

## The Process of Subsidising Subsidies

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### Abstract:

Subsidies, bounties and taxes are the economic mechanisms which provide governments with the means to alter production costs and, thereby, the means to encourage or discourage the output of specified goods or services. In transport, subsidies have proved to be a mainstay of policy throughout the western world; however, there exists a set of circumstances which can trap policy-makers into subsidising already existing subsidies.

'Cost' or 'producer' subsidies are commonly found in all modes of transport, both in Australia and overseas, but it is also possible to subsidise 'consumers' directly, so that demand is effectively increased without altering price. For where 'price' has already been calculated with the benefit of a cost subsidy, the increase in demand simply draws forth further cost subsidies to the producers. Such policies are rarely deliberate, but nevertheless contribute to the distortion of public sector efficiency. With transport, the expansion of multiple subsidies may result in the provision of services which otherwise have no economic or social benefit.

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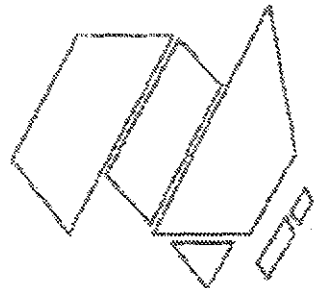
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## 1. INTRODUCTION

Subsidies, bounties and taxes are effectively the economic mechanisms available to government which affect production costs and thereby encourage or discourage the output of specific goods or services. In Australia, while bounties and tax concessions have gained some favour amongst governments as tools in transport policy, particularly in shipping, it is subsidies which have been the mainstay of policy since the First Settlement. In this context, a subsidy is said to be simply "... the opposite of a tax" (Varian 1990:27). In effect, it is the financial means for government to reduce the actual price facing the consumer of a particular good or service. In general terms, the application of subsidy policies to the transport sector can be seen as a system of payments by governments to the providers of transport services to ensure that those services are available at an acceptable price to consumers. The same process, seen from a different perspective, helps to sustain the producer's revenue and therefore minimises the prospect of any economic loss.

Subsidy policies are applied by most nations throughout the world in many areas of transport; most obviously in the cases of urban commuter services, nationalised railways, state 'flagged' shipping companies and air lines, and with the operation of terminal infrastructure. Throughout Australia, subsidies have been used extensively to finance passenger services in all transport modes, and for freight services by rail and sea at least. Subsidies, in the 1990s, remain as a contentious element of domestic economic policy for urban passenger services, for the freight and passenger services of railways, and for coastal shipping. While there are many economic reasons that might justify the use of subsidies for transport, there are only two arguments that appear frequently in the Australian context: first, the pursuit of economies of scale and second, the potential for reducing the cost of associated externalities, such as from improved road safety or from less road congestion. This, however, tends to oversimplify the analysis of subsidising public transport supply.

Kerin's (1987) review of Australia's state transport authorities assumes that public railways and urban passenger services exhibit the characteristics of natural monopolies, an argument still supported by the Industry Commission (1991). Whether or not this is fact, the natural monopoly assumption provides a clean theoretical base from which to examine the way that subsidies are intended to work in the transport environment, both in Australia and elsewhere. A subsidy paid by government to a service provider may be made either directly or indirectly, on a lump sum or on a performance basis. Whatever the mechanism, effectively a subsidy is designed to have only two effects: it can reduce costs for the producer and/or it can lower prices for the consumer.

## 2. SUBSIDIES AT WORK

The neo-classical view is that subsidies are less than optimal because they imply that prices do not signal production costs, and that government must have increased its tax take from the economy to provide them (Kerin 1987:62). Nevertheless, it might still

be appropriate, in an industry like transport, to maximise output, even though the efficient output level (where the average cost per unit of output is at its minimum) lies beyond the demand curve. Such a case is shown hypothetically in Figure 1.

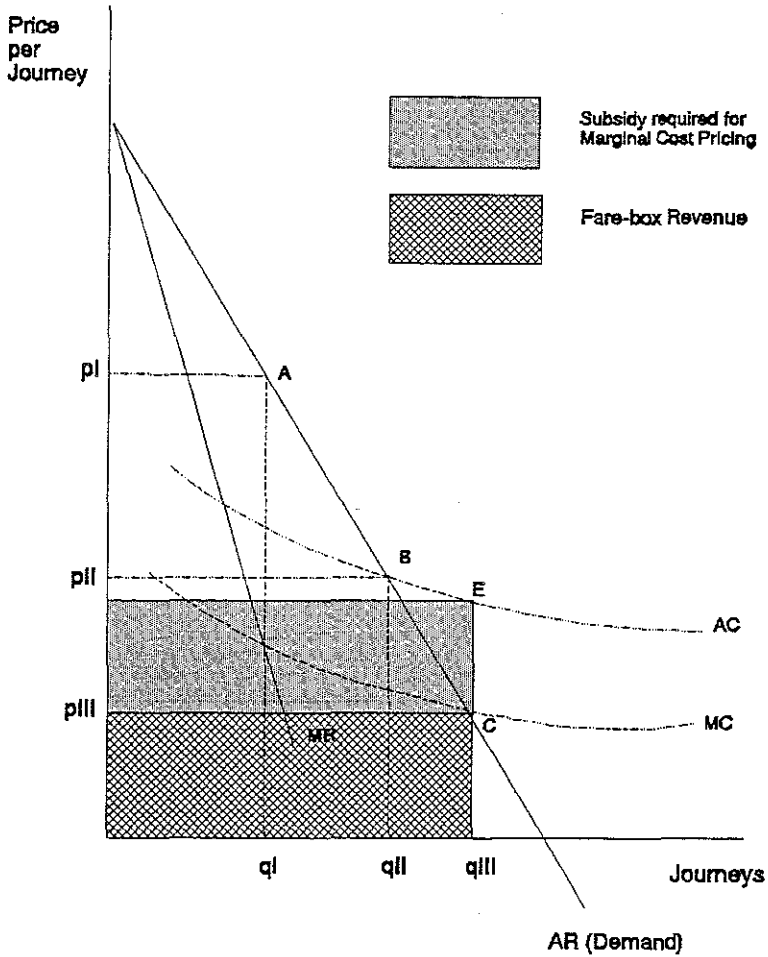
This is described as a 'paradox' in the undergraduate texts (Hirschleifer 1976:289) because the most efficient outcome is the level of output where price equals marginal cost (Position C), even though total revenue falls short of total costs. For public policy, monopoly pricing (position A) is normally seen as inappropriate for transport supply, because it minimises the consumer surplus. Average cost pricing (position B) would yield a break-even financial result with an output of  $q_{II}$ , but this is still less than potential output ( $q_{III}$ ). Marginal cost pricing (position C), on the other hand, will maximise output ( $q_{III}$ ) at the lowest production cost per unit. This is so because while no loss would be incurred at Position B, the demand price between B and C is always above marginal cost. These circumstances would impose a loss on the operator, however, unless the government provided a subsidy (the shaded rectangle) equal to the difference between marginal and average cost prices at the optimum output level.

In this approach, all subsidies are seen as subsidies to *cost*. In essence, it matters little to the outcome whether the subsidy is for the *quantity* produced or whether it is *ad valorem* (based on the price of the product), the effect is the same - the price of the product to the consumer will be less than might be predicted under a normal market regime (Varian 1990:27). From the producer's point of view, a quantity subsidy will lower total costs at any given level of output, while an *ad valorem* subsidy gives the appearance of reducing average costs per unit of output; thus, effectively driving down the intersection of demand and average cost, from Position B at  $q_{II}$  to Position C at  $q_{III}$  in Figure 1 (Throsby and Withers 1979:22). In policy terms, the unit subsidy EC can be engineered either by vertically depressing the average cost schedule by EC, or by vertically raising the demand schedule by EC.

### 3. TYPES OF SUBSIDY POLICY

Subsidies to cost may be directed at either *capital* or *operating* costs. Subsidising a capital works program is sometimes a more appropriate course of action for government than subsidising operating expenses, because capital subsidies are oriented towards the future supply of a transport service. Furthermore, in those situations where it is appropriate to regard the capital cost as a sunk cost, as is the case in some transport applications, such an approach to policy leaves the operator more easily placed to pursue a market-based pricing policy. The danger of capital subsidies, of course, is that they may encourage unnecessary capital expenditure which might distort resource use. One method of overcoming this danger is for specific capital programmes to be subsidised (presumably those ranked by the government to be the more important), rather than by adopting an across-the-board approach.

Operating subsidies are common to public transport operations throughout the world and are provided on a number of different bases. There are, at least, four distinct



**NB:** *It is assumed that there is no capacity constraint, or alternatively, it exists beyond the reach of potential demand.*

Figure 1. Efficient Pricing and Cost Subsidies

applications, viz:

### **Deficit related subsidies<sup>1</sup>**

General deficit subsidies provide payment for all types of losses (passenger or freight) incurred by a transport operator. This type of subsidy does not encourage efficiency nor aid the operator in assessing the performance of each service type. Whilst it is administratively simple for government, it may engender cross-subsidisation unless the operator takes specific initiatives to determine service costs and recover them appropriately.

### **Cost related subsidies**

These types of subsidy fully reimburse the operator for the costs of providing a given service. Usually, the operator foregoes the revenue earned by the service, returning it directly to the subsidy provider. Again, this form of operating subsidy does not provide the operator with incentives to promote efficiency, nor does it allow the subsidy provider any control over the operator's cost-structures. Indeed, as recent Australian history shows, it is completely rational for the service operator's managers to bloat their cost structures and enter into 'sweetheart' deals between management and labour.

### **Loss related subsidy**

This type of subsidy may be used to compensate directly for losses incurred by specific services retained at the request of government. The amount of subsidy paid is the difference between the allocated cost of the service and the income derived from its operation, with the intention of providing management with a break-even financial result. While this form of subsidy may be seen as an improvement in economic terms, it still provides no incentive for the service provider's managers to promote efficiency.

### **Output related subsidies**

This form of subsidy relates the subsidy payment to an output measure (e.g. passenger-kilometres, number of seats occupied per trip, net tonne-kilometres, etc.) A clearly defined and readily determined measure of output provides the incentive for management to test the efficiency and effectiveness of the service, given that the level of subsidy is adequate to achieve its objectives and that the output measure is appropriate. If the level of subsidy is too low, the operator will experience solvency problems, and if it is too high the operator may be encouraged to offer a service level above that required. The internal dynamic of this method is the stimulus provided to management to enhance efficient and cost-effective operations, and hence, the need to set objectives and targets for service delivery in order to satisfactorily negotiate the subsidy's terms.

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<sup>1</sup> These are sometimes referred to as "Revenue Supplements" in Australia.

There is a third element of subsidy policy which concerns the timing of the subsidy payment; that is the decision about whether the subsidy should be paid before (or during) the delivery of the service, an *ex-ante* subsidy, or whether it should be paid after the event, an *ex-post* subsidy. An *ex-ante* subsidy is usually negotiated at the beginning of a financial period. One disadvantage that arises with these payments is that, since the amount of subsidy is fixed in advance, it is likely that the operator will strive for financial balance, or profit, given the subsidy constraint. This may result in a deterioration in the quantity and quality of the service being offered. An *ex-post* subsidy, on the other hand, negotiates payment after costs and revenues have been ascertained at the end of a financial period. The provision of *ex-post* subsidies may provide the operator with more incentive for experimentation to improve the economic outcome, which may be beneficial over the longer term. Since losses are subject to analysis and review before being offset by a corresponding subsidy, there is also some financial pressure on the operator to improve performance. Consequently, an over-allocation of resources is less likely to result.

#### 4. SUBSIDIES AND DEMAND

There is another approach, however, that suggests it is also possible to design subsidies to *increase volume* by increasing effective demand at a given price. Sometimes such subsidies are mistakenly referred to as 'revenue subsidies' because they visualise the payment from the producer's perspective. In fact, these subsidies could more correctly be labelled as subsidies to *consumers* because the effect is intended to increase consumption at a given price.

In a segmented market, for example, a particular group of consumers might warrant a special subsidy for equity reasons. In *realpolitik*, this is a fairly normal occurrence. For instance, the disabled, pensioners or schoolchildren might all warrant free travel or discounts on a city's urban transport system on such a basis, but without the policy-makers wishing to disturb the existing price/revenue regime of the service operator. This sort of situation is depicted in Figure 2, where the first market segment can make only  $q^a$  journeys at the legislated price,  $p_{III}$ . A consumer subsidy, say in the form of free travel vouchers,<sup>2</sup> will increase usage from  $q^a$  to  $q^b$ , thus increasing total travel demand from  $q_{III}$  to  $q_{IV}$ . As price has not changed, the level of demand must be considered to have increased: visible in Figure 2 as the shift from point C to point D. By any description these consumer payments are a separable form of subsidy. They are payments to consumers who consume a specified product or service, but which have the effect of altering demand at a given price.

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2 The consumer receives a free voucher; government reimburses the producer at  $p_{III}$  per voucher used.

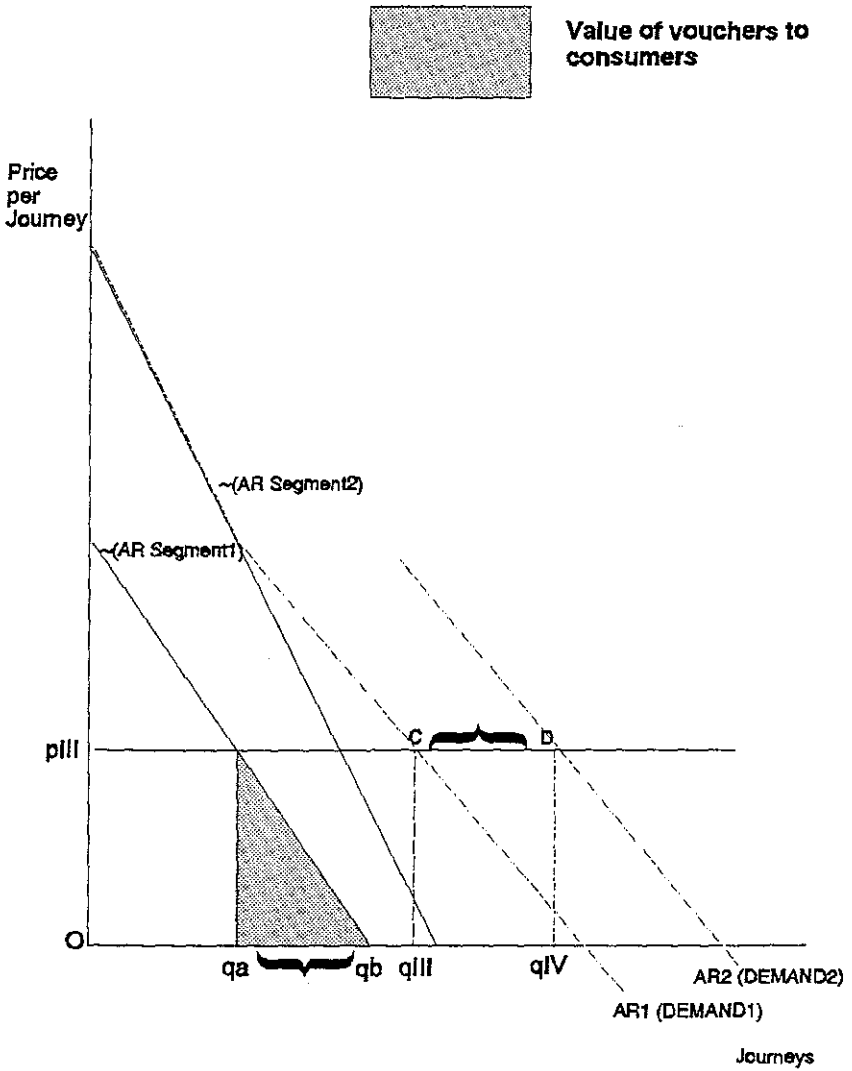


Figure 2. The Effect of Consumer Subsidies on Demand

## 5. THE SUBSIDY TRAP

This suggests new problems in policy applications in certain circumstances. Large monopolistic enterprises, and particularly those maintained by Government, tend to exist in part because of the extraordinary economies of scale inherent within those particular industries. This is certainly the case with most transport modes. With railways, as one example, the paradigm is that average costs continue to decline or remain more-or-less flat well beyond the existing market's potential level of demand (Industry Commission 1991). If this is in fact characteristic of the state-owned transport authorities, then the combination of both a cost and a consumer subsidy policy will lead not to marginal efficiency gains but to accelerating financial losses.

This, perhaps, can be demonstrated by pursuing the example given before in Figure 2, where a new average revenue curve had been established (see  $AR^2$  now in Figure 3) and a new level of output consumed,  $q_{IV}$ . In this situation, *revenue* comprises normal fare-box returns plus government reimbursements for extra sales, plus the cost subsidy to make-up the difference between total costs and total revenues. If both subsidies operate simultaneously, as in Figure 3, and price remains fixed at the original level ( $p_{III}$ ), then the consumer subsidy will generate more consumption which must then be further subsidised for the increase in cost to position (D).

In some circumstances, a subsidy to consumers may effectively lower the price and increase output (Throsby and Withers 1979:24), but, with the transport sector in particular, the net result might simply be to increase the income benefit to the producer through multiple subsidies, whilst maintaining the nominal price regime for consumers. Arguments about the benefits to consumers are constrained to those who actually use their government-funded vouchers, for there is no expansion to the consumer surplus (as the extension CD in Figure 3 shows).

If the output/price decision were based on efficiency criteria in the first place,<sup>3</sup> which for a public transport monopolist might be the intersection of marginal cost and average revenue, it is possible that an additional consumer subsidy would lead to a poorer outcome. For example, if the marginal cost of services were to remain more-or-less unchanged or were to rise beyond the competitive market price solution (Position C), then any new level of output would increasingly exceed the cost of production. It is this situation (a kind of worst case scenario for policy) which is illustrated in Figure 3. Clearly, in these circumstances, government will be paying subsidies within subsidies and moving still further from an efficient delivery of services, because total financial costs (the sum of the two shaded rectangles) will continue to escalate with each additional unit of consumption, while fore-box revenue remains unchanged.

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3 Let  $q=q^*$ , such that  $MC\{q^*\} = P\{q^*\}$  (or  $AR\{q^*\}$ ), and set  $P=p\{q^*\}$ .



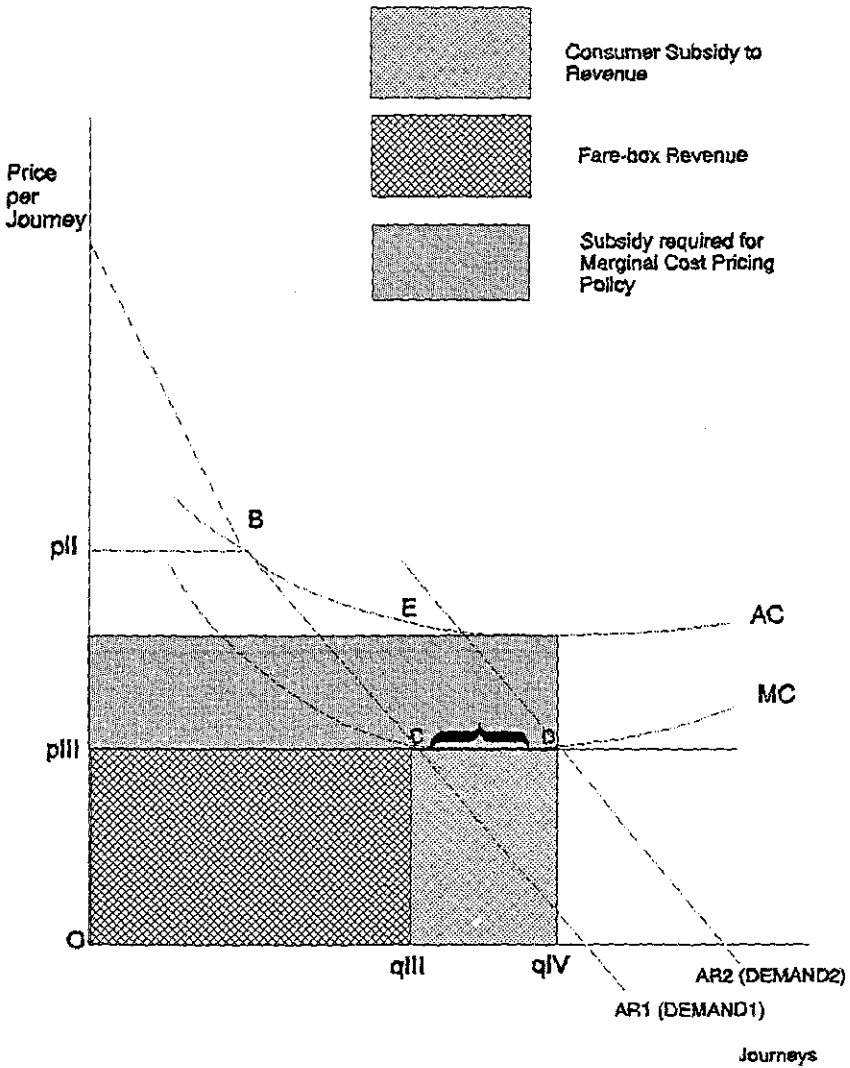


Figure 3. The Combined Effects of Cost and Consumer Subsidies

## 6. OBSERVATIONS

The value of a consumer subsidy in this form is often determined *ex post*, because it is the outcome of a separate policy process designed to meet consumer needs, not producer needs. It is not unusual for costs, service levels and prices to be predetermined in some way when establishing a cost subsidy. In this case, when government offers an additional subsidy to specific consumers, the original price decision may still remain. For example, when a government issues vouchers or provides some form of reimbursement to specific classes of users, such as freight rebates to drought-stricken farmers, consumption rises but the effective price set by the service provider remains unchanged. The outcome shown as position D in Figure 3 is that output is substantially increased (qIV), but so too are total costs, which are now the sum of all three rectangles, while cost-recovery remains locked within the same original fare-box.

The Victorian government's decision in early 1993 to abandon a long-held policy of free and discounted travel for pensioners during 'Senior Citizen's Week' on the state's railways serves as a simple illustration of the application of these problems. In years past, V/Line had been provided with a revenue supplement (cost subsidy) by the State's budgeting process, presumably derived from estimates of price, revenue and costs. Under a different welfare agenda there had been added a reimbursement (consumer subsidy) for these specific pensioner vouchers and discounts. The original assumption was that the second subsidy was only to make-up the very small additional or marginal cost that was incurred by adding a small number of travellers to the existing services. The original revenue supplement, of course, expanded in response, because it was based on the total levels of activity which had now grown to include the new patronage.

Of course this outcome was not that intended by the original policy-makers. Nevertheless, this sort of subsidy trap remains possible where different government agencies administer different subsidies, for the operator has no incentive to curtail them as its expanding costs are always fully subsidised. It may also be a matter of simple historical neglect, where policies become institutionalised and are therefore assumed to work, without knowledge of their actual impact. This, at least, is the observation in Victoria's case, but it raises the suspicion that the subsidy trap is functional in many other instances throughout the transport sector.

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