owners, businesses and farmers. This is unfair and inefficient. To correct this, there is, therefore, a need for government measures is certainly required.

Reduction of Transport Externalities

Government measures should aim at curbing these externalities, both for reasons of economic efficiency and equity. A price based approach ensures that prices paid by transport users better reflect total costs: this can be achieved by internalising the external costs - i.e. imputing them to users. The internalisation approach represents a different type of government policy than the traditional regulatory measures usually relied upon in the past.

Both policy approaches try to reduce the size of the (transport) externality (e.g. pollution, noise etc.). The internalisation approach does this by ensuring that each transport user pays the full social (i.e. private, environmental and other) costs associated to each individual trip and therefore has an incentive to reduce the underlying problem. Clearly, economic instruments are only effective if transport choices are sensitive to prices. Some arguments shows that, certainly in the longer run (say 5 years), most transport behaviour is strongly affected by transport costs and prices. The regulatory approach tries to reach a reduction in the externality without relying on the price mechanism for changing transport behaviour. This approach consists, for example of laying down rules for products which reduce the environmental consequences of transport. The ideal case of an absence of externalities is by no means identical to the complete absence of environmental damage, accidents or congestion. There would be no transport activity if the level of noise, accidents or emissions had to be zero. Instead, the negative side-effects of transport activity should be at a level that is "optimal" from the point of view of society: the marginal costs of further reducing these side-effects exactly equal the marginal benefits from doing so. Reducing the side-effects by more would entail higher costs than benefits. In order to devise policies for internalising transport externalities, it is first necessary to measure them.

Measurement of Externalities

Externalities can be measured in monetary terms either by inferring their value from observed market transactions (e.g. expenditure on damage avoidance, health costs, property value loss etc.) or by asking people how much they would be willing to pay for the reduction of a specific negative transport externality by a certain amount.

Estimates concerning the present total external costs of transport, as a percent of GDP in different States in the country, are useful to highlight the size of the problem, but they are only of limited value for implementing sound policies for dealing with individual cases. For this purpose, detailed estimates are required, distinguishing transport modes, times and places, as well as types of externality.

Different methods for measuring externalities can lead to significantly different results. But this does not invalidate such estimates. A large part of the differences can in fact be explained either by different assumptions or by different degrees of comprehensiveness. In particular, market related valuation approaches tend to systematically underestimate the full amount of external costs by only including those that lead to easily identifiable changes in prices and it may help to estimates based on willingness-to-pay or willingness-to-accept permit a more comprehensive measurement to be

made. Cost estimates reported in this paper for individual externalities generally refer to conservative assessments relying heavily on observed market transaction evaluation methods. For accident externalities, however, account is taken of peoples' willingness to pay for reduced mortality and morbidity risks as this is a crucial factor in evaluating accident costs

Main Transport Externalities

The size of transport externalities varies significantly between transport modes, times and places. Thus, caution has to be applied when making general statements for the purpose of discharging right decisions. Nevertheless, on the basis of the existing studies it appears that generally external congestion costs are the largest individual externality, followed by accident and environmental problems (air pollution and noise).

This Paper therefore concentrates on those externalities, without, however, overlooking infrastructure costs (closely related to congestion) which should, of course, also be covered by a comprehensive, accurate and fair pricing methods. It is sometimes argued that transport creates significant positive externalities because it stimulates productivity and economic growth. Increased productivity leads to economic benefits, which, however, are internal to the user and can thus not be treated as externalities. The bulk of the available scientific evidence suggests that, in modern industrialized economies, increases in transport efficiency are generally reflected in decreased transport costs: these effects are internal to the market mechanism and not external. Some studies claiming external benefits of transport seem to refer uniquely to private benefits. Moreover, an important distinction has to be made between externalities resulting from the *provision* of infrastructure and the use of infrastructure: whereas, in planning infrastructure projects on the basis of cost benefit analyses, full account should be taken of possible benefits elsewhere in the network and of possible regional policy objectives, this does not mean that the benefits people derive from its *use* are external. This paper does not, therefore, analyse the case of positive externalities.

Criteria for selecting policy instruments to curb transport externalities Effectiveness

It is clear that any policy instrument should reach its intended objective of reducing a specific transport externality. There can be significant differences in the degree of certainty with which alternative instruments are likely to reach their target. It has to be emphasized, however, that a high degree of effectiveness in precisely reaching a target is not always an asset. In particular, when there is a high degree of uncertainty concerning the actual costs of reaching the target, effective instruments will increase the economic penalty of not having chosen the right target. In such a situation, it may be preferable to choose an approach that puts more emphasis on keeping the costs of the policy under control than on precisely reaching the target.

The Principle of Welfare Costs

The principle of welfare costs is fairly straightforward. Individual citizens feel that the more they can live according to their individual preferences, the larger is their well-being. Whenever the Government overrules these preferences (for example by introducing traffic bans) this represents a "cost" in terms of well-being to the individual (which has of course to be compared to the benefits of this policy intervention, e.g. in terms of reduced accidents). This cost can be measured in monetary terms by the monetary compensation an individual would require in order to feel as well-off as before the government intervention; the concept of welfare costs is the basis of the use of the willingness-to-pay approaches which has already discussed and presented above.

Cost-effectiveness

Cost-effectiveness is a key criterion which suggests selection of an instrument that is able to reach a predefined target at

least cost. In this context, it is crucial to have a comprehensive notion of "costs". Often, costs are understood to be merely the costs of technologies (e.g. a catalytic converter). It should be clear, though, that there are many policies where the technology costs only represent a small or even negligible part of the true costs to society. This means that the only economically valid cost concept is total welfare costs. It goes without saying that this comprehensive cost concept also includes administrative and transaction costs. In particular the latter can be quite important. It is this welfare cost that is the true economic cost of a policy intervention.

Static and Dynamic Cost Effectiveness

The difference between static and dynamic cost effectiveness can easily be illustrated for the case of product standards. Assume, for example, that the government introduces emission standards for car engines and power stations. Static cost-effectiveness would in this case require the additional cost of saving one unit of emissions from a more environmental friendly power station is equal to the cost of saving this unit emission from a more environmental friendly car. Dynamic cost-effectiveness requires that this is not only the case at the point in time when the product standards are decided upon, but during the entire period that the standards are binding. This would imply among other things that both standards are permanently adapted to technical progress. It is clear that, in the case of the example chosen, neither static nor dynamic cost-effectiveness is likely to be given. It is precisely one of the key advantages of market-based policy instruments that they are more likely to guarantee static and dynamic cost-effectiveness.

Transparency

Externalities seem to be one of the most important areas where governmental interventions are justified and strongly needed to achieve an efficient economy. To assure that the government interventions are justified, understood and accepted it is important that the necessary interventions are transparent. Simple instruments should be favoured as much as possible. In view of this transparency is very much required under transport costing.

Distributional Equity

It should be avoided that those who are least able to shoulder the consequences of a policy are hit hardest. However, sometimes, distributional effects are misused in the public policy debate. For example, equity considerations need not be an argument against introducing cost-effective policies, but rather suggest that additional measures should be introduced. This is because the efficiency gains from choosing a cost-effective instrument over an inefficient instrument can be used to compensate those who are faced with an unfair burden due to the policy and still make society as a whole better off. For example, if it were found that a certain policy had especially adverse impacts on poor households, then compensation could be found through lower income taxes or housing subsidies. If it were very difficult to devise sufficient additional measures, then, of course, the formulation of the transport policy itself could be modified to reduce negative distributional impacts. Moreover, any assessment of the distributional incidence of policies should also take account of the distribution of the overall benefits of a policy. It is indeed often the poor who suffer particularly from the external costs of transport (bad air quality, noise etc.).

Spill-over's/secondary benefits

Any policy intervention to correct a specific transport externality is likely to impact also on other externalities or policies. These so-called spill-overs can be either positive or negative. The catalytic converter, for example, significantly reduces conventional vehicle emissions, but also raises carbon dioxide emissions. On the other hand, carbon taxes not only reduce CO₂ emissions, but simultaneously also reduce conventional emissions. It is clear that such linkages have to be included in the evaluation of alternative policies.

CONCLUSION

From the above discussion it is very clearly drawn the conclusion about the high cost of carbon abatement in the transport sector appear to emanate from models which essentially assume a business as usual baseline for travel demand growth. This, in turn, is based on a highly static view of the economy and consumer demand which is still almost entirely oil dependent and predicated on a continuation of the link between transport activity and economic growth. Most of the circumstance the expectation that transport is expected to be one of the fastest growing end users of energy into the future emanates from a partial examination of the literature. This partial picture leads to a conclusion that travel behaviour change is too difficult and any evidence suggesting otherwise is not robust. It also emanates from a failure to consider an alternative future where oil is not as cheap and plentiful as it is today. This may have a variety of implications for the analysis such as the effect of overestimating economic growth and/ or stability (and hence travel demand), downplaying the risks of relying on conventional technologies and overlooking the role of innovation towards alternative fuels and lifestyles.

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