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Chapter Author: Kent T. Healy

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# *Some Major Aspects of Urban Transport Policy Formation*

KENT T. HEALY

YALE UNIVERSITY

The character of the metropolis and the directions in which it develops have in recent years become an increasing concern of public policy. The transport aspects in particular have become a center of attention at all levels of government. Economists have responded with their usual enterprise to the challenge of a new field of public concern. With the modern emphasis on analytical tools and hypothesis, they have made considerable progress.<sup>1</sup> But this emphasis has taken attention away from an important influence on policy formation, namely, the way policy questions are structured.

This structuring can influence the weight given or type of analysis applied to policy questions at the working level of legislative bodies or administrative branches of government where actual decisions are made. It is important, then, that what appear to be some of the more significant structural aspects in the approaches to urban transport policies be examined and their effects assessed.

## *The Spatial Arrangement of the Metropolitan Area*

Because local leadership for urban study generally comes from top business executives and government officials whose most immediate interests and places of work are likely to be in the central business district, the urban transport problem is likely to be approached as primarily a central business district problem. It is important for transport policy formation, however, that all sections of the metropolis be considered.

The geographical pattern of the typical metropolis involves a central urban core, historically the main location of the work activities of the

<sup>1</sup> See John R. Meyer, "Regional Economics: A Survey," *The American Economic Review*, March 1962, pp. 48-54, for a listing of much of the pertinent literature.

city, and always a principal location. Because of this, as a metropolis increases in size there is a tendency for the average length of trips to increase. A theoretical top limit to the extent of this increase can be shown by assuming that all employment, shopping, and other activities are retained in the center. In purely geometric terms, if the metropolitan area is equally developed in all directions around the center, and residential density is uniform, the "person-trip" length increases as the square root of the increase in population. That is, if population and area quadruple, trip length doubles. Actually, decentralization of economic activity occurs and not all the trips are to the central area so that the rate of increase is always below this rate. Also, since one end of most trips is the residence, the effects of change in residential density are important. Again using the model of the single central core of work activity, the length of trips from home increases with the square root of the increase in land area per dwelling. That is, if the area for a dwelling unit quadruples, the average trip distance to the center doubles. These are not the only geometric features influencing urban transport but they are the ones of greatest significance here.

Consideration of social and economic as well as geographic factors demands a more complicated analysis than that of this simple model. The varying degrees of decentralization and intensity of land use in urban activities make significant generalizations difficult. The over-all parameters are broadly shown by recent metropolitan area transport studies.<sup>2</sup> Much has been learned from these studies about the spatial positioning of the demands for transport. In the first place, for large diversified metropolitan areas, some 75 to 90 per cent of all "person-trips" (which include trips by all vehicular modes of transport) involve leaving or going home. The work place provides the next largest group—some 30 to 40 per cent. The remaining trips are for such purposes as education, shopping, recreation, personal business, and social gatherings.<sup>3</sup>

The importance of the locations of various types of activity as they determine trip spatial patterns is further illustrated by classifying

<sup>2</sup> *Report on the Detroit Metropolitan Area Traffic Study, Part I, Data Summary and Interpretation* (1955), Part II, *Future Traffic and Long-Range Expressway Plan* (1956), Detroit; *Chicago Area Transportation Study, Survey Findings, Vol. I* (1959), Vol. II, *Data Projections* (1960), Chicago; *Pittsburgh Area Transportation Study, Vol. I, Study Findings* (1961), Vol. II, *Forecasts and Plans* (1963), Pittsburgh; *Twin Cities Area Transportation Study, Vol. 1, Study Findings*, St. Paul, 1962. In the footnotes which follow, these sources will be referred to respectively as *DMATS*, *CATS*, *PATS*, and *TCATS*, with the volume or part noted.

<sup>3</sup> Calculated from *PATS*, Vol. I, p. 92; *DMATS*, Part I, p. 81; *CATS*, Vol. I, p. 37.

destination according to basic land uses. Counting all reasons for going to residences makes their land use proportion as a destination just over 50 per cent. The sum of people going to retail and to service facilities to work, eat, shop, etc., accounts for some 25 per cent of destinations. Manufacturing and wholesale uses together account for only 6 to 7 per cent, and schools, about the same proportion. Public buildings, museums and the like, and open spaces such as parks and athletic areas, together account for another 6 to 7 per cent. Transportation facilities for external travel, stations and airports, are the destination for some 2 per cent of trips. These proportions are surprisingly stable for the three major metropolitan areas for which data have most recently been published, Chicago, Pittsburgh, and the Twin Cities.<sup>4</sup>

It is obvious, then, that residential location and land-use characteristics are major determinants of transport requirements. These characteristics are a result of a complex of economic and social factors which are as dynamic as technological change in transport itself. The character of residential facilities which people desire has been affected by the recent increase in the proportion of households with children under eighteen years of age. This proportion remained practically constant from 1930 to 1950, but in the following decade increased from 50 to 60 per cent. In addition, an increasing proportion of families have been receiving higher levels of income.<sup>5</sup> An approximate measure of this is the proportion of families and unattached individuals with incomes before taxes equivalent to over \$5,000 in 1960. In 1939, about 25 per cent of

<sup>4</sup> Calculated from *PATS*, Vol. I, pp. 94-95; *CATS*, Vol. I, p. 112; *DMATS*, Part I, p. 125; and *TCATS*, pp. 92-93. Details for individual study areas are as follows:

Category of Generalized Land Use	Proportion of Person Trip Destinations for Major Categories (per cent)			
	Pittsburgh	Chicago	Detroit	Twin Cities
Residence	52	55	53	52
Retail shopping	15	24	27	18
Personal services	10			
Professional	8	11	12	7
School	6			
Public bldgs. (exc. schools) and public open spaces	6			7
Transport	2	3		2

<sup>5</sup> Calculated from Bureau of Census, *Statistical Abstract of the United States*, 1951, p. 26, and 1962, p. 43.

the country's families and unattached individuals had incomes above this level; in 1950, 43 per cent, and in 1960, 56 per cent.<sup>6</sup>

Another economic factor has been the improvement in the terms of home financing. For new privately owned housing there have been reductions in down payments, extensive government guarantees of mortgage loans, some ceilings on interest rates on such loans, and income tax exemption for that part of income spent on mortgage interest. Offsetting this, the terms of financing and renting large multiunit housing for low-income and, more recently, for middle-income families have also improved. Public construction of multiunit dwellings has been undertaken and, for units of this type, relief from property taxes has been provided. More recently the incentives for private promotion of multiunit housing construction have become substantial.<sup>7</sup>

The preference for private homes or apartments is also affected by psychological factors about which little is known empirically. Many people have a basic desire to have their own house or land. The desire for privacy or individual expression in home ownership also plays a role. In the other direction is the desire to attain anonymity by living in a large apartment or housing development or to avoid the responsibilities of caring for a residence.

On balance, these economic, psychological, and social factors have in recent decades led to a much reduced density of living, a shift from multiunit dwellings to single ones, with an increase in the number and size of rooms. The decennial housing censuses, the first of which was taken in 1940, have indicated that the type of housing units constructed in metropolitan areas has shifted markedly since the 1920's. Of the dwelling units constructed in 1920-29 and inventoried in 1940, some 54 per cent were single-family houses and 21 per cent were structures of five and more units. For those built in 1930-39, the single-family unit proportion had risen to 70 per cent and the five and over remained at 21 per cent. Changed definitions and classifications in the later censuses make comparisons difficult, but 1940-49 building showed further increases in the single-family category—to 72 or 80 per cent depending upon whether the terms of the 1950 or 1960 census are used, and the five and over group dropped to 10 or 11 per cent. Finally, for the 1950-60 period, the proportion of construction in newly defined single-family units rose to 85 per cent and the five and over unit structures dropped from 9.7 to 9.4 per cent. The modal number of rooms per

<sup>6</sup> Calculated from *ibid.*

<sup>7</sup> *Ibid.*, 1962, p. 763.

unit has varied from five to six in the single-family house and has been three in the structures of ten units or more.<sup>8</sup>

These trends have been accompanied by a rapid growth in urban population, considerably more rapid than for the country as a whole. The population of the contiguous United States as a whole grew 7 per cent from 1930 to 1940, 15 per cent from 1940 to 1950, and 18 per cent from 1950 to 1960. The 1960 standard metropolitan statistical areas grew 22 per cent from 1940 to 1950 and 26 per cent from 1950 to 1960.<sup>9</sup>

As a result of desire for reduced residential density by more people and a general increase in population, there has been tremendously rapid growth in population outside the central cities of the metropolitan areas. For the standard metropolitan statistical areas of over 250,000 population in 1960 in the northeast, Great Lakes, southwest, and Pacific coast states (the regions defined in the last section) the growth outside of the central cities increased from 18 per cent in the 1930's to 29 per cent in the 1940's, and to 54 per cent in the 1950's. These rates may be compared with declining central city growth rates of 3, 14, and 6 per cent respectively. For the northeast and Great Lakes regions alone, these latter rates were only 1, 9, and -1 per cent respectively. This summary points up the dramatic decentralization of metropolitan residential locations and the dispersal of the major category of trip-ends which urban transport must serve.

Finally, to translate these factors into the geometry of transport, the point in space of the residence trip-end is determined by the fact that, in general, residence locations tend to spread out from the center of the city. The farther from the center, the fewer the dwelling units per acre, and the higher the proportion of land used for residences. The combined effect is made apparent by viewing the residential areas of a metropolis as a series of equal-width concentric rings around the center. The farther from the center a ring is, the greater the area it includes. The increasing size of the area and its rising proportion devoted to residences with increasing distance from the center make up for the concurrent declining density of residences. Table 1 shows these characteristics for Chicago, Pittsburgh, and Detroit. The rings, extending from three or four to ten miles from the center, each have the same general order of population proportion. Beyond this the

<sup>8</sup> Bureau of Census, *U.S. Census of Housing*, 1940, Vol. 2, Part 22, p. 4, and 1950, Vol. 2, Part 1, pp. 1-18; and calculations from Bureau of Census, *Metropolitan Housing*, 1960, HC (2) No. 1, pp. 1-22.

<sup>9</sup> Bureau of Census: *U.S. Census of Population*, 1950, Vol. 1, pp. 1-69; and calculations from *ibid.*, 1960 *U.S. Summary*, PC (1), 1A, U.S.; and *Statistical Abstract*, 1962, p. 13.

TABLE 1  
 PROPORTION OF METROPOLIS STUDY POPULATION IN  
 EQUAL-WIDTH RINGS AROUND CENTER

Ring-Range (in miles from center)	Percentage of Population		
	Pittsburgh	Chicago	Detroit
0 - 1.9	5	3	
0 - 2.9		7	14
2 - 3.9	27	11	
3 - 5.9		25	26
4 - 5.9	19	18	
6 - 7.9	23	17	
6 - 8.9		26	21
8 - 10.9	20	21	
9 - 11.9		17	21

Source: Calculated from *PATS*, V. 2, pp. 11 and 60; *CATS*, V. II, p. 114; *DMATS*, Pt. I, p. 30.

effect of declining density seems to outweigh the added area. But residential density varies substantially, and the size of the city itself is a factor, so that the share of population living within a given distance of the center can vary considerably. About 50 per cent of the 1.5 million population of the Pittsburgh study area live within six miles of the center, while only about 30 per cent do in Detroit (with 3 million), and 32 per cent in Chicago (with 5.17 million).

At the other, nonresidential, end of the urban trip path are the activities which, in the past, were mainly oriented toward the center. A wide range of factors have tended to reorient many of these activities.<sup>10</sup> It is clear that changes in transport technology have been only one influencing factor though their impact is felt in several ways. Of great importance has been the growing recognition of the advantage of single-story buildings for manufacturing and distribution facilities, and the consequent requirement of larger plots of land not generally obtainable in an already built-up area. Ancillary to this are the high land values in central districts (or even some not so central) which provide an added incentive for activities requiring single-story buildings to move away from central urban areas. The flexibility in space of modern highway transport has been a facilitating factor.

<sup>10</sup> An analysis of these factors is presented in Raymond Vernon's *The Changing Economic Function of the Central City*. Some of the more important aspects are briefly reviewed here.

Further, the very extension of residential sites away from the center has moved the labor pool, the retail purchasing power, and the need for services out from the center. The facilities for meeting the two latter demands have themselves moved out. All these decentralizing factors have been facilitated by the ability of highway transport to provide economically for the less dense traffic flows of decentralized activities. Along with this, developments over the years in the distribution of power, water, and services required by industry have made most of them essentially ubiquitous throughout a metropolitan area.

The trend, then, is for person trip-ends away from the residence to be less predominately into urban centers. For instance, it is estimated that in 1956 only 4.6 per cent of all person-trips from the over-all Chicago area were destined to the "Loop." In 1958, the proportion was 6 per cent to the "Golden Triangle" in Pittsburgh and 8 per cent to the combined central business districts of Minneapolis and St. Paul. But the smallness of the area of these central districts does cause a very high concentration of trip-ends per square mile, twenty, or even more, times that for average residentially developed land.<sup>11</sup>

For the larger metropolitan areas, the dispersal also results in trip lengths shorter than might be expected from the spacing between the central business district and the distant residential areas. Half of the person-trips within the transport study area were estimated to be under 3 miles for Detroit; the average estimated actual length of person trips was 3 miles for Pittsburgh, 4.4 for Detroit and just over 5 for Chicago. Of the different categories of trips, that to the place of business was the longest, roughly half again as long as the average shopping trip. The latter, however, was made up of shorter trips to local shopping centers and trips twice as long to the central business district.<sup>12</sup>

Another important result of the dispersal of activity appears in the relatively small proportion of trips going to, from, and passing through the central district as compared to that for areas just outside it. For metropolitan Detroit, out of 5.2 million estimated weekday internal person-trips (by auto, taxi, and transit), 4.5 per cent were destined to the one square mile central business district; that is, roughly 9 per cent of the total trips originated or terminated there. Trips between areas outside of that district, which might pass through it if made in a straight line between origin and destination, were less than 1 per cent of all trips.

<sup>11</sup> Calculated from *CATS*, Vol. I, p. 115; *PATS*, Vol. I, p. 97; *TCATS*, Vol. I, p. 56.

<sup>12</sup> Calculated from *DMATS*, Part I, pp. 91 and 125; *PATS*, Vol. I, pp. 17 and 93; and *CATS*, Vol. I, pp. 81 and 117.



In contrast, 10 per cent of the total Detroit area trips were entirely within a ring encompassing the area three to six miles from the center. Another 10 per cent were between that ring and rings farther out; and 15 per cent were between the three- to six-mile ring and inner rings. Finally, about 10 per cent passed through the three- to six-mile ring. The total trips involving that ring were some 45 per cent of all internal trips, compared with some 10 per cent involving the central business district. However, the 45 per cent of trips were in an area of over twelve square miles, whereas the 10 per cent were in an area a little over one square mile. In the central business district, there were 2.5 times as many trips per square mile as there were in the three- to six-mile ring. Again, the high intensity of transport use of the innermost land and its small relative share of total metropolitan area transport stands out.<sup>13</sup>

Thus, the geometric picture portrays a demand for transport spread widely over large modern metropolitan areas. It also shows a very intense demand upon land space for transportation in the inner part of the metropolis, arising from a small share of total transport demand. Relatively small fractions of both trip ends and trip paths involve the central district. The underlying factors influencing the use of metropolitan land point in the direction of further dispersal and declining relative importance of the center. These are fundamental considerations for policy formation that should not be overlooked.

### *Patterns of Transport Organization*

In terms of structuring the approach to policy questions, the most important institutional aspects of the urban transport picture lie in the variety of organizations for supplying transport services and the consequent variety of ways in which they are paid for. The first is public transport, where an organization, whether private corporation, quasi-public authority, or governmental department, operates vehicles and sometimes track and terminal facilities. The users pay trip by trip or, sometimes, for certain packages of trips, such as monthly commuter tickets. The sum of fare payments provides the organization's revenue. In the case of privately owned public transport—primarily bus operations—this revenue must at least meet total vehicle and general costs and may be expected to contribute for the use of streets and to general tax revenue. With government or quasi-public authorities providing public transport, revenue may be expected to meet only operating

<sup>13</sup> Calculated from *DMATS*, Part I, pp. 144 ff. and Table 45.

expenses, with capital cost being met by local government sources (New York Transit Authority), or revenue may be expected to meet total costs exclusive of taxes, as under some cost-of-service plans (Chicago Transit Authority).

For private transport, which involves private persons or businesses operating automobiles or trucks, on highways run by government agencies, the pattern is entirely different and is always in two parts. The costs of running the vehicles are met directly by the operators. The costs pertaining to streets and highways, provided of physical necessity by government, are, with relatively few exceptions, not met out of fares or tolls paid for trip by trip, but are provided for by user charges (such as gas taxes) or out of general government funds. Because of the established pattern for collection of user charges, almost the entire amount is collected by federal and state, rather than metropolitan governments. Thus the amount and allocation of these receipts are a matter of legislation and administrative decision removed from the metropolitan level. The dominance of rural and small town political influence at the federal and state levels has, over the years, resulted in relatively small shares of these receipts being made available for urban streets and highways, though in recent years the share has increased substantially. In general, there has been no allocation of the receipts in proportions related to the extent of metropolitan vehicular use, even though most of the imposts are related in some manner to use.

The local government departments responsible for supplying highway service thus have no direct financial incentive to increase or improve facilities. The only exception has been where a separate authority has been able to apply a toll in connection with a bridge or tunnel.

Put in another way, the user of urban transport has no direct or positive way to make his needs or his quality preferences for highway services felt. He cannot say that he would pay four mills a vehicle-mile for provision of a certain measure of highway service on a particular route, the sum of the four-mill charges to go to the city department for the costs of supplying the service.

Granting the necessity, in most cases, for highway services to rely on state and federal user taxes of various types, it follows that a most important problem for urban highway transport is how to structure the approach to user-charge allocation policies. Can user charges be channeled so as to meet the costs? It was estimated, in the course of the Chicago Area Transportation Study, that 80 per cent of the motor-vehicle miles run in Illinois were within the study area. To this must be added the fact that the gasoline consumption in much of that area

was at higher rates per vehicle-mile than in the rural part of the state. The net collections in Illinois of the state and federal user charges in 1960 (the latest year for which data are available) were close to one-half a billion dollars. Eighty per cent of this would make some \$400 million annually available to the Chicago metropolitan area, more than enough, with other already used sources, to meet the needs projected in the study.<sup>14</sup>

The varied financial characteristics and organization structures also tend to color the general approaches to policy. The public transport institutions, rail transit and bus operators, stand on one side. Strong organizational loyalties, the vested interest of employees and unions challenged by declining demand, and inevitable opposition to competitively successful private transport, create a tendency to frame policy questions principally in terms of unfairness of competition, and demands for a place in the sun. On the other hand, the urban highway system inherits pre-motor-vehicle street patterns, which are hard to change. There is a lack of market-place pricing of services provided by street and highway departments, and a lack of directly associated revenue with which to build and operate the urban system as well as an extremely rapid increase in demand for its services. All of these factors have left the responsible organizations unable or belatedly able to cope satisfactorily with their problems. The normal municipal capital programming and budgeting processes have often not risen to meet the urban highway needs. More recently new approaches have come, with federal promotion of metropolitan area transport studies since World War II. But even with forward strides in cost-benefit, demand, and other analyses, policy formation is still subject to substantial elements of political pressure based on many varieties of parochial and vested interests. Consequently, policy questions are structured in ways which overemphasize those interests.

Out of all this the tendency is for important aspects of urban transport policy to become formulated in terms of conflict between for-hire public transport and private transport on public highways. This is fraught with hazards. For one thing it can develop a restrictive influence on the growth of new forms of transport, which, in turn, restricts the growth of gross national product of which transport is a significant component. Currently, for instance, transport expenditure accounts for some 12 to 13 per cent of personal consumption expenditure.<sup>15</sup> It may well be that higher proportions which meet consumer preferences

<sup>14</sup> Calculated from *CATS*, Vol. I, p. 82; and Bureau of Public Roads, *Highway Statistics—1960*, 1962, pp. 85, 86, and 101.

<sup>15</sup> *Statistical Abstract*, 1962, p. 315.

will provide an even higher national product. The question is whether patterns of government finance should not be such as to allocate all or the major share of user-charge receipts to the type of transport which generates them, binding annual costs to anticipated annual receipts. Subsidiary questions involve equalization between transport types of the incidence of taxation, both in its direct burden on an organization and in relation to rates of interest on borrowed capital.

The final question then is, do the answers to the above questions provide an environment in which urban transport growth and new developments will be forthcoming at a rate and in ways consistent with the country's desire for over-all progress and increases in national product? In addition, does the environment foster effective allocation of resources and services in line with consumer preferences?

### *The Passenger-Mile as the Measure of Transport Service*

Much of the economic analysis relating to the supply of urban transport has been oriented around the passenger-mile as the measure of service. This has led the analyses to ignore the relative merits of different urban transport services. Consideration of speed has represented the only quantitative evaluation of varying qualities of transport services. The difficulties of giving weight to qualities of service are not unique to transport but pose serious problems for economic analysis of all kinds of services; so often quality is as important (or even more important) in valuing output as the production of a unit of output itself.

Quality of transport service varies sufficiently to be vitally significant, both in considering transport as an element in the urban scene and in weighing transport alternatives. For example, a passenger-mile of service in the form of standing in a subway car has quite different qualities from driving in a comfortable seat in one's own car. At peak hours, the tight crowding of standees in the subway car must be compared with the bumper-to-bumper traffic in driving. The valuation of these qualities is always a subjective matter, not something that can be measured readily against a common scale. An analytical attack on the quality problem has been started,<sup>16</sup> but at the policy formation level, a passenger-mile tends still to be used as a basis for comparing alternatives in cost terms. The possibility that a higher valuation of qualities may justify a higher cost per passenger-mile does not receive adequate consideration.

<sup>16</sup> J. M. Meyer in *American Economic Review*, March 1962, references 95, 101, and 120.

The use of the passenger-mile tends to focus consideration of urban transport upon basic vehicle services which, from the consumer's view, are only part of the over-all trip in the urban area. With public transportation, there must be a walk from home to bus stop, a wait for arrival of a vehicle, and a walk from the destination stop to the place of work. For highway transport, the trip involves going to one's own vehicle, driving it, parking it at the other end, and walking to the place of work. The trip-maker's valuation involves the appraisal of all the elements which combine to make up his trip, not just the vehicular part. What to him may be a high-cost vehicular element may be offset by gains with respect to the other elements, such as saving in time, less discomfort, less anxiety. The difficulties of analysis in these more complicated terms are great, but failure to consider them is likely to lead to erroneous policy conclusions.

### *Alternative Locations of Future Population Growth*<sup>17</sup>

The greatly increasing magnitude of urban problems, transport and others, as metropolitan area populations become larger surely raises the question of whether the population increases of future decades must inevitably converge on existing metropolises and densely populated regions. Most study effort has been devoted to the problems of existing metropolises, with the tacit assumption that their continued growth is inevitable and perhaps desirable. This is another illustration of the structuring of the approach to questions, in this case, taking attention away from the alternative of attracting population to small cities and sparsely settled areas as a solution to the problem.

Experience in the United States over the past forty years suggests rather limited possibilities of channeling population growth away from existing large cities. However, there have been significant variations in growth rates for different metropolises in the United States, with indications that under certain conditions small cities and less populated areas have absorbed large amounts of population. The variations can be most effectively analyzed by comparing growth in the four principal regions of the country, the Northeast, the Upper Mississippi-Great Lakes area, the Southwest, and the Pacific Coast. The configuration of regions as chosen is different from the usual Census groupings in order

<sup>17</sup> Calculated from Bureau of Census, *Abstract of the Fourteenth Census of the United States, 1920*, and *Abstract of the Fifteenth Census of the United States, 1930*; and *U.S. Census of Population, 1950*, Vol. I, and *1960 U.S. Summary*, PC (1), 1A, U.S.

to obtain a more homogeneous distribution within each region. The Northeast as defined here comprises Massachusetts and Virginia and the states lying between them, excluding the western tiers—two deep—of counties in New York and Pennsylvania. The Upper Mississippi-Great Lakes area includes the states east of the Mississippi and above its junction with the Ohio River, and those North of the Ohio to the northeast region, together with the tier of counties just South of the Ohio in Kentucky and West Virginia, and the metropolitan areas of St. Louis and Minneapolis. The Southwest includes five states: Kansas, Oklahoma, Arkansas, Louisiana, and Texas, as well as metropolitan Kansas City. The Pacific region comprises simply the three Pacific states. In 1920 these four regions accounted for 70.5 per cent of the population of the continental United States; in 1960, 73.5 per cent. In 1960, the two eastern regions each had a population of some forty-six million and the two western ones, each a population of twenty million.

The first approach in this analysis is the review of shares of growth for different ranges of metropolitan size. Size is measured in terms of 1960 populations of standard metropolitan statistical areas or consolidated areas, these areas being referred to as metropolises in this section. The earlier decennial population figures are for the areas encompassed by the 1960 metropolises. In 1960 there were twenty-one metropolises in the four regions with a population of over one million. It may be noted that these same metropolises accounted for all but one of the eighteen which were over 500,000 in 1920.

The percentage of each region's growth for forty years accounted for by the metropolises of over one million in 1960 is shown in the following table.

<i>Region</i>	<i>Number in Group</i>	<i>Percentage of Region Population Growth in Metropolises of Over One Million (1960)</i>		
		1920-40	1940-50	1950-60
Northeast	5	68	61	57
Upper Miss.-G. Lakes	8	67	54	54
Southwest	4	27	46	42
Pacific	4	58	53	59

In the two eastern regions, the growth proportion accounted for by these metropolises has declined significantly over the last four decades. In the Southwest it has increased, but is still below the eastern levels. The proportion in the Pacific area has not changed significantly, and is currently of the same order as that of the eastern regions. While some

two-thirds of population growth from 1920 to 1940 in the two eastern regions was in metropolises of over one million, in the most recent decade, 1950-60, this has dropped to something over one-half.

In each of three regions, the Northeast, the Upper Mississippi-Great Lakes, and the Pacific, there has been one metropolis among those of over one million population substantially greater in size than any of the rest. The variations in proportions of region growth accounted for by these metropolises is significant, as the following table indicates.

<i>Region (Metropolis)</i>	<i>Percentage of Region Population Growth in Metropolises of Over Six Million (1960)</i>		
	1920-40	1940-50	1950-60
Northeast (N.Y.-Northeast N.J.)	36	28	29
Upper Miss.-G. Lakes (Chicago- N.W. Ind.)	23	15	17
Pacific (Los Angeles-Long Beach)	46	31	41

Over the decades considered, there has been some decline in the share of growth in these super metropolises. In the more mature, slower growing, eastern regions, there appear to be more active factors operating to slow down the growth of the one largest metropolis than in the Pacific region.

The share of growth among medium-size metropolises is indicated in the following table.

<i>Region</i>	<i>Number in Group</i>	<i>Percentage of Region Population Growth in Metropolises of One-Half to One Million</i>		
		1920-40	1940-50	1950-60
Northeast	6	6	11	9
Upper Miss.-G. Lakes	6	9	13	12
Southwest	3	12	24	17
Pacific	4	10	13	18

In contrast to the largest-size metropolises, this middle group shows a generally increased share of growth in the two more recent decades as compared with the first two decades. In all periods, the share of this middle group is greater in the West than in the East.

Finally, the share of growth in a group of relatively small-size metropolises is shown in the following table.

Region	Number in Group	Percentage of Region Population Growth in Metropolises of 250,000-499,000		
		1920-40	1940-50	1950-60
Northeast	14	8	8	9
Upper Miss.-G. Lakes	10	9	8	7
Southwest	5	11	17	17
Pacific	5	6	9	5

Only in the Southwest has the share of these metropolises increased significantly.

Another way to view the matter is to compare rates of growth for metropolises of different sizes based on the size at the beginning of each two-decade period from 1920 to 1960. The data for this second approach is shown in Table 2. The growth rate of metropolises of over one million initial population declined slightly over the forty-year period in the Northeast and increased slightly in the upper Mississippi-Great Lakes region. The over-all growth rate in the latter region was substantially higher than in the former. With one exception, growth rates of the cities in the smaller-size groups increased markedly in both regions, and for the Upper Mississippi region in the 1940-60 period they became substantially higher than for the cities of over one million.

In the Southwest in the 1920-40 period, the cities of 100,000-249,000 population showed double the rate of growth that larger cities did, but in subsequent periods the growth rates for all size groups were substantially the same. In the Pacific region, the metropolises of over one million has a markedly higher growth rate than the smaller ones for 1920-40; but, by the 1940-60 period, the smaller metropolises had attained higher growth rates.

Over-all, the average growth rates of metropolises of over one million were at their peak in the 1920-40 period, and generally exceeded those of any smaller-size class. Since then, the average growth rates for the above one million class have tended to fall below those of smaller metropolises in two of the three regions having the largest metropolises. In three of the four regions there has been relatively faster growth in smaller metropolises. Yet, as was indicated earlier, the great accumulation of the past in the largest metropolises makes their share of total growth still above half of the over-all growth, except in the Southwest.

A review of the individual states in these four regions and of individual cities for the most recent decade gives further insights into the distribution of growth. In particular, the State of Ohio provides a case where the growth of metropolises of over one million has even in



absolute terms failed to equal that of the smaller metropolises in the state. From 1950 to 1960, Cleveland and Cincinnati together increased by 499,000, or 21 per cent. The group of four metropolises in Ohio with populations in 1960 of from 500,000 to one million grew in all by 552,000, or 30 per cent. The smallest-size group considered in this section—100,000 to 250,000—also grew by 30 per cent. In total, those metropolises from 100,000 to one million accounted for 47 per cent of the state's growth, while those above one million accounted for only

TABLE 2  
GROWTH RATES OF METROPOLISES FOR TWENTY-YEAR PERIODS,  
BY REGIONS  
(per cent)

Metropolis Size (millions) <sup>a</sup>	1920-40	1940-60
NORTHEAST		
Over 1	31	29
.5 - 1 <sup>b</sup>	23	20
.25 - .5	14	26
Largest over 1 <sup>c</sup>	37	27
Total region	24	30
UPPER MISS.-GREAT LAKES		
Over 1	36	39
.5 - 1	32	43
.25 - .5	31	53
.1 - .25	11	45
Largest over 1 <sup>c</sup>	43	39
Total region	24	34
SOUTHWEST		
.5 - 1	30	84
.25 - .5	35	85
.1 - .25	76	87
Total region	24	29
PACIFIC		
Over 1	118	117 <sup>d</sup>
.5 - 1	--	76 <sup>d</sup>
.25 - .5	32 <sup>d</sup>	232
.1 - .25	68	144
Largest over 1 <sup>c</sup>	191	131
Total region	75	109

<sup>a</sup> Size as of beginning of period.

<sup>b</sup> Excluding Washington, D.C.

<sup>c</sup> For Northeast, largest is New York—N.E. New Jersey;  
for Upper Miss.—Great Lakes, largest is Chicago—N.W. Indiana;  
for Pacific, largest is L.A.—Long Beach.

<sup>d</sup> Too few in group to make rate significant.

28 per cent. This was in substantial contrast to the Upper Mississippi-Great Lakes region, where the respective figures were 32 and 54 per cent.

Wisconsin provides a similar contrast with a quite different pattern of population distribution. In the 1960 census there was one metropolis of over one million and all the rest were under 250,000. For the cities and metropolises of from 100,000 to 250,000—seven in all—the growth from 1950 to 1960 was 242,000, or 33 per cent, compared with Milwaukee's 165,000, or 19 per cent. Adjacent Chicago's corresponding growth rate was 21 per cent. Of the total Wisconsin growth in the period, the seven smaller places accounted for 47 per cent and the sole big one, only 32 per cent, similar to the Ohio distribution.

In that part of the Northeast region made up of the three southern New England states, growth rates from 1950 to 1960 in the medium size metropolises were just over twice that of Boston. The two with population between 500,000 and one million accounted for substantially the same absolute increase as Boston, and so did the four metropolises of 250,000-499,000.

These figures indicate that smaller metropolises under certain circumstances can provide for or attract population growth in competition with the very large ones. It would be desirable to investigate the factors accounting for this.

Some insight into these factors can be obtained by noting the common characteristics of those small cities of 1920 which have become large metropolises in recent decades. Table 3 lists the metropolises in the United States of over 250,000 in 1960 which had more than doubled in population in the twenty years from 1940 and which did not have over 200,000 population in 1920 (all data is for the population within the area encompassed by the 1960 standard metropolitan statistical areas).

These eighteen places are, with few exceptions, either centers of air- or space-craft development, or in retirement and resort areas. Many also reflect general regional growth based on development of petroleum or agricultural resources, or both. They are all in the warmer climate belt of the United States. Two, Tucson and Albuquerque, are the seats of a principal state university. Mobile is the only one primarily dependent on general commercial and industrial development.

This indication that smaller population centers can expand substantially suggests the possibility of both private and public policy to stimulate this growth. Are there perhaps other small cities which in the future can become the larger metropolises? Can these take care of a major share of the expanding future population and relieve the existing larger cities of their already heavy burdens? This depends on

TABLE 3

U.S. METROPOLISES OF LESS THAN 200,000 IN 1920  
WHICH MORE THAN DOUBLED IN POPULATION  
BETWEEN 1940 AND 1960

Metropolises, by 1960 Population Categories	Population of 1960 Metropolitan Areas (in thousands)		
	1920	1940	1960
Over one million			
Houston	187	529	1,243
San Diego	112	289	1,033
500,000-one million			
Miami	43	268	935
San Bernardino	123	267	810
Tampa	116	272	772
Phoenix	90	186	664
San Jose	101	175	642
Ft. Worth	190	256	573
250,000-500,000			
Jacksonville	114	210	455
Fresno	129	179	366
Wichita	92	143	343
Ft. Lauderdale	5	40	334
Orlando	31	92	319
Mobile	121	142	314
El Paso	102	131	314
Bakersfield	55	135	292
Tucson	35	73	266
Albuquerque	30	69	262

the answers to some basic questions. First, have the desirable locations for economic activity already been pre-empted by the existing large metropolises? For instance, have all desirable coastal port locations already been occupied? Have existing large centers pre-empted water resources, which are so essential for much of industry? The answer to this sort of question may partially lie in such technological advances and engineering capabilities as have made possible port activity without nature-provided channels and basins, and cities without fresh water supply in the immediate vicinity. In general, technological advances in the fields of transportation, energy production and distribution, and climate control, along with discovery of new mineral resource locations, have tended to make many formerly localized factors more widely available. Further, there have been important changes in the character of production: de-emphasis on the basic extractive and primary stages of manufacture and an increase in the role of service industries and the secondary stages of manufacture. These changes, too, have lessened the constraint of some of the influences that have in the past led to the location of economic activity in what are now the larger metropolises.

But, is the attractiveness of the existing larger metropolises—their labor and sales markets—so great as to outweigh the other factors? Another query relates to the strength of vested interests of large metropolises in maintaining their position and even expanding it. The power of these interests is great. It has been particularly strong in the economic field, but now appears to be developing in the political sphere. Is the formulation of future public policy likely to be in terms of promoting growth in new locations where there are few voters, as opposed to supporting the metropolises to which an increasing proportion of legislators will owe their office?

## COMMENT

GEORGE WILSON, Indiana University

If the denial of certainty is the beginning of wisdom, transport economists must be on the verge of major breakthroughs of knowledge. Most of the papers in the conference make reference to how little we know for sure in transportation, and all appeal for more research, which I interpret as partly symptomatic of guilt feelings for not having carried their own analyses further.

But the paper by Healy goes even further than merely pointing out how many empty economic boxes exist at present. Indeed, he is highly doubtful that, even if we had perfect knowledge and could explain correctly all the evil consequences of existing policy, nothing much of significance would or could be done about it. The answer to needed changes in public policy must therefore go beyond filling up empty economic boxes. We need somehow to chop down or at least hack away at the barriers of political bias and vested interest. And there is much truth in this contention, as anyone who has argued the impeccably logical case for user charges with representatives of the barge industry can sadly testify. If logic is a powerful force (self) love is not only a many splendored thing but equally potent.

Healy is really asking why there is so much emphasis on the central business district of the large metropolitan areas and, a related question, why there is a tendency to stress mass transit. He finds answers in two areas: political bias and lack of knowledge. The combination of these two leads to policies which, from an economic point of view, appear to border on stupidity.

For example, Healy argues that “a surprisingly small proportion of person-trips are destined for the so-called central business district” and

that, from an over-all urban transportation point of view, the central business district is not very important. Furthermore, he suggests that the trend will reduce the transportation significance of the central business district even further. Aside from the dubious relevance and validity of the data cited, it is clear that Healy not only dislikes the central business district but also the present large metropolitan centers. He somewhat wistfully hopes that future population growth will not go to these areas and thus is led to examine evidence showing that medium-sized metropolises in some segments of the country have grown relatively rapidly in recent decades.

I interpret this demonstration and the rhetorical questions which suggest that all the best sites for cities have not been monopolized by existing centers as implying that it is *possible* to arrest big city growth. That it is a "good thing" to do this is an implicit value judgment. In fact, it may not be unfair to characterize Healy as a mid-twentieth century Oliver Goldsmith for whom "Sweet Auburn" has become a middle-sized city located somewhere in the South-Central United States. But, alas, nostalgia and mere possibilities are not enough. Healy knows full well that public policy is unlikely to "promote growth in new locations where there are few voters, as opposed to supporting the metropolises to which the numerous legislators owe their office." In short, Healy's value judgments suggest that most of the large metropolitan areas are beyond "optimal city size" (whatever that is!), and instead of trying to save them we should let them stagnate and funnel people into "new towns." He sees the attempt to improve movement to and from the central business district via mass transit as deliberately biased since those doing the analysis have vested interests in the central business district. Indeed, the entire approach to "The City" is apparently cleverly disguised to mask its true colors.

What I find disturbing in the Healy paper is the aura of pessimism. Here is a competent analyst and observer of the transportation scene whose contributions to the field have been numerous over the years. He now informs us that we are doomed to a policy of muddle through, that unless we are lucky enough to have a good rip-roaring crisis in transport nothing will be done. In short, "rational public policy" is virtually a contradiction in terms. Thus the economics of transportation, as far as public policy is concerned, is but the pallid handmaiden of the politics of transportation. I suspect in the final analysis this is right.

I will not quarrel with Healy's value judgments. Let him who is without bias cast the first stone! But it is obvious that on any

cost-benefit approach toward cities themselves or urban transit, one's valuations can easily determine the answer, to say nothing of influencing the "correct" rate of discount and the pricing of externalities. I doubt whether the implicit notion of optimal city size has any real meaning. I further doubt that improvements even to mass transit to and from the central business district can objectively be viewed as economic waste even if politically motivated. In short, I sympathize with Healy's viewpoint and some of his recommendations but do not think he has made a very persuasive case (except for illustrating the importance of bias), nor has he adequately demonstrated the relative insignificance of the central business district from a transportation point of view.

THOR HULTGREN, National Bureau of Economic Research

Transportation policy is a coat of many colors. In the course of time, interest has shifted from some aspects of policy toward others. Fair return on fair value has become a dormant problem in the transport area. Reinvestment of earnings and financial reorganization long ago drained the water out of railway capitalization; return on value is a smaller portion of cost for the newer kinds of transport, with their comparatively low private investment per dollar of revenue. Complaints of personal and geographical discrimination are no longer common. Two major influences have changed the emphasis. One is the growth of competition among the means of transport; the other is the growth of government and the burden to general taxation. The construction and maintenance of the newer transport facilities—highways, waterways, airports, and air navigation aids—are largely financed in the first instance by government. Should users of these facilities be required to pay for them? Should they pay enough to cover full interest at some imputed rate, actual interest on borrowed money, or only maintenance and depreciation? Should past expenditures be regarded as "sunk" costs? How should the cost of roads be divided between adjacent property owners and vehicle operators? How between small vehicles and big trucks and combinations? How should the cost of air facilities be apportioned among airlines, other private users, and the military? Taxation for nontransport governmental purposes is still largely in the form of property tax. Is it good economics to tax railroads for general purposes on their roadway while other carriers own no roadway to be taxed? Other urgent questions include pricing policy. Does it make for an efficient allocation of traffic among the various modes of transport? Low earnings of railroads and, at least recently and temporarily, of airlines have imparted new life to the merger question.

No meeting of reasonable length could deal with all aspects of policy. The paper before us deals with the important problem of metropolitan passenger transport. To what extent should this kind of transport be provided by private automobiles, and to what extent by collective riding? Should collective facilities be subsidized to reduce the cost of maintaining and policing highways? Should peak-time use be discouraged by some kind of pricing device? Where are freeways most appropriate, and where rails? Kent Healy points out that the answers to such questions depend on the social and economic background. They may differ from locality to locality. Healy draws material from the growing literature composed of detailed studies of transport conditions in specific metropolitan areas. He finds that individual home ownership and larger lots are reducing the density of population in the outer zone of the areas. Shopping centers and one-story factories are reducing the importance of travel to and from downtown. He thinks that the system of public finance results in a geographically inefficient pattern of transport expenditures. He reminds us that a rapid transit ride is often only a part of the whole origin-to-destination trip, and that quality of service as well as the number of passenger-miles is important. He wonders whether growth must occur where population is already large—a pointed question nowadays in mid-Manhattan. On the other hand, he omits two factors that have changed the pattern of metropolitan travel: the spread of the five-day week, and the growth of home entertainment in the form of television.

Perhaps for lack of time, Healy does not tie the factors that he mentions to specific transport proposals; the reader is left to find for himself the direction in which those factors point. The decline in peripheral population density tends to raise the amount of supplementary travel needed to use transit; the discussion seems to me to point toward less reliance on the latter. Healy notes that the number of trips originating or terminating in the central business district is surprisingly small—partly because of supermarkets, etc. Other studies show that a large part of other travel goes *through* the district. The argument here seems to point toward more belt and peripheral, rather than radial, facilities.