

ECONOMIC THEORY AND ECONOMIC PRAGMATISM IN
TRANSPORT PRICING DECISIONS

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ABSTRACT:

The paper initially defines the theory of pricing decisions and then discusses the nature of markets for transport services which demonstrates that the neo-classical assumptions of pricing are rarely appropriate and that the theory of second best prevails. Means for arriving at commercial prices for transport services are also advanced.

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INTRODUCTION

Goods and services are exchanged in markets. Markets are simply venues specified in time and area at which buyers and sellers can meet for trade. Price and quantities exchanged in markets are simultaneously determined by the interaction of supply and demand.

Supply levels depend upon the technology of the process of producing the good or service, the costs of inputs to that process and the prices of substitute inputs. On the other hand demand is affected by consumer tastes and incomes and the relative prices of other goods and services which consumers may wish to purchase.

The equilibration of demand and supply in most markets is an aggregate process. Provided that the market functions in a competitive fashion (i.e. there are many buyers and sellers and collusion between same is not possible) no buyer or seller is able individually to influence price. Under such circumstances all buyers and sellers are price takers. They adjust their quantities of sales or purchases according to the ruling market price. Price determination to them in a specific sense is therefore irrelevant.

With some added conditions which are specified later in this paper, this freedom of competition is the cornerstone of neo-classical economic theory. The theory of course does not apply to the real world but rather, it acts as a benchmark for economists in investigating real world phenomena.

Nevertheless, monopolies (i.e. single sellers), and monopsonies (i.e. single purchasers), often exist in markets. For example take the railway commissions in most Australian states and the Australian Wheat Board throughout Australia respectively.

When such phenomena arise, neo-classical economic theory in its strictest sense, is no longer applicable and must be modified to take such aberrations into account. The discussion of such occurrences and the problems that arise with them are the main thrust of this paper.

NEO-CLASSICAL ECONOMIC THEORY

The basis of all neo-classical economic theory is the assertion supported by observed behaviour, that all individuals attempt to maximise the 'utility' or satisfaction or 'welfare' that they realise from the employment of the

limited resources at their disposal. Many caveats can be added to this statement. Nevertheless even Marxian economics and altruism have bases which can be reinterpreted along these lines.

A major caveat refers to interdependent satisfactions. Individual satisfactions obviously depend to varying degrees upon those of others as manifest from intra-family dependencies within households and inter-family relationships between households. Their existence is also confirmed at a broader level by the incidence of social assistance and international aid programs. Such interdependencies are termed externalities. Individuals can be expected to aspire to maximise their collective satisfaction gains as a society, given the resources at their disposal. The level of satisfaction that they collectively achieve is usually termed "social welfare".

Economic theory demonstrates that there are two interrelated aspects of optimising social welfare for any particular society. The first is the attainment of an efficient allocation of resources. The second is the achievement of that distribution of welfare that is preferred by society given that particular efficient resource allocation.

The theory is developed assuming a perfectly competitive economy and a lack of welfare interdependencies as discussed above, in order to simplify the concepts used and to clarify the type of processes involved, rather than give a prescriptive model of the workings of actual economies. In detail the implications of these assumptions are: (Hyman 1973, p.21)

- (i) the theory is static in the sense that time and hence uncertainty are not relevant
- (ii) there is no interference with the free flow of productive resources
- (iii) property rights are well defined so there is no need for an enforcement authority
- (iv) there are no spillover effects or externalities in the sense that:
 - the production of any good or service produced by any business or firm does not depend upon the inputs used in some other process by some other firm
 - there is no government and no goods are consumed collectively

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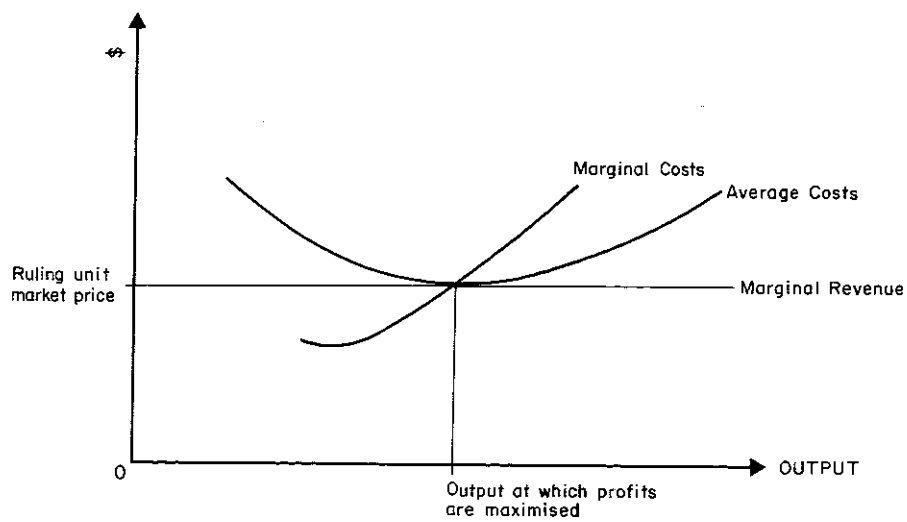


FIGURE 1
DETERMINATION OF OUTPUT BY THE COMPETITIVE FIRM

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- (v) decreasing cost industries (natural monopolies) do not occur and marginal products of all inputs in all productive processes always decrease
- (vi) household preferences are not satiated and marginal rates of substitution between all goods diminish
- (vii) total productive resources available for alternative uses are fixed
- (viii) information flows concerning demand, supply and prices are perfect in the sense that all details of market conditions including production and consumption are instantly known to all.

These conditions define a perfectly competitive market without welfare interdependencies. They have been reduced philosophically to three basic requirements. These are the maintenance of perfect information flows and the existence of markets for all goods and services including resources, along with the participation of sufficient buyers and sellers in all markets to make collusion in order to interfere with market mechanisms impracticable. Furthermore, these conditions are subject to the thorough indifference of any household to the welfare of any other or a complete lack of externalities. (Robinson, 1934 pp104-120)

Under these assumptions all firms set their output according to price as shown in Figure 1. This diagram simply indicates the rule: marginal cost equals marginal revenue, if social welfare is to be maximised.

THE NATURE OF MARKETS FOR TRANSPORT SERVICES

Transport has a special role in any economy, since it is the means that satisfies the demand for the spatial mobility of resources including passengers, goods and services. Different geographical areas typically have a comparative advantage over each other in the production of goods and services because of their proximity to resources and/or markets. Specialisation in production and distribution by different areas and hence the resultant trade between them, leads to increased efficiency in the use of the limited resources available to society. Consequently, trade as facilitated by transport leads to a greater volume of production and along with it higher consumption than that which could otherwise occur. Hence, larger real incomes, lower prices and therefore enhanced social welfare result because of trade. These interdependencies are indicative of many externalities in transport markets.

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Official statistics consistently underestimate the contribution that transport makes to the production of goods and services in economies. Generally, ancillary transport services in particular are ignored, their value being assigned to other sectors. Moreover, pedestrian, private motor vehicle, pipeline, conveyor belt and minor modes in general are also omitted from official statistics. The extent of errors arising from such practices are illustrated by a recent unpublished study commissioned by the BTE. Resource flows in the Australian road, rail, sea and air modes were investigated. It was estimated that these contributed about 33 per cent of all resources available in the Australian Economy and 25 per cent of an adjusted GNP figure in 1972-73. On the other hand in the Australian National Accounts for 1972-73, the transport and communications sector was estimated to contribute only 8½ per cent to the value of final goods and services at factor cost.

These figures amply demonstrate that transport is largely an intermediate rather than a final good or service. Demands for transport services are therefore mainly derived from those for other goods and services and this in itself has important implications for transport policy. Transport of some sort is an essential input to all goods and services and represents a significant fraction of the total cost of most. Hence according to Marshall's principles of derived demand, (Friedman, 1971, pp148-161) other things being equal, the demand for many transport services will be relatively unresponsive to changes in price especially in the short run. In the short run therefore, producers of transport services may be able to command higher prices and profits by restricting their output. In the longer run competition between transport suppliers and substitution by consumers of other inputs, say land and capital through relocation, will reduce their ability to act in this fashion.

A further aspect of transport is that because of the increase in social welfare that it generates through its enablement of trade, defence, and emergency movements such as ambulance services etc, non-users as well as users benefit from its provision. The considerable social as opposed to private benefits it provides, mean that in many aspects it resembles a public good. Furthermore, because of geographical welfare differences, transport also has welfare distributional impacts.

These features of transport are obviously most likely to attract public attention and give rise to government intervention in transport markets for the following reasons.

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- (1) Since many producers of transport services can increase prices without commensurately changing the level of demand for their services in the short run, the introduction of licensing and other regulations which limit entry into, or competition in their subsector or region will be to their financial advantage.
- (2) Because of (1) above, governments are most likely to regulate or even provide and operate transport services which are natural monopolies, in order to ensure "equitable pricing" and limit "excess profit" taking.
- (3) The quasi-public good aspects of transport imply that government subsidy and/or taxation of transport services will take place. This may be achieved without having direct transfer payments through regulation, deficit financing, or payment of profits into consolidated revenue by government owned and operated services.
- (4) The welfare distributional aspects of transport services mentioned above, imply that governments will intervene in markets in order to achieve income distributional goals.
- (5) Natural monopolies are characteristic of many transport services. Their existence implies greater intervention in transport markets than in those of intermediate goods or services which also have public good aspects and distributional effects but which are typically provided in a competitive fashion.

Overall therefore, the competitive theory advanced so far is not particularly relevant to transport markets because of market imperfections. Economic theory has been developed to cover such situations but will not be dealt with here in detail. Instead a broad brush approach has been adopted.

Government intervention in transport markets can be expected to be considerable. Hence the external and distributional effects of intervention can be anticipated to assume importances which in some instances may override monetary or pecuniary considerations. The role of political assessments as opposed to objective economic evaluation may therefore be more significant in determining transport policy than in many other sectors of an economy.

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THE THEORY OF SECOND BEST

Overall, transport markets often therefore diverge considerably from the assumptions of classical economic theory. Hence the simple pricing rule developed above i.e. set output where marginal cost equals marginal revenue, often should not be followed and in fact it has been shown to be totally inappropriate in many instances.

The theory of second best is said to prevail when the neo-classical assumptions break down and the appropriate rules for establishing output and prices differ from those applied in the classical approach.

The static economic theory advanced initially in this paper, implies that a positive gain in social welfare could only arise with movement from an inefficient allocation of resources to one that was efficient. An efficient resource allocation is one where the production of any single good or service cannot be increased without reducing the production of at least one other good or service. Such a resource allocation is termed Pareto optimal.

Economists once considered that even if some of the marginal conditions for attaining an efficient resource allocation could not be satisfied, it was advantageous to endeavour to meet as many other conditions as possible. The emphasis in this approach was that any move towards satisfying more of the marginal conditions was desirable, as there was an implicit belief that if conditions in an economy were more completely based upon marginal principles, the more welfare distribution could also approach Pareto optimality. (Nath 1969, p49)

However, more recently it has been established that even given only one unsatisfied Pareto condition, the maximum possible level of social welfare cannot be attained without departing from the other Paretian efficient optima. (Lipsey and Lancaster, 1956) Such a solution may be entitled second best in the sense that it is not Pareto optimal, because it is attained given a constraint (i.e. the initial unsatisfied condition) which precludes achievement of that position. But in the light of the value judgements embodied in the Pareto criterion, determination of the relative extent of departures from Pareto optimality is logically inconsistent. Nevertheless theoretically, value judgements can be made concerning comparative desirabilities, (Nath 1969, pp51-53) but as long as just one of the conditions for Pareto optimality remains unsatisfied, it is neither necessary nor desirable to satisfy the remaining conditions.

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Given the existence of market imperfections, problems of measurement and the dynamic nature of economic decisions and processes, Pareto optimal allocations of resources and distributions of welfare will never be attained in actual purposeful (i.e. policy implemented) economies except by chance alone and then only for short periods.

The theory of second best indicates that the elimination of distortions is not necessarily desirable under such circumstances. The costs of doing so may often exceed the benefits achieved, thereby resulting in an overall welfare loss. Alternatively, at any given time, the effects of some imperfections may be offset by those of others, resulting in the same partial resource allocative and distributional effects as those that might pertain under perfect competition.

Those economic distortions which are not covered by these two categories may warrant scrutiny. Their modification could produce increased social welfare. The general equilibrium analysis that is involved should attempt to identify all possible effects of policy changes. As such it is more realistic and potentially yields more reliable information than partial analysis. The latter is typically undertaken with the implicit assumption that the rest of the economy remains unchanged. Consequently, general equilibrium analyses are logically more likely to identify both situations in which market distortions offset or exacerbate each other or in which the improvement of social welfare may best be undertaken by the introduction of offsetting imperfections rather than "freeing" market conditions.

The pricing rule indicated by the theory of second best states that prices ought to be set so that they differ from actual marginal costs in proportion to their relevant elasticities of demand. The actual formula is not presented here. It is available in many economic texts. It is not particularly relevant to this paper since it will be shown later that it is inapplicable because of problems of measurement.

A further approach has been advocated which adopts a theory of 'third best' which is really a subset of the theory of second best. This theory centres upon information problems. Under restrictive assumptions, the theory of third best implies that first best solutions are often more appropriate than second best ones in the real world.

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However the theory is not as yet sufficiently well developed to be discussed in detail at a general forum such as this. However it does highlight the problem of information and in particular that aspect of it called mensuration which is the main basis for this paper.

PROBLEMS OF MEASUREMENT

It has been demonstrated above that under neo-classical theory, it is necessary to set prices according to specific rules concerning the relationship between costs and returns, if resource allocative efficiency and welfare maximisation are to be achieved. This obviously cannot be done if costs and returns cannot be measured.

In addition to the impossibility of objectively determining the relative merits of different distributions of social welfare, insurmountable difficulties are also encountered in assessing the real costs and benefits associated with monopolies, externalities and public goods. Furthermore, even pecuniary costs and benefits cannot always be measured sufficiently well to allow the application of economic theory in policy problems because of the difficulties associated with joint products and common costs. Finally, non-pecuniary and information benefits and costs also usually cannot be readily measured.

Joint Products and Common Costs (1)

Many goods and services are not distinct entities since they fulfil a number of functions simultaneously. For instance vehicles of every mode are capable of carrying both freight and passengers. Under such circumstances freight and passenger services are often joint products and the costs of say vehicle operation and providing infrastructure are shared in common between these services.

Economic theory demonstrates that for resource allocative efficiency to be attained under the assumptions of perfect competition, the level of output of every good and service must be determined so that the marginal cost of its production equals its ruling market price or average revenue. Determination of marginal costs for each joint product requires that all common costs be allocated in some way between them. When joint products are produced in fixed proportions it is usual and aesthetically pleasing to allocate common costs according to the product mix ratio. However such costing rules are open to question.

1 As indicated below joint and common are used interchangeably to describe the costs of producing a number of goods or services simultaneously in the one process.

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Five general types of production of multiple services or goods are cited in economic literature. (Bressler and King, 1970, pp176-181) These are:

- (1) Joint services in fixed proportion
- (2) Outputs with varying composition
- (3) Independent services from a single plant
- (4) Single services that may be applied to several physical commodities and hence may be regarded as different products
- (5) Joint services with variable proportions.

With the exception of the very short run when fixed proportions may apply, only the variable proportions category is relevant to transport services in a pragmatic way. In the long run, input mixes, technologies of production and hence product mixes all change over time.

In the variable proportions case, the levels of common costs attributable to each good or service cannot be determined on any sound basis. The economic contribution of each input to each product is always variable depending upon changes in input prices and technology. Allocations of common costs in such instances must necessarily be completely arbitrary. Furthermore, even in the short run fixed proportions case, the outputs of many processes are classified into major and minor or "by" products by producers and consumers alike. The marginal cost of producing the latter is usually regarded as being relatively low and actual market prices consistently confirm this view. The use of a product mix ratio rule for allocating common costs is therefore probably inappropriate in such instances.

It is widely accepted in the literature that the most pleasing way of determining the costs of jointly produced services is to calculate the sum of two components. Marginal direct costs, that is those which can be separately allocated to specific goods or services, should be added to pro-rated marginal common costs. The basis of pro-rating is necessarily purely subjective and hence implies potential human error. The consequence is necessarily sub-optimal resource allocation if pricing or taxing strategies are based upon such values, unless the "right" prices are chosen by chance alone.

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Marginal cost pricing of jointly produced goods and services and hence the achievement of overall resource allocative efficiency in an economy with joint products, is therefore usually not possible, even if all the assumptions required for perfect competition previously listed hold.

Non-pecuniary Benefits and Costs

The implicit assumption common to most empirical economic research and neo-classical theory, is that real income levels and satisfaction gains achieved from that income are indicative of each other. This assumption is generally considered to be reasonable for aggregates of households, however it is untenable for comparisons of the satisfactions of individual households because of their unique natures.

Apart from the invalidity of inter-household utility comparisons, both pecuniary and non-pecuniary elements give rise to satisfaction and the relative importances of these vary markedly from household to household. Because they contribute to satisfactions, both pecuniaries and non-pecuniaries have costs and benefits associated with them. Pecuniary elements are traded in markets and can be accounted for financially by their ruling market prices. Such values are appropriate because they are taken into account by households when they are faced with decisions concerning the employment of their limited resources and incomes.

On the other hand, non-pecuniary components per se are not traded in markets and therefore cannot be readily valued in the same way as ordinary goods or services. They are generally associated with externalities or public goods. Some such as noise or air pollution can be measured in physical units. If they are capitalised in the values of other resources such as real estate, attempts may be made to determine their values by economic analysis. Econometric analyses may also be used to estimate shadow prices for such components e.g. time.

However, such efforts are time consuming and expensive, and are also subject to the errors common to all statistical inference. The costs of such studies are usually considered by Governments to outweigh the potential benefits to be gained from the information they produce. Subjective judgements by policy makers and conclusions reached through the political process are used in their stead in order to assess the optimum level of output and consumption of non-pecuniaries, externalities and public

goods. Regulations rather than pricing or taxing strategies are often applied to directly ensure that such levels are achieved, probably because selection between alternatives usually involves making further judgements concerning market responses.

Determination of output levels by objective marginal cost pricing of non-pecuniaries or goods and services with non-pecuniary elements, is therefore not possible. Pricing such occurrences is essentially a subjective process and therefore subject to human error. Shadow prices must be set by judgement rather than measurement. Therefore, as long as non-pecuniaries arise, resource allocative efficiency is unlikely to be achieved in any economy except by chance alone.

Information Costs and Benefits

The existence of perfect flows of information concerning all market conditions has been shown to be a most important condition for the achievement of resource allocative efficiency in both perfectly competitive and fully planned economies. However, in practice, such perfection does not occur and information must be assembled. In the real world the costs of achieving perfect information flows would be infinite. A trade off therefore exists between the quality of information obtained and the possible future benefits that it engenders and the costs of obtaining that information.

Costs are incurred in collecting, collating and analysing data because of the complexity of markets and government directives and administration. In many instances, the costs of assembling additional information on which decisions can be based often appear to outweigh the benefits that can be achieved from these extra data. On such occasions the decision maker has two alternative options available. Either information services can be purchased or he must base his decisions upon subjective assessments from the limited data already at his disposal.

Information service agencies such as brokers and other professional advisers often enjoy greater efficiency in data assembly than decision makers because of their specialisation and experience. Such specialists are also often able to spread the costs of each unit of information over a number of clients. Information purchased from such sources is likely to be more reliable than that assembled by a decision maker in isolation and can be obtained at lower cost. However, such services increase the costs of goods and services since they increase transaction costs. For this reason, many follow the second course of action prescribed above.

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The situation is analogous to the trade offs involved in attempts to value non-pecuniary costs and benefits. By not assembling extra information, the decision maker demonstrates that he is prepared to bear the risk of losses arising from his relatively "uninformed" decision. Presumably he considers that such losses will probably be no more than those that might arise if he based his decision upon either extra self assembled or purchased information.

The larger and more complex the market in which the decision maker acts, the more important information costs are likely to be relative to other transaction costs. The costs of bargaining depend upon the degree of difficulty that purchasers and sellers have in reaching a consensus about market price, which in turn is dependent upon the quality of information available to them and the size of the market.

In the perfectly competitive model, information is instantaneously known to all, consensus concerning prices is readily reached and marketing costs are known with certainty. When information costs are incurred however, the resources available for other uses are reduced, given the limited budgets of market operators. Buyers and sellers will attempt to pass these costs on to each other in order to minimize such losses, through buyer and seller resistance to prices, substitution of similar goods or services and by curbing the physical size of their transactions. Their success in doing so depends upon the responsiveness of quantities supplied and demanded in the market to price.

The effect of information and bargaining costs therefore, is that consumers and producers do not attain the satisfactions and profits respectively that they would in a perfectly competitive market. In addition, since the information available to them is imperfect and unevenly distributed, most incur greater or smaller marketing costs than they anticipated. Following each transaction, therefore, some gain more satisfaction or profits than they expected while others are in the opposing position. Hence the technical criterion for resource allocative efficiency is not met under real circumstances except by chance alone.

Other Cost Problems

Several particular aspects of imperfect information warrant specific discussion since they are most relevant to economic questions concerning transport. These are differences between perceived and resource costs and private and social costs.

Perceived Costs

Households and firms have different budgets or resource portfolios and different preferences for satisfactions derived from the range of resources available to them. Furthermore, they have different levels of information at their disposal and the time horizons that they consider when making investment or consumer decisions also vary markedly. For this combination of complex reasons, many consumers and producers appear to disregard or place zero value on many of the true costs and benefits of their activities, especially when long term and non-pecuniary costs and benefits are involved.

For example, they may consider that the costs of running a motor vehicle include only out-of-pocket running expenses and may disregard the value of time used in travelling, and the costs of maintenance, depreciation, interest on capital, and the effects of pollution produced by their vehicle. Such costs are not borne immediately even though they must be met ultimately in one way or another.

Because of their uniqueness, each individual, household and firm perceives each available good or service and the costs and benefits pertaining to it, at different levels even though they may be overall the same. Hence, theoretical explanations of social, political and economic behaviour are often not confirmed by statistical tests using data at the individual or disaggregated level.

The wide variation between individual perceptions and the inherent imperfections of data and mathematical formulations of such theories, often combine rather than offset each other to invalidate otherwise legitimate tests. On the other hand, for the same reasons, spurious theories may be confirmed by statistical testing of aggregated data, because of the manner in which the distributions of perceptions and data and model errors interact.

Resource Costs

Many of the costs faced by consumers and producers are not resource costs but are simply money transfers within the economy concerned. For example, income, sales and excise taxes are not resource costs to a whole economy but they may appear to be to a firm. In considering the values of resource flows, care must therefore be exercised to ensure that such transfers are not included in economic analyses of resource use. This is despite the fact that they influence supply and demand and therefore effect the levels of flows

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of resources. The determination of those costs which are relevant to an analysis depends upon the level at which the study in the economy is being conducted. Those appropriate for a corporation as compared to those pertinent to a national government for say the same investment project, would most probably be quite different. (Mishan, 1972)

Social and Private Costs

Differences between social and private costs arise because groups or communities have preferences that differ from those of particular individuals and households. The costs and benefits that they face therefore also differ. For instance, while some individuals may not value soil conservation works along transport infrastructures, society as a whole could have strong preferences for them.

In a purely competitive market economy, divergences between social and private costs do not occur. They arise only because of the existence of externalities, quasi-public goods, and welfare distribution problems, since if all goods and services are traded in markets, all satisfaction gains and losses are fully compensated for in the market mechanism. (Stigler, 1967)

As in the case of externalities and public goods, unresolved differences between social and private costs may also be attributed to information problems. The existence of such divergences could be attributed to the costs of bargaining in order to reach a consensus, being considered to exceed the potential benefits. Otherwise private or political action could be expected to be undertaken to internalise such differences.

Dynamic Considerations

The discussion above has been based upon a static world. Tastes, resource availabilities and technology have basically been assumed to be fixed and both the partial and general economic equilibria have been discussed at particular points in time.

In the real world however, unpredictable changes in resource availabilities, physical and economic environments, human tastes and wants, and technologies of production and marketing occur. These ensure that the operation and the attainment of resource allocative efficiency are much more complex issues in practice than the neo-classical static theory prescribes.

Unless economic equilibria tend to be stable, static theory is only relevant for short periods of time. If equilibria shift in a consistent fashion, static theoretical positions can be compared in sequence in order to give an indication of dynamic economic conditions. Furthermore, if such movements are of regular form, continuous formulations may be used to indicate the dynamics of such equilibria. The latter approach has particularly been applied to business cycles and economic growth.

The major difference between static and dynamic situations is the extent of risk and uncertainty concerning all economic factors. Risk and uncertainty was shown to be associated with problems of measurement and information at particular times in preceding sections. In dynamic theory, these factors also extend into the future. Hence while the static theory related so far incorporates risk and uncertainty as viewed at a particular point of time, dynamic theory incorporates continually occurring changes in risk and uncertainty over time. Dynamics therefore add a further dimension to economic theory.

Households, firms and governments may be considered to hold portfolios of assets including human ones. The composition of these can be changed by investment, so that the flows arising from those portfolios are expected to maximise future yields of satisfaction to their owners. According to this approach, economic actions are based upon expectations of future demands, supplies, costs, returns and life expectancies, taking into account expectations of probabilities that those expected levels will actually be achieved.

The statement that all will attempt to maximise their expected future net satisfaction streams given their preferences for risk is the basis of this approach. Under such circumstances, a high risk preferer will adopt a highly variable but potentially high yielding portfolio, while a low risk preferer will select a portfolio with a safer and hence potentially more stable but lower expected return. (Tobin, 1958)

In the dynamic situation of the real world, decision makers therefore cannot act with certainty, but must formulate decisions on the basis of expectations. Attempts to evaluate theories concerning the formation of expectations have not been successful. Nevertheless it is obvious that they must be based to some extent upon past experiences modified by predelictions of future disasters, wars, institutional changes and political and industrial activity.

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Expectations of households will only be perfect by chance alone because of the existence of such events. Therefore, households, firms and governments will rarely actually achieve their economic goals in the ways that static theory indicates, even though they may attempt to do so.

PRAGMATISM AND PRICING DECISIONS

The Paper so Far

The discussion so far in this paper initially defined perfect competition and showed that pricing decisions are irrelevant in such an environment. It was next demonstrated that transport markets are highly imperfect and that the simple rules of elementary economics are not usually applicable to transport circumstances. Thirdly, the theory of second best was discussed which fundamentally simply advocates price discrimination as the optimal basis for establishing prices. This is the approach recommended by professional economists since it encourages structural adjustment in an economy. However as we know well, its distributive impacts often lead to political action to control "unfair pricing" practices.

The second part of the paper reviewed problems of measuring marginal costs and returns. It was shown that for a large variety of reasons they cannot be measured accurately. Furthermore even if they could be determined, the costs of doing so will often outweigh the benefits achieved from the extra information made available. Moreover, there is the problem that prices must be set for the future, not for the past. Hence expectations must be formulated before prices can be established and they are inherently inaccurate.

One is therefore tempted to conclude that marginal cost based pricing determinations are practical impossibilities. It must be emphasised that perfect objective information on any subject has an infinite cost. Nevertheless, in some instances, a little knowledge may have marked benefits.

Commercial marginal cost curves can be determined by econometricians from past data. It is a very expensive process which is inherently inaccurate but in some instances may be worthwhile as an aid to forming expectations on which pricing decisions can be based. The first and second best pricing rules should not be forgotten as they form a useful basis for understanding the underlying considerations that must be taken into account in a pricing decision. All this paper says is that they cannot be practically applied in most situations.

Charging what the market will bear

The establishment of prices on the basis of costs, whether assessed subjectively or objectively, simply does not make sense philosophically from a political or an economic point of view. Nevertheless, costs are a constraint that an organisation must cover in the long run in order to remain viable.

Such action will impede structural adjustment in the sector and ultimately within the economy. If marginal costs are below marginal revenues then it is indicated that society demands more than is being produced. Excess profits will encourage other firms to produce either that particular good or service or a substitute for it, thereby increasing output, decreasing price and enhancing social welfare.

Alternatively if marginal costs are above marginal revenue, excess supply prevails and firms will exit from the industry. The exodus will make resources available to satisfy society's other demands thereby also usually enhancing welfare. However there are usually costs associated with firm failure which may be sufficient to warrant government intervention. Nevertheless the adjustment process is usually so powerful that such interventions are temporary.

On the basis of this socially desirable need for continuing structural adjustment in the economy, the obvious pricing rule is to charge what the market will bear. Essentially this means equilibrating supply with demand. Supply should be adjusted so that there is either no deficient or excess demand.

For the operator in a competitive market segment, the relevant price is dictated by market pressures. He must strive to keep his costs down below that price in order to remain viable. For him the process of pricing is relatively simple. He simply needs to observe the actions of his competitors and remain flexible enough to adapt to changing circumstances in a timely fashion.

At the government level however the pricing process is often much more complex. If government operates a competitive business such as say an airline, it simply needs to behave as the private entrepreneur described above. As a monopolistic operator, regulator or provider of infrastructure however, its goals cover wider areas than mere monetary profits. Equilibration of demand and supply may often include not only user pricing but the imposition of appropriate combinations of taxes, subsidies and regulations in either a direct or indirect fashion.

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In effect a level of output must be established which society is prepared to pay for either directly as user charges or indirectly through fiscal or other internal transfers. In establishing the appropriate level of transfers they are further faced with the standard budgetary problem encountered by all governments - how much can we afford politically and economically to collect and how do we distribute it between both the vast number of society's demands for welfare redistribution and the needs of economic management?

As discussed earlier, the process is further complicated by such decisions being made now for the future. They must be based upon expectations and past performances or occurrences may be almost irrelevant. Budgetary performance of Australian Governments over the past five years bear witness to the great extent to which future economic variables can be under or over estimated even in the short run.

The process is therefore not only highly subjective, but also appears to require a sixth sense. Perhaps we ought to employ clairvoyants as matter of routine. A more detailed discussion of these factors is given in a recently released report. (BTE, 1977)

An ideal aim of pricing that is often advanced, is to cover at least joint operating costs in the short run, but this may be negated by social demands which require the payment of subsidies that enable operation at prices which are insufficient to cover these costs. There are plenty of examples of long standing deficit situations in which operating costs were obviously not met by revenue alone, but were covered by governments or by the public at large if not overtly, covertly through overall deficit financing or highly protective regulations.

The process of pricing obviously requires experimentation which can be done on a partial rather than overall basis, but it must obviously require considerable flexibility so that decisions may be reversed if it is found out that expectations have been wrong. The economy is continuing to change its structure at an ever increasing rate. As such the stability that enabled successful rate hikes by the application of an overall percentage increase no longer prevails. Increases in real terms are no longer necessarily uniform across the demands and supplies for different goods and services or for the same service or good in relation to all other goods or services over time.

Overall therefore, pricing of government services is a very complex question. Fiscal limitations, compensation for external effects, the provision of public goods,

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subsidisation of monopolies and welfare distribution questions, must all be traded off against each other. It therefore involves political judgements which can only legitimately be made by politicians since they alone are held accountable for the outcomes of their determinations. Nevertheless, much can be gained from the experiences of other like instrumentalities both domestic and foreign, in a manner similar to the approach advocated above for competitive operations.

CONCLUSION

This paper suggests that prices can not be specifically set according to the simple neo-classical marginal cost pricing rule because the costs themselves are nearly always indeterminate. It further states that in the real dynamic imperfect world, such actions would be inappropriate and not aid movement towards maximising society's welfare. Price discrimination should be employed.

However, this paper does not purport the naive view that costing exercises are therefore wholly irrelevant to operating and investment policies of firms and instrumentalities. Nevertheless, it is argued that they simply may provide useful input to managerial decisions. They cannot be used in a deterministic fashion as a rational means for price determination. The later process is necessarily subjective, futuristic and requires a great deal of flexibility if marked resource misallocations and welfare losses are to be avoided.

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