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Transportation

Who Plans? Who Pays?

TRANSPORTATION

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This Bulletin in Brief—

In December of 1969 work on the William R. Allen (Spadina) Expressway was stopped, and in January of 1970 a review of its planning and design concepts was ordered by the Metropolitan Toronto Transportation Committee. In the debate that followed, several questions were raised regarding the distribution of expressways and transit facilities in the overall transportation system for Metropolitan Toronto. This study focuses on the way in which decisions regarding the Metropolitan Toronto transportation system are made, and gives special attention to the technical input into those decisions.

Our main contention is not that transportation planning is inexpert, because clearly it is not. We would argue, however, that the technical bases of the transportation policy need shifting around, and that the policy itself requires major new directions and definitions if it is to cope with the social consequences of urban traffic.

Transportation *Who Plans? Who Pays?*

THE POLITICS OF EXPERTISE

Transportation planning methodology has created an aura of impartiality and expertise around transportation planners and technicians, and has lent credibility to potentially unpopular policies. No transportation decision is either exclusively technical or exclusively political. Technical and political decisions each have their own language and each is justified by appeals to quite distinct authorities. While not political in substance, most major technical decisions are political in consequence; and the technical expert has become an effective political force in deciding transportation policy. Part of this effectiveness stems from the fact that the aura of expertise surrounding the technical policy-maker has insulated him from lay criticism and exempted his ideas and policies from challenge. Altshuler writes that:

> If an official wishes to persuade his superiors and political critics that his decisions on a wide range of subjects should be considered authoritative, *his most obvious strategy is to maintain that they are technical* — to maintain, that is, that public policy has been declared in highly operational fashion and that he speaks as an expert interpreter of it.[1]

Within the technical bureaucracy, the claims to objectivity and science have accorded policy-makers persuasive influence over which problems are to be considered and how they are to be decided. Since 1953, transportation decisions have been increasingly defined, shaped, and moved by the "politics of expertise". In the period 1953-1965 over two-thirds of the policy issues that came before Metro Council were defined and initiated by key Metro department heads.[2] In the case of transportation policy, two factors encouraged the concentration of expert policy making at the top, and its isolation from Metro Council. First, there was a failure, at the Council level, to provide the experts with a clear and explicit policy direction in which to frame transportation plans. Any policy direction or preferences had to be inferred. Second, experts (both operations people and planners) were dealing almost exclusively with highly specialized technical data, unintelligible to laymen, both citizens and councillors alike. In making this information highly particular to themselves, the experts came to control the direction and limits of the policy.

The effect of this decision-making power has been widespread. One important consequence is that policy problems problems are defined with reference to professional values and programs.[3] Not unexpectedly, the policy process is highly

[1] A. A. Altshuler, *The City Planning Process* (Ithaca, N.Y.:Cornell University Press, 1965), p. 334. Emphasis added.

[2] Harold Kaplan, *Urban Political Systems: A Functional Analysis of Metro Toronto* (New York: Columbia University Press, 1967), pp. 65-66, and pp. 164-165.

[3] The Transportation Technical Advisory Committee, which looks at operational and design problems, and the Transportation Technical Planning Advisory Committee, which deals with the technical and political implications of alternative policies, provide a rough indication of this professionalism, and of the co-operation and co-ordination between experts at the top. The Metropolitan Planning Commissioner, the Metropolitan Roads & Traffic Commissioner, the Toronto Transit Commission Director of Planning, and the Ontario Department of Highways Chief Planner sit on both committees.

influenced by experts who are bound together by common professional interests and intellectual leanings, and who share common approaches to policy problems. Another significant effect of this concentration of expertise is that, from a technical viewpoint, policy innovation must be preceded by technical innovation. To date, however, transportation planners have seemed reluctant to expand their search for new techniques to areas where outcomes are uncertain and their side-effects unpredictable. To legitimately maintain that the problem is technical and that judgments about it are impartial, the planner must define the goals of the transportation system narrowly and precisely. If the goals are defined more comprehensively to include the socio-economic as well as the traffic aspects of urban travel, the means to reach the goals necessarily become more complex and usually less compatible within themselves and with goals in other areas of policy. If, and this seems to be usually the case, the problem becomes unmanageable under the comprehensive approach and the available techniques inapplicable, the policy-makers "retreat to technology". The result is that their problem solving capabilities are restricted and hobbled by the dictates of their specialty. The inability to develop a more sophisticated and comprehensive set of methods for analyzing urban traffic has thus become the basis for justifying shortcomings in the techniques now used.

If the ethos of science in planning has been a professional and research blessing, it has unfortunately proved to be a policy burden. In transportation planning, the technical parameters have been fixed around time and cost and policy goals have been narrowly defined in terms of the efficient distribution of trips in the system. In Metro, both the technics and politics of urban transportation have focused on ease of movement; the prime benefit of the system was and still is viewed as the ability to move large traffic volumes between origins and destinations. Technically and politically this has been the main failing, and it has been compounded by ignoring the *distributive* effect of the transportation system on opportunity, choice, and income.

The technical ideas now used in transportation planning are inadequate to deal with the social consequences of urban traffic. These inadequacies stem from two fundamental problems with the Metropolitan Toronto Transportation Plan (MTTP):

(1) Traffic is viewed simply as an effect of urban land use, and it is not seen as a contributing cause of social, economic and environmental problems. To put the matter technically, traffic is always seen as a dependent variable, and land use as the independent variable.[4]

(2) The Plan and the policies it justifies fail to identify which social classes and groups benefit from transportation decisions.

As with most urban transportation studies done in North America, the MTTP turns on one essential idea: that there is a significant relationship between land use and traffic.[5] The relationship was defined by making explicit the following assumptions:[6]

1. Transportation facilities are established if, where, and when land use produces volumes of persons and goods which require facilities for movement.
2. The choice between public and private modes of transportation is dependent upon population density.

[4] An independent variable is the presumed cause of the dependent variable. The independent variable is the antecedent; the dependent variable is the consequent.

[5] The Detroit Area Transportation Study (1953) was the first analysis to employ the land use-transportation relationship. A detailed analysis of the relationship can be found in R. B. Mitchell and C. Rapkin, *Urban Traffic: A Function of Land Use* (New York: Columbia University Press, 1954).

[6] Metropolitan Toronto Planning Board, *Report on the Metropolitan Toronto Transportation Plan* (December, 1964) pp. 19, 7, and 31 respectively.

> 3. The objective of the [MTTP] has been to determine the most suitable transportation system to serve this [dispersed] development rather than to arrive at the transportation system most likely to produce a desired form of development.

Or, in other words, existing land use patterns create "demands" for transportation; a transport system accommodates, not determines, land use, and hence is dependent upon how the land is used. The critical factor involved in deciding which transportation modes are to be used, and in what combinations, is the concentration in time and space of what technicians like to call "travel demand".[7] For example, public transport modes are thought to be most efficient when the users have common origins and destinations, and want to travel at the same time. On the other hand, in the suburban rings, where activities are less concentrated spatially, and where origins and destinations are diffused, the car is the most convenient mode of travel.

The difficulty with all of this is that there is no conceptual or logical reason for looking at traffic as a dependent and not an independent variable. Blumenfeld rgues that urban movement is an independent as much as a dependent variable.

> . . . while it is true that traffic is a function of land use, it is equally true that land use is a function of traffic. Any change in traffic facilities changes the relative attraction for various land uses of every piece of land in a given area. Therefore, it is equally valid to treat traffic facilities as an independent variable and land uses as a dependent variable.[8]

Blumenfeld suggests that the choice of dependent and independent variables is arbitrary, and if the analyst were forced to make such a choice, either would be valid. The problem, however, is not which to choose, but rather is choice possible? Since land use and traffic are acknowledged to be reciprocal — that is, both are inter-related and each affects the other — the analyst in fact does not have the choice of which direction to study. If there is reciprocal causation, then to get meaningful results the problem must be treated as a reciprocal case in which both land use and traffic are evaluated in relation to each other. This was not done in the MTTP.

The conventional argument of the MTTP that traffic is the dependent variable has proved to be the main stumbling block in evaluating the socio-economic effects of urban transport policy. To date, the traffic planner has managed the land use-transportation nexus this way: "There is no point in assuming that the transportation system and policy are independent variables since changes in them, while affecting land use, are not effective in appreciably changing the pattern of land use. Granted, traffic does have some impact on how urban land is used, but zoning and sub-division controls are more effective instruments for regulating land use than are changes in the transportation system itself."[9] The qualification by technical officials that traffic does influence land use is both academic and virtually irrelevant since they neither make policy on that basis nor do they consider that urban transportation has direct socio-economic consequences for the user of the system. In order to begin serious thinking about the repercussions of traffic on the choices and opportunities available to different social strata, it is necessary to look at the whole of urban transportation as a causal agent, and not simply as an effect produced by other agents.

[7] We will argue below, in the section Travel Habits and Traffic Demand, that there are very probably only travel *habits* and that if a "demand" for transportation exists, it does so only in the mind of the planner. Whenever the term demand is used to describe parts of the MTTP, it will be in this qualified sense.

[8] Hans Blumenfeld, *The Modern Metropolis* (Cambridge, Mass.: M.I.T. Press, 1967), p. 137.

[9] *MTTP*, p. 29.

The second problem with the 1964 Plan — the failure to spell out how the benefits of transport policy are distributed in the social structure — is one result of the prevailing view that urban transport is a dependent variable. One of the central concerns of the 1964 Plan was to define and justify the general goals of the transportation system. The objectives were:

> (1) to increase mobility through higher speeds and reduced travel time; and
> (2) to increase the ease of access to economic and social opportunities.[10]

The overall consequences of these changes in mobility and accessibility were thought to enlarge the range of choice people had in jobs, recreation and so on.

Access and mobility were analyzed in terms of travel demand or trip times, or rates of trip generation and attraction. While these concepts may have a certain technical elegance, their usefulness in planning transportation is limited because they are rarely, if ever, tied to the urban class structure. For example, when travel times for car and transit are related to an index of social class such as income, the relationship is either not explained, or interpreted in a highly esoteric fashion. To date, there has been no definition of which income classes and groups use transportation facilities, or the extent to which they benefit from their use. Rather, policy changes have been evaluated on the basis of the *total* benefit they would bring to the whole system, and not to any one group of users.

Existing transportation policies do not, however, provide equal benefit to all income classes. The further down the social ladder one goes the more critical transportation becomes in providing basic access to jobs and distributing real income. The middle and high income user, in contrast, is more concerned about his mobility in the system; that is, his concern focuses on the time it takes to travel from home to work, and not whether he has some means of getting there. He will readily sacrifice some increases in travel costs for a reduction in travel time. To go back to the MTTP idea that the range of choice will be enlarged by changes in mobility and accessibility, it would be more precise to say that, for Metro:

> (1) Choice can be *restricted* as well as enlarged.
> (2) Whether choice is restricted or enlarged will depend upon which classes and groups, both in terms of income and location, the transportation policy seeks to accommodate.
> (3) The bulk of transportation policy favours the car owner; the low income user, or second wage earner in a single car family, is typically a captive of public transport, makes fewer and shorter trips, and must put up with much reduced levels of access and mobility.

Metro transportation policy, then, is not beyond dispute simply because it has a technical basis or because the technical formulations are the work of professionals acknowledged to be expert in the field of urban transportation. Quite the contrary.

The idea of a balanced transportation system:

> (a) assumes that travel characteristics and needs are the same for all income classes and groups;
> (b) determines which transport policies would and would not be tested for their effect on the modal split;[11]

[10] *MTTP*, Chap. II. The terms mobility and accessibility have distinct meanings. Mobility refers to movement in *time*; thus travel speed in relation to trip length is a rough measure of mobility. On the other hand, accessibility, which is a *spatial* concept, refers to the quality of one location in relation to the location of other desired activities. Also see Hans Blumenfeld, *op. cit.*, p. 114. Blumenfeld argues correctly that any enlargement of the freedom of choice is dependent upon trade-offs between mobility and accessibility.

[11] *modal split* refers to the distribution of ridership between public and private transportation facilities.

(c) is used by technical officials, unwittingly or not, to avoid politically controversial policies such as direct user charges on cars;
(d) does not describe the real world situation since it applies only to upper income groups.

The judgment that public policy cannot affect travel habits is premature. Urban traffic has social and economic effects on transport users:

(a) lower income groups use transit disproportionately more than upper income groups;
(b) there is a greater incidence of captive ridership on transit among lower income groups than among upper income groups;
(c) upper income groups have a greater choice in how and where they travel while lower income groups are significantly restricted in the access they have to jobs and other opportunities.

The idea and measurement of traffic demand is inadequate since:

(a) it has been confused with travel habits;
(b) it is premised on assumptions which reinforce existing travel habits and which inflate the actual need for road construction;
(c) technical officials, while presuming to measure a supposedly rational demand for transportation, have ignored the social costs of supplying it.

The Bureau contends, then, that transportation is a cause of some of the prevailing social and economic ills cities face, and that the technical ideas, as they are now applied, ignore the social implication and effect of urban travel.

TRANSPORT PLANNING: LIMITATIONS AND NEED FOR RE-DEFINITION

The Metropolitan Toronto Transportation Plan, 1964

The major premises that (1) land use generates traffic demand; and (2) this demand must be accommodated, form the core of the MTTP analysis of the effect of public policy on various aspects of travel behaviour. Using these assumptions, and an operational definition of a balanced transportation system, a series of computer simulations were run to determine which policy factors would alter traffic demand, trip behaviour, and the configuration of the transport system itself. Traffic demand and trip behaviour were evaluated in the Variable Studies — Group B portion of the simulation; the transportation facilities were dealt with in the Concept Group, Plans C-3 and C-5.[12]

In analyzing traffic demand and trip behaviour, for example, *hypothetical* changes were made in policy factors such as level and cost of transit service, vehicle operating costs, and the supply and cost of parking to determine their effect on how people travel. Based on these different policy inputs, estimates were made of the total travel time and distance, and the number and average length of trips by public and private modes. Modal split was considered at the time of MTTP publication to be a central problem in transportation planning.[13] It is important to note that the effect of each policy on the modal split was simulated *individually;* limitations in the computer program at that time, as well as later cost levels, did not permit any analysis of the effect of combined policies. The main conclusion of the Plan was that public policy had little effect on travel behaviour, and that people could not be shifted readily from cars to transit.

[12] *MTTP*, pp. 26-27, and Chapter IV, especially pp. 33-39. Also see Appendix B.

[13] The Metropolitan Toronto Planning Board's forthcoming *1995 Traffic Demand Study* did not consider modal split factors in the forecast procedure. The 1964 MTTP simulation of the effects of policy on trip-making and the subsequent studies done in 1965 *(Modal Split Analysis)* and 1967 *(Modal Split Analysis for the 2 Hour 7-9 AM Peak Period in Metropolitan Toronto)* are all forms of modal split analysis. The latter studies specified travel time, travel cost, level of service and income as the parameters which influence modal split. The 1964 simulation expressed these parameters in the form of specific policies such as operating costs, transit fares and so on.

The "Balanced" System Myth

The single most telling conclusion of the MTTP is that public policy can have very little effect on how people travel. If, as suggested in the Plan, people move in urban areas as they please, independent of policy incentives and sanctions, the problem of urban travel is beyond political and technical control, and transportation planning becomes a process of reacting, not planning. If one accepts the whole intellectual framework around which the simulations of trip making are built, the relatively fixed nature of travel behaviour makes sense. The problem is that the framework itself does not make sense, logically or empirically.

Most of the difficulty revolves around the definition of the system's so-called "balancing mechanism", its relationship to the policy factors thought to influence trip making, and the ability of those factors to influence urban travel. The problem is three-fold. First, the definition of the system's balancing mechanism (and the simulation based on that definition) begs the question any modal split analysis attempts to answer. Second, the results of the simulations and of subsequent research done in 1965 are in direct contradiction to the idea that the system is balanced. Third, since the simulation procedure tested the effect of different combinations of policy, the judgment that public policy cannot effectively change travel habits is at least premature.

The definition of a balanced transportation system is, at best, confused and misleading. In popular usage, the term refers to roughly equal investment in public and private transportation facilities. Professional planners, while reluctant to attach any precise meaning to the term, have defined it this way:

> "Every measure favouring the automobile increases road use and consequently increases congestion and travelling time; this produces, as a reaction, a shift of some travellers to transit. Measures favouring transit, by relieving street congestion and facilitating higher auto speeds, produce the opposite reaction — i.e., they induce some additional auto usage."[14]

The definition states that one mode is to some considerable degree inter-related with the other; thus, the balancing mechanism can be thought of as a form of equilibrium between cars and transit where an increase in the use of one, say transit, would produce a decrease in car use. Using this conceptual definition, operational factors such as fares, operating costs, and level of service were defined for two categories: factors favouring vehicle use, and factors favouring transit use.[15] For example, it was found that a 50% reduction in parking charges produced about a 2% increase in vehicle use, and a 4% decrease in transit use; the elimination of transit fares produced an increase of about 11% in transit use, and a decrease of 8% in vehicle use. By simulating *only* the effect of incentives on trip behaviour, it was assumed, consistent with the definition of balance, that factors which encourage transit use automatically discourage vehicle use.

There are two limitations to this interpretation. First, the question of modal split is begged, not tested; that is the inter-relatedness of public and private modes was accepted as valid *a priori*. The simulations of trip behaviour demonstrated that factors such as fares and operating costs had little effect on the

[14] *MTTP*, p. 33.
[15] *Ibid.*, p. 34.
[16] *Ibid.*, p. 39.

choice of public as opposed to private transportation, and that people did not readily change from one mode to another.[16] These results clearly violate the assumption that the transportation system will balance or regulate itself through trade-offs between public and private facilities. What is implicit and most difficult to accept in the notion of a transportation balance is that the urban travel market is socially homogenous with similar travel characteristics and needs. This assumption is not a realistic one. One of the basic, though rarely specified, problems with urban transport is that people use it for different reasons decided, in part, by disparate socio-economic conditions. Because of the gaps in income, housing, and transportation service, the use of public and private transportation facilities does not overlap to the extent suggested by the MTTP. Rather, transit and automobile use are, to a marked degree, independent of each other. Thus, while the main thrust of the MTTP focused on the idea of an equilibrium between cars and transit, a more realistic view was hinted at in the following:

> This process of adjustment [to travel habits] has been simulated by the model in various forms: choice of other routes, change from driving to transit riding, and change in trip distribution.[17]

In other words, the idea of balance refers to the manner in which the system adapts or adjusts itself to changes in volume and concentration of trips, and this adjustment probably occurs *within* modes, not between them. That is, car drivers will substitute one route for another, while transit users will substitute buses for subways or subways for street cars and so on. Since the idea of adjustment to travel habits within modes as opposed to a balance between them more accurately describes travel behaviour, and since the simulation data clearly indicated that this was the case, it is difficult to apreciate continued references to the balancing effect between public and private facilities in the 1970 review of transportation policy.[18]

In our argument that car and transit use occur in large measure independently of each other, it is necessary to clarify (1) how the balance assumption in the MTTP determined which policies would and would not be tested; and (2) how, in our version, auto and transit use relate to each other. The MTTP simulations of policy effects on trip-making were confined to the incentives affecting the use of public and private transport. With the exception of one factor, a 50 per cent increase in parking charges, no direct sanctions on either cars or transit were programmed. Incentives alone were simulated because public and private modes were thought to be highly interdependent or balanced; that is, increased transit use would automatically produce, in some proportion, decreased car use. Put another way, transit use itself was viewed as a direct sanction on car use, and it was thought that all the transit factors simulated would have the same effect as imposing direct sanctions such as user charges and limitations in road construction.

We would argue that this is not the case. Factors which discourage car use are not necessarily connected to factors influencing transit use. Rather, whatever changes occur in the existing levels of auto use will probably be dependent upon *direct* costs in time and money and convenience the driver himself must absorb beyond the existing pressures of congestion and operating costs. Transit ridership cannot be expected to increase until dependence on the car, especially for work trips, is reduced. The provision of more transit facilities alone, without radical changes in the existing levels of service, and suburban housing and transport pricing policy, and without technological innovation, will not change prevailing travel habits.[19]

[17] *Ibid.*, p. 54.

[18] Metropolitan Toronto Planning Board, *A Planning Review and Appraisal*, (1970), p. 22.

The second limit has to do with the judgment that public policy has very little effect on the travel habits of the urban population. The judgment is critical since it has been used to justify current policies which favour road construction, and hence the car owner. While travel characteristics are to a certain extent more or less fixed in the short run, the effect of combining policies to produce changes in travel habits in the long run has probably been under-estimated. Findings for American cities of around 100,000 population suggest that while individual changes in comfort, convenience, accessibility, and frequency of service alone did not affect transit patronage, taken collectively they produced a marked upswing in transit use. For example, in Peoria, Illinois, transit ridership rose 53 per cent. It was also found that "new riders (had) a 50 per cent higher level of automobile ownership and 20 per cent more income than the initial group of transit patrons. Aparently, these service variables when manipulated as a group have a vastly different impact from that indicated when each (was) considered separately".[20]

Two general conclusions can be drawn from the preceding criticisms. First, the effect of public policy. Since Peoria is more likely than not to be dissimilar to Metropolitan Toronto, and since the base transit ridership before improvements was very much lower than transit use has ever been in Metro, it would be pushing the point to say that any new policy combinations would stimulate large shifts from private to public transport. Clearly it would not, at least not on the scale experienced in Peoria. It is equally clear that it is much less difficult to make some improvement in a terrible situation than it is to improve an almost tolerable one. But this is not really the important question. What is important is that Metro planners have drawn the ambitious conclusion that public policy cannot induce people to change how they get about. In view of their failure to (1) test various combinations of policy, and (2) consider policies such as user charges to discourage vehicle use and to pay for the social costs of traffic congestion, their judgments about what public policy can and cannot do are questionable.

Second, the definition of the balancing mechanism is inappropriate when applied to all users of both public and private transport. The definition simply does not describe the real world situation. As we will show below, in the section Social Class and Transportation, only in a very limited sense is there any trade-off or balancing effect between public and private modes.[21]

Social Class and Transportation

Much of the contradiction discussed in the preceding section can be attributed to the failure of the MTTP to explicitly

[19] Technological innovation will not be discussed in the bulletin. Apart from major changes in the nature of line-haul systems or rights of way, changes in the feeder and collector systems which move people to and from the main line-haul facilities are likely to have the most immediate impact. Computer controlled bus-taxi systems, for example, may improve the total travel times of low density suburban commuters who would normally drive, but who may be shifted to public transportation because of the increased convenience, flexibility, and reduced travel times. Unfortunately, technological change is difficult to regulate. People and institutions uncover what they can and not necessarily what they or society might prefer. At least in the short run, policy innovation in the areas mentioned holds the most promise. For a discussion of the importance of residential feeder systems see H. Blumenfeld, *op. cit.*, pp. 114-121. For a recent discussion of transportation and technological innovation see *Future Directions For Research in Urban Transportation* (Organization for Economic Co-operation and Development: Paris, 1969).

[20] Mark J. Kasoff, "The Quality of Service and Transit Use", *Traffic Quarterly* (January, 1970), p. 119.

[21] See figures 2 and 3 in the next section. They clearly show that only among the upper income groups does any appreciable shift occur between the two modes.

consider *social class* as a determinant of how people choose to travel, or if they have that choice at all. Despite clear research findings in North America relating socio-economic status to travel patterns, transportation policy in Metro still remains focused on the efficient distribution of traffic in the system. By not asking who travels, by what means, and where, technical officials, in effect, deny the social effects of urban traffic on its users. In this section we will demonstrate that:

(1) Travel characteristics differ between social classes; income, car ownership, and type and location of housing are related to mode of travel.

(2) Lower income groups have a disproportionately high level of transit ridership; for work trips, the level of captive ridership among transit users is almost twice that of car users.

(3) Higher income groups have and exercise a greater *choice* in how and where they travel; only among these groups is there any significant trade-off between public and private transport.

The effect of (1) through (3) is that, for the urban poor, choice, access, and mobility are often restricted to the point where access to outlying jobs becomes difficult, if not impossible.

Recalling the basic land use-transportation relationship, scholarly research has shown that trip characteristics such as the number and length of trips, and mode of travel used are associated in varying degrees with average household income, car ownership, occupational status, distance from the city centre, residential density, type and location of dwelling, and size of lots for single family dwellings. Of course, a number of these indicators are themselves inter-related; studies done in the late 1950's suggest that car ownership, one of the important explanatory variables used in modal split models, is highly related to population density and income. Since much of the urban transportation problem revolves around rush hour work trips, factors influencing residential location and their relation to the journey to work assume prime importance. In this context, income and household characteristics offer the most promise.[22]

Most of the systematic evidence relating social class factors to travel patterns is available for large American cities. Meyer, Kain, and Wohl, in looking at Chicago central city commuters, found mode of travel to be related to income, type of housing, residential density, and length of work trip. The authors conclude that:

> . . . residents of single-family structures more often apear to use the longer distance and faster modes. Automobile riders make the longest trips (12.4 miles) and reside in the highest proportions in single-family residences (63.3 per cent); automobile drivers average 12.4 mile trips and also display a strong tendency to reside in single-family residences (53.1 per cent). . . . Of all forms, rapid transit has by a substantial margin the smallest proportion of users residing in single-family units (11.5 per cent) and the largest proportion residing in multiple units.

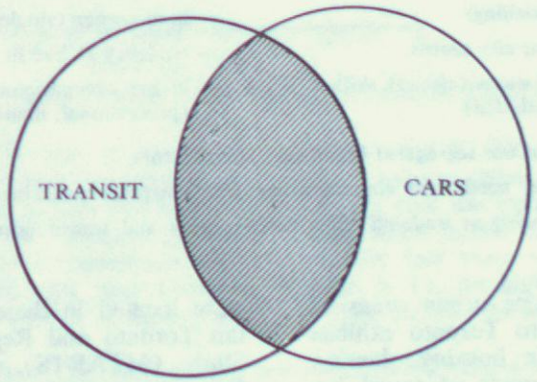
In addition, it was found that higher-income workers use the faster and more expensive form of transportation while low income groups tended to use transit more often.[23]

The connection between transportation, income, and economic oportunity has received wide attention in the United States where urban poverty has reached crisis proportion. Comparing "poverty target areas" in Nassau and Suffolk counties in the New York Metropolitan Region, it was found that low income families make less than half the number of trips as average income families, and that "trips are largely dependent upon car ownership, car ownership on income, and income on job availability and accessibility. Public transportation can provide the accessibility component in the chain, but it cannot necessarily satisfy the needs for all trip purposes".[24]

Figures 1 and 2 summarize alternate views of the relationship between modal split, the balancing effect, and social class. Figure 1 represents the MTTP view where it is assumed that social class is not related to the use of public and private transportation, and that the modes are highly dependent upon each other. An alternative, and we would argue more realistic view, is summarized in Figure 2. Here, we have discarded the assumption of a "balancing mechanism", and have assumed instead that travel characteristics differ with social class, and that public and private modes operate in large measure independently of each other.

Figure 1

MTTP EXPLANATION OF MODAL USE



Balancing Effect

Assumption 1: Modal use is highly inter-related.

Assumption 2: Travel needs and travel characteristics are similar (implicit).

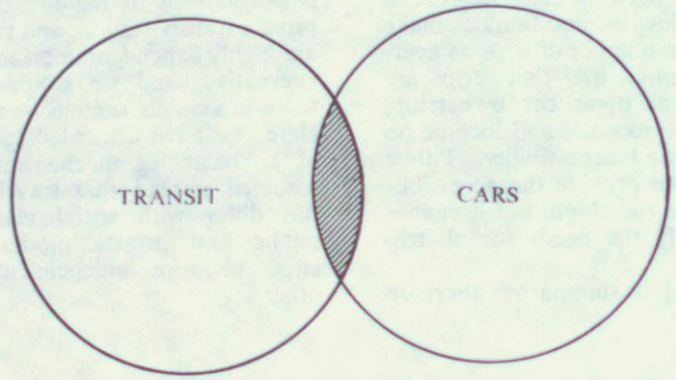
[22] J. R. Meyer, J. F. Kain, and M. Wohl, *The Urban Transportation Problem* (Harvard University Press: Cambridge, Mass., 1965), pp. 108-143. Also see G. A. Nader, "Socio-economic Status and Consumer Behavior", *Urban Studies VI* (June, 1969), pp. 235-245. Nader states that significant differences in consumer behaviour can be explained by differences in income and by type of dwelling occupied. While these relationships were developed to explain differing consumer patterns, it is probable that there is a significant connection between patterns and travel behaviour.

[23] Meyer, Kain, and Wohl, *op. cit.*, pp. 139-140. Also see Table 51. It is important to note that this data is for whites. Inequalities based on race are excluded.

[24] L. J. Pignataro an J. C. Falcocchio, "Transportation Needs of Low-Income Families", *Traffic Quarterly* 23 (October 1969), p. 525.

Figure 2

ALTERNATIVE EXPLANATION OF MODAL USE



Balancing Effect very limited

USER CHARACTERISTICS	USER CHARACTERISTICS
— low car ownership	— high car ownership
— low income	— middle and uper income
— higher residential density	— lower residential densities
— tenant (multiple dwelling)	— homeowner (single family dwelling)
— tendency to live near city centre	— tendency to live in outer suburban rings
— lower occupational status (clerical, skilled, semi-skilled and unskilled)	— higher occupational status (professional, managerial, official)

Assumption 1: Modal use segregated by income class factors.

Assumption 2: Travel needs and characteristics differ sharply between income classes and groups.

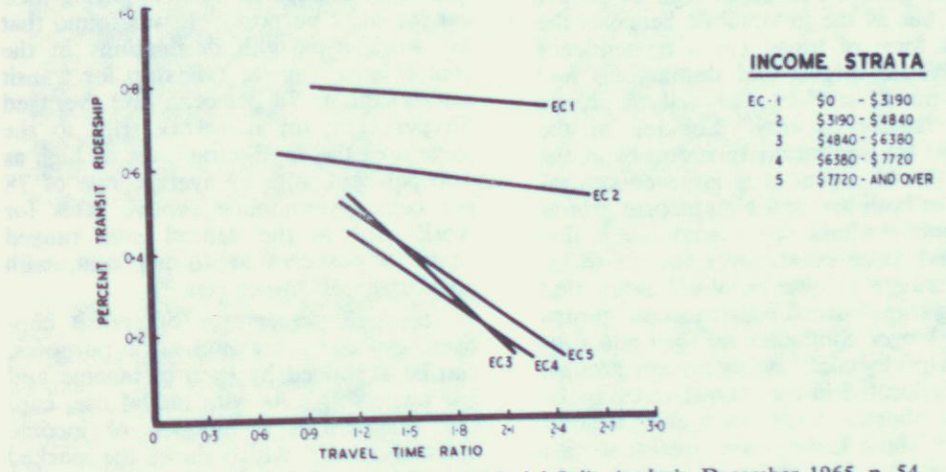
Assumption 3: Balancing or trade-off effect between cars and transit occurs only among upper income groups.

As with most major urban areas in North America, Metro Toronto exhibits striking differences in housing, density, car ownership, and mode of travel between the inner and middle suburban rings. Generally speaking, as the densities fall off rapidly from the central areas, and the proportion of single family dwellings increase, the automobile becomes the dominant form of travel. For example, 64 per cent of all single family dwellings in Metro in 1966 were located in the middle three boroughs of Etobicoke, North York, and Scarborough; 27 per cent of attached and row housing, and 39 per cent of apartments and flats were located in these areas. Metropolitan Toronto and Region Transportation Study (MTARTS) origin and destination surveys conducted in 1964 show that for these areas about 87 per cent of work trips are by private car while transit use varied from 9 to 12 per cent. By contrast the inner three (City of Toronto, York, and East York) exhibit a markedly different pattern in housing and travel characteristics. With less single family dwellings (35 per cent of Metro total), and more apartments (61 per cent) and attached and row housing (73 per cent) work trips originating in this area were equally distributed between transit (45 per cent) and automobile (46 per cent).[25]

Unfortunately, these social indicators (type and location of dwelling, residential density, and car ownership) have not been statistically related to mode of travel in any of the Metropolitan Toronto Planning Board's published data. The one exception is the 1965 *Modal Split Analysis* which demonstrates a clear relationship between income and mode of travel and between income and the *opportunity to choose* the mode of travel.[26] It can be seen from Figure 3 that as travel time increases and public transit becomes less

Figure 3

MODAL SPLIT DATA BASED ON WORK TRIPS IN MTARTS REGION



Source: Metropolitan Toronto Planning Board, *Modal Split Analysis*, December 1965, p. 54.

competitive than the car in terms of travel time, transit use remains high among lower income groups but falls off sharply among higher income groups. For example, of those individuals who make less than $3,200 per year, over 80 per cent use public transit; of those who make over $7,700, and *who have the oportunity to value travel time,* less than 20 per cent use public transit. Note that only when public and private modes are equally fast (i.e., where the travel-time ratio is 1), do high income groups use public transit. As transit becomes slower

[25]These figures are calculated from housing and transportation data in Metropolitan Toronto Planning Board, *Metropolitan Toronto Key Facts*. January 1968. The housing data is taken from Table 19, the transportation data from Table 51. Also see Tables 16, 23, 24, and 41. No *statistical* relationship has been established between housing and transportation; the relationships pointed out in the text are inferred from the patterns Meyer, Kain, and Wohl, found in Chicago. There are two additional limitations: First, the housing figures are for 1966 while the transportation data was collected in 1964 so they are not exactly comparable. Also, there has been a decreasing emphasis on single family construction in the middle three boroughs from about 1965 on, and since the transportation data for origins and destinations is not available past 1964, the percentages cited in the text, of necessity, do not account for changes in housing construction beyond 1964. The second problem is a minor one. Since housing figures are recorded by municipal boundary and transportation by planning district, the planning districts were fitted to the borough boundaries in order to compare housing and travel. With the exception of planning districts 3 and 4 overlapping into North York, the fit was good.

the higher income groups shift away from it rapidly; thus, among these groups, demand for travel time is highly elastic.[27] Figure 3 also shows that the idea of a balancing or trade-off effect is inapplicable when looking at low-income users; only among the upper income groups does this shift take place. Even in these groups, though, the shift away from transit is rapid enough to limit the balancing effect.

Transit ridership among the top three income groups can be as high as 50 per cent, but as the automobile becomes the faster form of travel (as a consequence of diffused origins and destinations and poor transit service), the well-off groups shift rapidly to cars. Looking at the income-transportation relationship in the U.S., Wohl argues that large concentrations of both low and high income groups use public transit while auto use is distributed more evenly over the entire income range. However, Wohl notes that among transit users, higher income groups make longer commuter railroad and subway trips; by contrast low income groups, usually located in the central areas, make much shorter local bus and subway trips.[28] These findings are consistent with patterns showing low income groups making fewer and shorter work and recreational trips, and having low levels of car ownership. But since commuter rail services are much less developed here, and long distance commuting not as prevalent as in the large American cities, transit use in Metro is correlated more strongly with low income than it is in the large American centres. Figure 3 also suggests that upper income groups have the luxury of valuing travel time where the poor, presumably being transit captives, have no choice in the matter. Captive ridership, especially among transit users, is an important measure of a transportation system's flexibility. In Metropolitan Toronto captive ridership was measured for both transit and automobile users. In the analysis, transit captives were defined as (1) not having a driver's license; or (2) under the age of sixteen; or (3) not owning a car; automobile captives were defined as those requiring their car for work purposes. It was found that for work trips with destinations in the central area, captive ridership for transit ran as high as 78 per cent, and averaged 56 per cent; for non-work trips to the same area the captive rate was as high as 100 per cent, with an average rate of 78 per cent. Automobile captive rates for work trips to the central area ranged from 19 per cent to 46 per cent, with an average of 38 per cent.[29]

The high percentages of transit captives, especially for non-work purposes, can be explained by level of income and car ownership. As with modal use, captive ridership is a function of income class. Figure 3, which shows the marked insensitivity of the poor to faster travel times, and their disproportionately high use of public transportation, also suggests that low car ownership and high captive ridership are the unhappy prerogatives of the poor. Of course this is inferred; no statistical relationship between captive ridership and level of income or car ownership has been established for the Metro area. While this information is stored on data tapes by the Metropolitan Toronto Planning Board, it has neither been tabulated nor published.[30] Unless the measure of captive ridership is *explicitly* related to socio-economic characteristics and to length of work trip; no adequate estimates can be made of the system's flexibility or of the level of accessibility to jobs and recreation it offers. Voorhees sums up the problem of social inequality and urban transportation:[31]

> In effect, we have two societies — one served by auto and one served by public transportation, and this level of service is substantially different. Clearly this disparity in opportunity compounds our social problems. It is not the cause of them, but the fact that it exists magnifies the social problems of today.

[26]Metropolitan Toronto Planning Board, *Modal Split Analysis* (December, 1965), p. 54.

[27]Demand elasticity for travel time is represented by the slope of the diversion curves in Figure 3. The sharper the slope, the greater the elasticity or sensitivity. The travel time ratios measured along the horizontal axis compares the relative travel times of cars and transit. The travel time ratio is expressed by dividing door-to-door travel time by door-to-door vehicle travel time. When the ratio exceeds 1, the automobile becomes the faster form of travel.

[28]Martin Wohl, "Users of Urban Transportation Services and Their Income Circumstances," *Traffic Quarterly* (January, 1970), p. 25.

[29]Metropolitan Toronto Planning Board, *Modal Split Analysis* (Dec. 1965), pp. 48-52.

Travel Habits and Traffic Demand

Among planners in Metropolitan Toronto the on-going rationale for building roads and expressways is that they are needed.[32] This need, they will maintain, can be measured in terms of a traffic demand. In the MTTP it was argued that transportation should be provided on the basis of demand for it; that this demand, both in terms of mode and volume, can be forecasted; and that irrespective of the level of demand, the pricing of transportation should be based solely on the capital and operating costs of the facility. As technical axioms go, these are not particularly good ones. In this section we will take the view that (1) the idea of traffic demand is premised on assumptions which tend to reinforce old travel patterns and which inflate the need for more roads; (2) the logic of traffic forecasting is often a self-fulfilling one; (3) the idea of traffic demand has been badly mixed with travel habits and the actual use of the transport system; and (4) the social costs of urban traffic and their payment have been ignored. It is at once obvious that these difficulties are specific examples of the two key problems discussed in the second proposition. (See pp. 4-7). That is, in the planner's mind, traffic demand is the consequence of the independent variable land use; traffic, then, is an effect and not a cause, a dependent variable and not an independent one.

Transportation planners admit far too infrequently that forecasts of traffic demand are only rough approximations of future travel habits. Traffic demand is a reliable measure only to the extent that future trends in urban traffic resemble past ones, and to the extent that the analyst can account for changes in the urban structure. As an increasing proportion of social, economic, and cultural developments go unnoticed, the forecast data becomes less and less valid. This is the case whether one is forecasting a modal split relationship or some future traffic volume. The reliability of the MTTP forecast of doubled vehicle work trips for 1980 is compromised by two factors: (1) the lack of up-to-date information on travel characteristics; and (2) for purpose of the forecast, transportation facilities which have not been built are assumed to exist. These factors, especially the latter, cast doubt on the utility of forecasting as a technique for identifying traffic demand and as a basis for decision-making.

Using the 1964 MTARTS travel data as a base, 1980 vehicle work trips were

[30]*Ibid.*, pp. 6-7. Percentages of both transit and automobile captives were recorded for each origin and destination pair. However, in reporting captive ridership (pp. 48-52), only destination zones were related to levels of captive ridership. For reasons not apparent in the analysis, income data by zone of origin was not published.

[31]A. M. Voorhees, "The Changing Role of Transportation in Urban Development", *Traffic Quarterly* 23 (October, 1969), p. 530.

[32]Metropolitan Toronto Planning Board, *Revised Toronto City Official Plan*, (June 12, 1969), p. 12.

projected from changes in population and employment.[33] (Recall the assumption that land use generates traffic). Since the 1954 travel characteristics are reproduced in the forecast, the projection is valid only if the future travel characteristics are similar to past ones. If the transportation system itself is a powerful influence on travel habits, then one possible conclusion to be drawn is that travel is stable over time only if there are no innovations in transport modes and patterns. Yet the decision to provide transportation is premised on the idea that travel is, in fact, stable over time. In this context the planners' argument is circular and the assumption precludes change. If, however, travel habits stem from less visible social, cultural, and psychological factors, then the assumption is relatively unimportant in deciding which facilities are to be built.

The second assumption — that all road and transit facilities planned for 1980 are assumed to exist for current traffic forecasts — needs little comment. It can be readily seen that the estimates of vehicle work trips are valid only if the planned roads actually exist. The forecasted demand is dependent upon the *planned* road, and the rationale for building the road rests on the forecasted demand. Put another way, demand for roads is determined, in part, by assuming they already exist. This assumption inflates the demand to artificially high levels, and while the projection will obviously show a level of demand sufficient to utilize the road, the whole forecast logic in this context is a self-fulfilling one. If forecast data are to be used as planning criteria, some estimates are required of the impact of a given transportation network on travel patterns, and of the extent to which assumptions of the kind discussed above distort the need for transportation.

Traffic demand is a misleading term. As it is formally conceived in modal split and traffic forecast modals, traffic demand is actually an estimate of the probable use of a facility *after* it has been built. While this estimate in no way measures individual or aggregate preferences for a transportation service, planners often imply that the actual use of the transportation system is some measure of rationally calculated preferences for it. *Demand for transportation is not necessarily the same as the use of transportation.* To take this further, it is doubtful whether the urban traveller rationally chooses, in the classic economic sense, between costs and benefits; or if he can clearly order travel preferences when the alternatives he must choose among are limited and inflexible; or, more fundamentally, if he has choices to be rational about. Travel demands, as Eliot Hurst contends, are rarely demands or preferences, but simply habits. Hurst goes on to state that:

> No attempts are made to measure the satisfaction of the trip-maker with the transportation system, and in fact the existing system may be effectively masking real desires by deliberate limitations on levels of transportation service.[34]

Meeting what are assumed to be demands may be, in fact, a process of calcifying travel habits.

Traffic demand is a term of political convenience. As such, it provides a free market rationale for suplying transportation according to some measure of demand for it while ignoring its actual use as a pricing base. By some ideological or political or intellectual oddity the former remains eminently acceptable, the latter unpalatable. If it were possible to determine the full range of costs a

[33] *MTTP*, Appendix A, p. ii. "In the absence of new surveys and statistical analysis which would indicate the stability of the formulas originally developed, it has been assumed that the basic travel characteristics of the survey year 1956 will be the same for the projection year 1980. A new home interview survey was conducted in 1964 and will provide the basis for further transportation studies".

[34] M. E. Eliot Hurst, "The Structure of Movement and Household Travel Behavior", *Urban Studies* VI (February, 1969), p. 71.

transportation system imposes on a city, and if it were possible to get some consistent measure of the relative value to time and out-of-pocket costs as opposed to social costs, the idea of cost-based prices would have validity in determining who should pay how much for transportation. But since costs have traditionally meant capital and operating expenses while social and environmental costs have meant nothing — quite literally zero — the cost-based price cannot rationally or equitably allocate benefits whether in the form of improved accessibility and service or re-distributed income. Thompson correctly argues that:

> We cannot blithely rely on prices equal costs to achieve a rational pattern of resource allocation in the tradition of the free market . . . We (should) price to achieve certain responses and the response is determined by the nature of the demand for the relevant service.[35]

The suposed inability and reluctance (the former inevitably seems to justify the latter) to consider non-economic costs and to implement user-based pricing in urban transportation has exacerbated the price discrepancies between car and transit users, and between peak and off-peak travellers.

Since individual changes in fares and charges apparently have little impact on the split between public and private transportation, pricing innovation has been abandoned. Transportation planners have traditionally viewed the pricing of different modes as a means to encourage (or discourage) the use of one mode as oposed to another. Because so little is known about which factors influence modal choice, and since the use of private transportation is highly price inelastic, pricing transportation to shift people out of their cars really leads nowhere. The whole question of modal split is a moot point. But because modal split relationships are aparently insensitive to pricing changes, it does not follow that pricing policies should not be changed; nor that pricing must be designed to get people out of cars into transit. On the contrary, if one looks at urban transportation not as a system of competing modes, but as a distributor of real income and economic oportunity, and as a force which deals out real social costs in the form of rush hour congestion, then the need for new user-based pricing policies is clear.

TRANSPORT POLICY: SOME NEW ASSUMPTIONS

That planners have been slow to plug new assumptions into transportation policy, and that they have been hesitant to push into the fuzzier areas of the social consequences of traffic can be attributed, in part, to the fact that the technical parameters within which they can work have remained fixed for a remarkably long time. In developing forecasting techniques, the emphasis apears to be solidly stuck on predicting person or vehicle trips on a corridor or zone basis. Who moves in the zone, how he moves, what his income and occupation are, where his trip starts and where it ends, and how far and how often he travels are regarded as inputs in the forecast procedure. Income is viewed as a useful predictor of movement, but not, for example, as an indicator of high captive ridership among the urban poor.

This approach to urban travel is hinged on a number of assumptions, most of them well buried in planning nomenclature, and sufficiently obscured to go unnoticed. As policies, they have proven elusive and sufficiently vague to permit experts and politicians alike maximum room for political adjustments. As technical assumptions, they are insensitive to the transportation needs of the poor, and have focussed on the measurement of physical movement, not the determination of social needs. The assumptions are summarized below.

1. Travel needs and characteristics are similar for the entire urban population. (See Figure 1)

[35] Wilbur Thompson, *A Preface to Urban Economics*, (Baltimore: John Hopkins Press, 1965), p. 350.

2. Changes in policy distribute benefits throughout the system, hence the value of the policy is determined by the *total* benefit it brings to the entire system, and not to any one class or group of users.
3. Transportation should be provided on the basis of demand for it.
4. Future demand can be determined by extrapolating from past use; demand for transportation is assumed to equal the actual use of the system.
5. Traffic demand is the most suitable criterion for determining future transportation investments.
6. There is no point to different pricing strategies because social costs cannot be quantified, and because the use of transportation is price inelastic.

These assumptions and the problems they raise have been discussed in detail in the preceding sections, and no further comment will be made here. An alternative set of assumptions, directed mainly at the social and economic consequences of urban traffic, are listed below. They differ appreciably from the current policy assumptions, and in some cases, are exactly opposite to the official view. These six assumptions converge on two general areas of transportation policy: (1) pricing urban transportation, and (2) transportation and economic oportunity. If not comprehensive, they at least identify where our priorities should lie, and what future policy might include.

1. Travel needs and characteristics differ sharply between social classes. (Se Figure 2)
2. Any given transportation policy does *not* extend equal benefit to all social classes. Each policy accommodates some groups and classes more than others, and the crucial question becomes which groups, and to the exclusion of what other groups?
3. The transportation system is a distributor of real income and access to oportunity and choice.
4. The poor are less mobile than the affluent, are typically captive of public transportation, and are restricted in their access to opportunity, especially those in the suburban areas.
5. The notion of travel demand is an inadequate basis for determining transportation investments. Attention should be shifted from the idea of meeting aggregate transportation needs to meeting the special needs of particular groups.
6. The social costs of urban traffic are not adequately paid for by those who create them.

Pricing Urban Transportation

We have noted that the rationale for not changing pricing policies in urban transport lay in the fact that changes in fares and charges had little impact on the split between public and private transportation. We observed that there was no apparent reason why pricing policies should be directed only at shifting people out of cars into buses and subways. It is generally held, and the case is valid for Metro, that automobile use is highly price inelastic, and that in the suburban rings, travel patterns shift rapidly away from transit to cars. No matter how low the transit fare, the suburban car owner will continue to drive when he is faced with erratic and inconvenient public transportation. The use of public and private transport will change only if the car user is faced with pricing restraints in the form of road tolls, or with severe congestion, and, *at the same time,* is provided with an alternative and acceptable form of transportation.

Pricing transportation is not the cul-de-sac Metro planners maintain it is. On the contrary, if pricing is removed from the confusion of modal split issues, the need for innovations in road pricing and in establishing price distinctions for on-peak and off-peak travel becomes readily apparent. The development of a new pricing strategy in these areas is built around the impact of the automobile on street congestion, accessibility, and land values. It is generally held that: (1) As there is a shift to the private car, land requirements increase prohibitively;[36] (2) the user of urban road space during peak-hour travel pays less than the social costs he creates; and (3) it does not cost the motorist more to drive in peak traffic hours, nor is it more expensive for him to drive on high value land in the central areas compared to less congested, lower value suburban land. In the case of Metropolitan Toronto, these statements are generally regarded as accurate, but the subtleties of defining and measuring social costs have stalled analysts, and have left politicians with a technical rationale for doing nothing.

The main stumbling block to the development of a new pricing strategy rests on the curious and persistent axiom that the price mechanism must finance transportation facilities rather than discipline their use. This can be seen when one looks at the price distortions for transit and cars during peak and off-peak travel. With transit, off-peak travel is highly over-priced, and peak travel is only marginally, if at all, underpriced. On the other hand, peak travel by automobile is highly underpriced, and to a lesser extent, if at all, off-peak travel is overpriced. The effect of this is that while the off-peak transit rider subsidizes the rush hour transit user, he does so in a significantly less proportion than the off-peak motorist subsidizes the peak-hour motorist.[37]

The Bureau recommends that:

1. In general, fares and charges should vary according to the level of use, and that operating expenses no longer be the sole criterion for determining transit fares.
2. Off-peak transit use be free for all fare zones.
3. Peak-hour motorists be charged a significant toll for travelling on routes that are badly congested.
4. The revenues from toll charges be used to subsidize any operating deficits incurred by the TTC.
5. The administrative costs of collecting tolls be carried by funds earmarked for road construction and maintenance.
6. A demonstration project, designed to test automated methods of toll collection, be carried out by Metro and municipal agencies, and that the project be jointly financed by Metro and the Province.

The consequences of these policies would be to more equitably distribute the social and congestion costs of peak-hour travel, to encourage drivers to avoid rush-hour travel where possible, and hopefully, to induce drivers to avoid tolls by shifting to low congestion routes. It is no longer adequate or reasonable to check congestion by increasing the supply of urban roads. More accommodation of traffic inevitably leads to more traffic.

Transportation and Economic Opportunity

The two crucial questions that emerge when one looks at urban transport as a distributor of job opportunities are (1) what is the comparable accessibility to jobs for car owners and non-car owners, and (2) what is the direct impact of the transit service on under-employment and unemployment?

Since travel patterns in Metropolitan Toronto are analyzed on the basis of the *average* travel behaviour of residents in each traffic zone, instances of people with severe transportation problems are often masked by lumping their activities in with the rest of the zone. We have also

[36] Peter Hall, "Transportation", *Urban Studies* VI (November, 1969), pp. 414-415, and Table III.

[37] William S. Vickrey, "Pricing in Urban and Suburban Transport" in G. M. Smerk, ed., *Readings in Urban Transportation* (Bloomington: Indiana U. Press), p. 124.

pointed out that the level of captive ridership for public transit was not in any way linked with the socio-economic characteristics of the users. Both of these characteristics obscure the travel patterns of the users.

To go back to the question of access to jobs and level of transit service, we would argue that job opportunities for the centrally located poor are not as readily accessible now as they were as recently as ten years ago. Two changes account for this. First the location of most employment is rapidly dispersing. Only service employment has increased fractionally in the Toronto core area while retail, manufacturing, and other employment have experienced a sharp decline relative to the suburban rings.[38] Cheaper suburban land prices, reduced dependence on rail for inter-city movement, and increasing efficiency of motor transport have encouraged the dispersal of manufacturing and retail firms to outlying areas. Second, the predominance of more expensive single family dwellings and large lot zoning in the suburbs, as well as pressures against locating low income and public housing in these areas,[39] have contributed to the relative immobility of the urban poor. As the blue collar jobs have shifted away from areas well served by public transit, the low income user, faced with relative isolation in the central areas and a rapidly expanding Metropolitan scale, is forced to put up with, at best, only marginal improvements in transit service to the suburban areas. Meyer and Kain write that:

> Post-war changes in urban ecology and transportation systems, while conferring significant improvements on the majority, have almost certainly caused a *relative* deterioration in the access to job opportunities enjoyed by a significant fraction of the poor.[40]

Limited transit service to the suburban rings is a function of low residential density, the dispersal of activities, high car ownership, and relative affluence. Under these conditions there is little need for increased transit service within the suburbs themselves. But for radial trips between the central areas and the suburbs, the need for public transit is substantially higher. Inadequate transit service outside the central areas impairs job accessibility for the low income transit user who, either by choice or economics and social pressures, lives in central locations, but who may have the opportunity of a better job in the outer areas. For the suburban car owner, who is more affluent, living in one area and working in another is less difficult. Because of his higher income and his ability to afford faster and more expensive forms of travel, he will readily trade access to his job for the less crowded, quieter, and more affluent suburban life. The poor cannot make that choice. [41]

Part of the solution to low levels of transit service in and to the suburbs resides in the suburbs themselves. The reluctance to extend rapid transit facilities into these areas is most often explained by the fact that low residential densities cannot support a system whose predominant function is to carry a large number of people concentrated in the same place and at the same time.[42] Unless the biases

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[38]*Metropolitan Toronto and Region Transportation Study*, Report No. 1, (April, 1966), p. 88, Table 10.

[39]Albert Rose, *Canadian Housing Policy* (Canadian Welfare Council: Ottawa, 1968), pp. 30, 38, and 97-98.

[40]J. R. Meyer and J. F. Kain, "Transportation and Poverty", *The Public Interest* 18 (Winter 1970), p. 76. Emphasis in the original.

[41]For example, see M. A. Stegman, "Accessibility and Residential Location", *Journal of the American Institute of Planners* (January 1969), pp. 26-29.

[42]*MTTP*, p. 7.

favouring the large lot and the single family dwelling are overcome, there appears to be little hope of persuading anyone — planner or politician or administrator — that more extensive public transport can and should be developed. We need, as Blumenfeld suggests, a floor as well as a ceiling on residential densities.[43] Without a greater concentration of activities, improved transit, let alone a vastly expanded system of public transportation, collapse into wishful thinking. To conclude, we are not arguing here that the solution to urban poverty and unemployment can be found in a transportation policy, but we do argue that adequate transportation is not the sole privilege of the car owner.

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[43]On this point see Hans Blumenfeld, *op. cit.*, p. 175.

Conclusions and Recommendations

1. Transportation planners identify the premises upon which they make policy, and that they spell out the probable social and economic consequences of that policy.

2. In transportation planning, the emphasis be shifted from meeting *aggregate* travel needs to the idea of meeting specific transportation needs of, for example, the elderly, the handicapped, and the poor.

3. The relationship between transportation, unemployment, and urban poverty be thoroughly investigated, and that this be given a priority in policy and research.

4. In general, fares and charges should vary according to the level of use, and that operating expenses no longer be the sole criterion for determining transit fares.

5. *Off-peak* use of public transit be free for all fare zones.

6. *Peak-hour* motorists be charged a significant toll for travelling on routes that are badly congested.

7. The revenues from toll charges be used to subsidize operating deficits incurred by the TTC.

8. The administrative costs of collecting tolls be carried by funds earmarked for road construction and maintenance.

9. A demonstration project, designed to develop and test electronic and computer methods for billing road users while avoiding traffic congestion traditionally associated with toll booths, be carried out by Metro and area municipality agencies, and that the project be jointly financed by Metro and the Province.[44]

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[44]For a more complete discussion of various possible computerized methods see: William S. Vickrey, *Op cit.*, pp. 120-133.

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