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MACROECONOMICS OF UNBALANCED GROWTH: THE ANATOMY OF URBAN CRISIS*

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There are some economic forces so powerful that they constantly break through all barriers erected for their suppression. Such, for example, are the forces of supply and demand which have resisted alike medieval efforts to abolish usury and contemporary attempts to control prices. In this paper I discuss what I believe to be another such mechanism which has colored the past and seems likely to stamp its character on the future. It helps us to understand the prospective roles of a wide variety of economic services: municipal government, education, the performing arts, restaurants, and leisure time activity. I will argue that inherent in the technological structure of each of these activities are forces working almost unavoidably for progressive and cumulative increases in the real costs incurred in supplying them. As a consequence, efforts to offset these cost increases, while they may succeed temporarily, in the long run are merely palliatives which can have no significant effect on the underlying trends.

The justification of a macroeconomic model should reside primarily in its ability to provide insights into the workings of observed phenomena. Its aggregation of diverse variables usually deny it the elegance and the rigor that are provided by microeconomic analysis at its best. Yet macro models have succeeded in explaining the structure of practical problems and in offering guidance for policy to a degree that has so far eluded the more painstaking modes of economic analysis. This article hopes to follow in the tradition—the structure of its basic model is rudimentary. Yet it can perhaps shed some light on a variety of economic problems of our generation.

1. Premises

Our model will proceed on several assumptions, only one of which is really essential. This basic premise asserts that economic activities can, not entirely arbitrarily, be grouped into two types: technologically progressive activities in which innovations, capital accumulation, and economies of large scale all make for a cumulative rise in output per

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man hour and activities which, by their very nature, permit only spo-
radic increases in productivity.

Of course, one would expect that productivity would not grow at a
uniform rate throughout the economy so it is hardly surprising that,
given any arbitrarily chosen dividing line, one can fit all goods and ser-
vices into one or the other of two such categories in whatever way the
dividing line is drawn. I am, however, making a much stronger asser-
tion: that the place of any particular activity in this classification is not
primarily a fortuitous matter determined by the particulars of its his-
tory, but rather that it is a manifestation of the activity's technological
structure, which determines quite definitely whether the productivity
of its labor inputs will grow slowly or rapidly.

The basic source of differentiation resides in the role played by labor
in the activity. In some cases labor is primarily an instrument—an in-
cidental requisite for the attainment of the final product, while in other
fields of endeavor, for all practical purposes the labor is itself the end
product. Manufacturing encompasses the most obvious examples of the
former type of activity. When someone purchases an air conditioner he
neither knows nor cares how much labor went into it. He is not con-
cerned one way or the other with an innovation that reduces the man-
power requirements for the production of his purchase by 10 per cent if
the price and the quality of the product are unaffected. Thus it has been
possible, as it were, behind the scenes, to effect successive and cumula-
tive decreases in the labor input coefficient for most manufactured
goods, often along with some degree of improvement in the quality of
the product.

On the other hand there are a number of services in which the labor is
an end in itself, in which quality is judged directly in terms of amount of
labor. Teaching is a clear-cut example, where class size (number of
teaching hours expended per student) is often taken as a critical index
of quality. Here, despite the invention of teaching machines and the use
of closed circuit television and a variety of other innovations, there still
seem to be fairly firm limits to class size. We are deeply concerned when
elementary school classes grow to 50 pupils and are disquieted by the
idea of college lectures attended by 2000 underclassmen. Without a com-
plete revolution in our approach to teaching there is no prospect that we
can ever go beyond these levels (or even up to them) with any degree of
equanimity. An even more extreme example is one I have offered in
another context: live performance. A half hour horn quintet calls for the
expenditure of $2\frac{1}{2}$ man hours in its performance, and any attempt to
increase productivity here is likely to be viewed with concern by critics
and audience alike.

The difference between the two types of activity in the flexibility of
their productivity levels should not be exaggerated. It is a matter of

degree rather than an absolute dichotomy. The jet airplane has increased the productivity per man hour of a faculty member who is going from New York to California to give a lecture. Certainly the mass media have created what may be considered a new set of products that are close substitutes for live performance and by which productivity was increased spectacularly. In addition, there are, as the reader will recognize, all sorts of intermediate activities which fall between the two more extreme varieties. Yet, the distinction between the relatively constant productivity industries and those in which productivity can and does rise is a very real one, and one which, we shall see, is of considerable practical importance.

In addition to the separability of activities into our two basic categories I shall utilize three other assumptions, two of them primarily for ease of exposition. The reader will recognize, as we proceed, that neither is essential to the argument. The first of the incidental premises consists simply in the assertion that all outlays other than labor costs can be ignored. This assertion is patently unrealistic but it simplifies greatly our mathematical model. A second, far more important, and more realistic assumption is that wages in the two sectors of the economy go up and down together. In the long run there is some degree of mobility in all labor markets and consequently, while wages in one activity can lag behind those in another, unless the former is in process of disappearing altogether we cannot expect the disparity to continue indefinitely. For simplicity I will in the next section take hourly wages to be precisely the same in both sectors, but the model is easily complicated to allow for some diversity in wage levels and their movements.

A final inessential assumption which is, however, not altogether unrealistic, asserts that money wages will rise as rapidly as output per man hour in the sector where productivity is increasing. Since organized labor is not slow to learn of increases in its productivity it is likely to adjust its wage demands accordingly. This assumption affects only the magnitude of the absolute price level in our model, and does not influence the relative costs and prices that are the critical elements in the analysis.

2. A Model of Unbalanced Expansion

Assume that the economy is divided into two sectors, sector one, in which the productivity of labor is constant, while in sector two output per man hour grows cumulatively at a constant compounded rate, r. Thus we have for the respective values of outputs Y_{1t} and Y_{2t} in the two sectors at time t:

(1) $$Y_{1t} = aL_{1t}$$

(2) $$Y_{2t} = bL_{2t}e^{rt}$$

where L_{1t} and L_{2t} are the quantities of labor employed in the two sectors and a and b are constants.

We suppose wages are equal in the two sectors and are fixed at W_t dollars per unit of labor, where W_t itself grows in accord with the productivity of sector 2, our "progressive" sector, so that

(3) $\qquad\qquad W_t = We^{rt}.$ $\qquad$ (W = some constant)

We may now derive several properties of such a system. First and most fundamental is *Proposition 1:* The cost per unit of output of sector 1, C_1, will rise without limit while C_2, the unit cost of sector 2, will remain constant.
proof:

$$C_1 = W_t L_{1t}/Y_{1t} = We^{rt}L_{1t}/aL_{1t} = We^{rt}/a$$
$$C_2 = W_t L_{2t}/Y_{2t} = We^{rt}L_{2t}/bL_{2t}e^{rt} = W/b.$$

Note that the *relative* costs will behave in this manner whether or not wages increase in accord with (3) for we have

$$C_1/C_2 = (L_{1t}/Y_{1t})/(L_{2t}/Y_{2t}) = be^{rt}/a.$$

In practice, we would expect in these circumstances that market demand for the output of sector 1 would decline. Suppose, for example, the elasticity of demand for the two outputs were unity in terms of prices which were proportionate to costs. Then relative outlays on the two commodities would remain constant, i.e., we would have

$$\frac{C_1 Y_1}{C_2 Y_2} = \frac{We^{rt}L_{1t}}{We^{rt}L_{2t}} = \frac{L_{1t}}{L_{2t}} = A\text{(constant)}.$$

Hence the output ratio of the two sectors would be given by

$$Y_1/Y_2 = aL_{1t}/bL_{2t}e^{rt} = aA/be^{rt}$$

which declines toward zero with the passage of time. Thus we have *Proposition 2:* In the model of unbalanced productivity there is a tendency for the outputs of the "nonprogressive" sector whose demands are not highly inelastic to decline and perhaps, ultimately, to vanish.

We may inquire, however, what would happen if despite the change in their relative costs and prices the magnitude of the relative outputs of the two sectors were maintained, perhaps with the aid of government subsidy, or if demand for the product in question were sufficiently price inelastic or income elastic. Then we would have

$$(b/a)\ Y_1/Y_2 = L_1/L_2 e^{rt} = K.$$

Let $L = L_1 + L_2$ be the total labor supply. It follows that

(4) $\qquad\qquad L_1 = (L - L_1)Ke^{rt}$ or $L_1 = LKe^{rt}/(1 + Ke^{rt})$

and

(5) $$L_2 = L - L_1 = L/(1 + Ke^{rt}).$$

Hence, as t approaches infinity, L_1 will approach L and L_2 will approach zero. Thus we have *Proposition 3:* In the unbalanced productivity model, if the ratio of the outputs of the two sectors is held constant, more and more of the total labor force must be transferred to the non-progressive sector and the amount of labor in the other sector will tend to approach zero.

Finally, we may note what happens to the overall rate of growth of output in the economy if the output ratio for the two sectors is not permitted to change. We may take as an index of output a weighted average of the outputs of the two sectors:

$$I = B_1Y_1 + B_2Y_2 = B_1aL_1 + B_2bL_2e^{rt}$$

so that by (4) and (5)

$$I = L(KB_1a + B_2b)e^{rt}/(1 + Ke^{rt}) = Re^{rt}/(1 + Ke^{rt})$$

where

$$R = L(KB_1a + B_2b).$$

Therefore

$$dI/dt = R[re^{rt}(1 + Ke^{rt}) - Kre^{2rt}]/(1 + Ke^{rt})^2$$
$$= rRe^{rt}/(1 + Ke^{rt})^2.$$

As a result, the percentage rate of growth of output will be

$$(dI/dt)/I = r/(1 + Ke^{rt})$$

which declines asymptotically toward zero as t increases. We have, then, arrived at *Proposition 4:* An attempt to achieve balanced growth in a world of unbalanced productivity must lead to a declining rate of growth relative to the rate of growth of the labor force. In particular, if productivity in one sector and the total labor force remain constant the growth rate of the economy will asymptotically approach zero.

3. *Discussion of the Propositions*

The logic of the entire analysis can be restated rather simply in intuitive terms. If productivity per man hour rises cumulatively in one sector relative to its rate of growth elsewhere in the economy, while wages rise commensurately in all areas, then relative costs in the nonprogressive sectors must inevitably rise, *and these costs will rise cumulatively and without limit.* For while in the progressive sector productivity increases will serve as an offset to rising wages, this offset must be smaller in the

nonprogressive sectors. For example (ignoring nonwage costs) if wages
and productivity in the progressive sector both go up 2 per cent per
year, costs there will not rise at all. On the other hand, if in the nonpro-
gressive sector productivity is constant, every rise in wages must yield a
corresponding addition to costs—a two per cent cumulative rise in
wages means that, year in year out, costs must be two per cent above
those of the preceding year. Thus, the very progress of the technologi-
cally progressive sectors inevitably adds to the costs of the technologi-
cally unchanging sectors of the economy, unless somehow the labor mar-
kets in these areas can be sealed off and wages held absolutely constant,
a most unlikely possiblity.

We see then that costs in many sectors of the economy will rise relent-
lessly, and will do so for reasons that are for all practical purposes be-
yond the control of those involved. The consequence is that the outputs
of these sectors may in some cases tend to be driven from the market. If
their relative outputs are maintained, an ever increasing proportion of
the labor force must be channeled into these activities and the rate of
growth of the economy must be slowed correspondingly.

4. Some Applications[1]

These observations can be used at once to explain a number of ob-
served phenomena. For example, there is evidence that an ever increas-
ing portion of the nation's labor force has been going into retailing and
that a rising portion of the cost of commodities is accounted for by out-
lays on marketing. Now there have been several pronounced changes in
the technology of marketing in recent decades: self service, the super-
market, and prewrapping have all increased the productivity per man
hour of the retailing personnel. But ultimately, the activity involved is
in the nature of a service and it does not allow for constant and cumula-
tive increases in productivity through capital accumulation, innovation,
or economies of large-scale operation. Hence it is neither mismanage-
ment nor lack of ingenuity that accounts for the relatively constant
productivity of this sector. Since some sort of marketing effort is an
inescapable element in economic activity, demand for this service is
quite income elastic. Our model tells us what to expect in this case—
cumulatively increasing costs relative to those of other economic activi-
ties, and the absorption of an ever growing proportion of society's re-
sources by this sector—precisely what seems to have been observed.

Higher education is another activity the demand for whose product
seems to be relatively income elastic and price inelastic. Higher tuition
charges undoubtedly impose serious hardships on lower-income stu-

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[1] Some of the ideas in this section arose out of discussions with Eugene Beem of Sperry
and Hutchinson.

dents. But, because a college degree seems increasingly to be a necessary condition for employment in a variety of attractive occupations, most families have apparently been prepared to pay the ever larger fees instituted in recent years. As a result higher education has been absorbing a constantly increasing proportion of per capita income. And the relatively constant productivity of college teaching leads our model to predict that rising educational costs are no temporary phenomenon—that they are not a resultant of wartime inflation which will vanish once faculty salaries are restored to their prewar levels. Rather, it suggests that, as productivity in the remainder of the economy continues to increase, costs of running the educational organizations will mount correspondingly, so that whatever the magnitude of the funds they need today, we can be reasonably certain that they will require more tomorrow, and even more on the day after that.

But not all services in the relatively constant productivity sector of the economy face inelastic demands. Many of them are more readily dispensable than retailing and education as far as individual consumers are concerned. As their costs increase, their utilization tends therefore to decrease and they retreat into the category of luxury goods with very limited markets or disappear almost completely. Fine pottery and glassware produced by the careful labor of skilled craftsmen sell at astronomical prices, though I am told the firms that produce them earn relatively little profit from these product lines which they turn out primarily for prestige and publicity, obtaining the bulk of their earnings from their mass production activities. Fine restaurants and theaters are forced to keep raising their prices, and at least in the case of the latter we know that volume is dwindling while it becomes ever more difficult for suppliers (the producers) to make ends meet.

An extreme example of an activity that has virtually disappeared is the construction (and, indeed, the utilization) of the large and stately houses whose operation even more than their construction allows for little in the way of enhanced productivity, and whose rising costs of operation have apparently decreased their salability even to the wealthy.

These observations suggest something about the likely shape of our economy in the future. Our model tells us that manufactures are likely to continue to decline in relative cost and, unless the income elasticity of demand for manufactured goods is very large, they may absorb an ever smaller proportion of the labor force, which, if it transpires, may make it more difficult for our economy to maintain its overall rate of output growth.

The analysis also suggests that real cost in the "nonprogressive" sectors of the economy may be expected to go on increasing. Some of the

services involved—those whose demands are inelastic—may continue viable on the free market. Some, like the theater, may be forced to leave this market and may have to depend on voluntary public support for their survival. Our hospitals, our institutions of private education and a variety of other nonprofit organizations have already long survived on this basis, and can continue to do so if the magnitude of contributions keeps up with costs. Some activities will either disappear or retreat to a small scale of operation catering primarily to a luxury trade. This fate may be in store for restaurants offering true *haute cuisine* and it is already the case for fine hand-worked furniture and for clothes made to measure. Some activities, perhaps many of the preceding among them, will fall increasingly into the hands of the amateurs who already play a considerable role in theatrical and orchestral performances, in gastronomy, in crafts such as woodworking and pottery. Finally, there is a considerable segment of nonprogressive activity that is dependent on tax support. Some of the problems that go with this position will be considered in the remainder of this paper.

In all the observations of this section there is one implicit underlying danger that should not escape the reader: the inherent threat to quality. Amateur activity has its virtues, as an educational device, as a good use for leisure time and so forth. But in a variety of fields it offers a highly imperfect substitute for the highly polished product that can be supplied by the professional. Unbalanced productivity growth, then, threatens to destroy many of the activities that do so much to enrich our existence, and to give others over into the hands of the amateurs. These are dangers which many of us may feel should not be ignored or taken lightly.

5. *On the Financial Problem of the Cities*

One of the major economic problems of our times is the crisis of the larger cities. Together with their suburban periphery the cities are attracting ever greater segments of our population. Yet at least the core of the metropolis is plagued by a variety of ills including spreading blight as entire neighborhoods deteriorate, increasing pollution of its atmosphere, worsening traffic, critical educational problems, and, above all, mounting fiscal pressures. The financial troubles are perhaps central to the entire issue because without adequate funds one cannot hope to mount an effective attack on the other difficulties. More than one reform mayor has taken office determined to undertake a radical program to deal with the city's difficulties and found himself baffled and stymied by the monstrous deficit which he discovered to be hanging over him, a deficit whose source appeared to have no reasonable explanation. There seems in these cases to be no way to account for the growth in the city's financial needs—for the fact that a municipal budget far above that

which was roughly adequate a decade earlier threatens to disrupt seriously the city's most vital services today. Where the political process is involved it is easy to blame growing costs on inefficiency and corruption but when they take office, reform administrations seem consistently puzzled by their inability to wring out the funds they require through the elimination of these abuses.

A critical element in the explanation becomes clear when we recognize how large a proportion of the services provided by the city are activities falling in the relatively nonprogressive sector of the economy. The bulk of our municipal expenditures is devoted to education which, as we have already seen, offers very limited scope for cumulative increases in productivity. The same is true of police, of hospitals, of social services, and of a variety of inspection services. Despite the use of the computer in medicine and in traffic planning, despite the use of closed circuit television and a variety of other devices, there is no substitute for the personal attention of a physician or the presence of a police patrol in a crime-ridden neighborhood. The bulk of municipal services is, in fact, of this general stamp and our model tells us clearly what can be expected as a result. Since there is no reason to anticipate a cessation of capital accumulation or innovation in the progressive sectors of the economy, the upward trend in the real costs of municipal services cannot be expected to halt; inexorably and cumulatively, whether or not there is inflation, administrative mismanagement or malfeasance, municipal budgets will almost certainly continue to mount in the future, just as they have been doing in the past. This is a trend for which no man and no group should be blamed, for there is nothing that can be done to stop it.

6. The Role of Static Externalities

Though these may be troubles enough for the municipal administrator, there are other compelling forces that plague him simultaneously. Among them are the general class of externality problems which have so long been the welfare economist's stock in trade.

Since the appearance of Marshall's and Pigou's basic writing in the area a most significant development has been the growing impact of external costs on urban living. No longer are road crowding and smoke nuisance only quaint cases serving primarily as textbook illustrations. Rather, they have become pressing issues of public concern—matters discussed heatedly in the daily press and accorded serious attention by practical politicians. Newspapers devote headlines to an engineer's prediction that the human race is more likely to succumb to its own pollutants than through a nuclear holocaust, and report with glee the quip that Los Angeles is the city in which one is wakened by the sound of birds coughing.

Now there are undoubtedly many reasons for the explosion in external

costs but there is a pertinent observation about the relationship between population size in a given area and the cost of externalities that seems not to be obvious. It is easy to assume that these costs will rise roughly in proportion with population but I shall argue now that a much more natural premise is that they will rise more rapidly—perhaps roughly as the square of the number of inhabitants. For example, consider the amount of dirt that falls into the house of a typical urban resident as a result of air pollution, and suppose that this is equal to kn where n is the number of residents in the area. Since the number of homes in the area, an, is also roughly proportionate to population size, total domestic soot-fall will be equal to soot per home times number of homes $= kn \cdot an = akn^2$. Similarly, if delays on a crowded road are roughly proportionate to n, the number of vehicles traversing it, the total number of man hours lost thereby will increase roughly as n^2, since the number of passengers also grows roughly as the number of cars. The logic of the argument is simple and perhaps rather general: if each inhabitant in an area imposes external costs on every other, and if the magnitude of the costs borne by each individual is roughly proportionate to population size (density) then since these costs are borne by each of the n persons involved, the total external costs will vary not in proportion with n but with n^2. Of course I do not maintain that such a relationship is universal or even that it is ever satisfied more than approximately. Rather I am suggesting that, typically, increases in population size may plausibly be expected to produce disproportionate increases in external costs—thus pressures on the municipality to do something about these costs may then grow correspondingly.

7. Cumulative Decay and Dynamic Pareto Optimality

Economic theory indicates yet another source of mounting urban problems. These are the processes of cumulative urban decay which once set in motion induce matters to go from bad to worse. Since I have discussed these elsewhere I can illustrate the central proposition rather briefly. Public transportation is an important example. In many urban areas with declining utilization, frequency of service has been sharply reduced and fares have been increased. But these price rises have only served to produce a further decline in traffic, leading in turn to yet another deterioration in schedules and another fare increase and so on, apparently *ad infinitum*. More important, perhaps, is the logic of the continued flight to the suburbs in which many persons who apparently would otherwise wish to remain in the city are driven out by growing urban deterioration—rising crime rates, a growing number of blighted neighborhoods, etc. Once again, the individuals' remedy intensifies the community's problems and each feeds upon the other. Those who leave

the city are usually the very persons who care and can afford to care—
the ones who maintain their houses, who do not commit crimes, and who
are most capable of providing the taxes needed to arrest the process of
urban decay. Their exodus therefore leads to further deterioration in
urban conditions and so induces yet another wave of emigration, and
so on.[2]

It is clear that these cumulative processes can greatly increase the
financial pressures besetting a municipality and can do so in a variety of
ways: they can increase directly municipal costs by adding to the real
quantities of inputs required for the upkeep of buildings, to maintain
levels of urban sanitation, to preserve the level of education attained by
an average resident, etc.; they can reduce the tax base—the exodus of
more affluent urban inhabitants cause a decline in the financial resources
available to the city; and with the passage of time the magnitude of the
resources necessary to arrest and reverse the cumulative processes itself
is likely to grow so that the city may find it increasingly difficult to go
beyond programs that slow the processes slightly.[3]

[2] As is to be expected, such dynamic processes may be monotonic or oscillatory, stable or
unstable. As examples we might expect the public transportation scheduling problem to
grow monotonically while automotive road crowding may be inherently oscillatory. More
specifically, let f represent frequency of public bus departure and p be the number of bus
passengers. We would expect the relevant relationships to be something such as

$$p_t = a + bf_t \quad \text{(demand for public transport) and}$$
$$f_{t+1} = w + vp_t \quad \text{(lagged public transport supply response)}$$

so that

$$f_{t+1} = w + av + vbf_t$$

in which the coefficient vb is presumably positive. On the other hand, if D represents average
delay on some road and A is the volume of automotive traffic, the corresponding relation-
ships would be

$$D_t = a' + b'A_t \quad \text{(delay grows with traffic volume) and}$$
$$A_{t+1} = w' - v'D_t \quad \text{(delays today lead to lower traffic tomorrow)}$$

so that we have a negative coefficient $-b'v'$ in the difference equation

$$A_{t+1} = w' - a'v' - b'v'A_t.$$

Since monotonic and oscillatory time paths correspond respectively to positive and negative
variable coefficients in a first-order difference equation, our result follows. An intuitive
explanation is fairly simple in each case: increased automotive traffic today causes delays
and so may reduce traffic tomorrow. But a decline in number of passengers which causes a
deterioration in service leads to still another fall in volume.

As stated, the time path in each case may be stable. But in the latter case, even though
the declines will not be unbounded, the limit toward which they tend may be very low and
totally unacceptable as a matter of public policy.

[3] I have argued that the cumulative processes involve what may be considered dynamic
externalities. Each passenger who uses public transportation less frequently imposes the
increased likelihood of poorer schedules not only on himself but on others as well. As a result
these processes will yield results that do not maximize social welfare. For the private and social
marginal rates of transformation between present and future will then differ from one another.
The individual will tend to cut down on his use of public transportation by an amount greater

8. Conclusion—The Financial Problems of the Large City

The story is perhaps completed if we add to the preceding observations the fact that each city is in competition with others and with its own surrounding areas for industry and for people with the wherewithal to pay taxes. No city government acting alone can afford to raise its tax rates indefinitely. Even if they were politically feasible, mounting tax rates must eventually produce diminishing and perhaps even negative returns as they depress the tax base further.

We can now quickly pull the pieces of our story together. We have just seen that our municipalities are perhaps unavoidably subject to a variety of growing financial pressures: the limited sources of tax funds, the pressures imposed by several processes of cumulative decay, the costs of externalities which seem to have a built-in tendency to rise more rapidly than the population. These phenomena imply that the activities of the municipality will have to be expanded if standards of city life are to be maintained. But the funds available for the purpose are extremely limited. And over all this hangs the shadow cast by our model of unbalanced growth which has shown that the costs of even a constant level of activity on the part of a municipal government can be expected to grow constantly higher.

The picture that has been painted is bleak. It suggests strongly that self-help offers no way out for our cities. All of this would then appear to offer stronger theoretical support for the Heller-Pechman proposal that the federal government can provide the resources necessary to prevent the serious crisis that threatens our larger urban communities and whose effects on the quality of life in our society may become one of the nation's most serious economic problems.

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than that which is optimal because he himself does not bear all of the costs of his action. There is a marginal rate of transformation between the utility derived from public transportation today and that obtainable from transportation tomorrow. If relative prices do not equal that marginal rate of transformation a misallocation of resources is likely to result. The consequences may even be what might be called Pareto-nonoptimal. That is, everyone may be harmed. For example, when automobile traffic becomes sufficiently bad it may become clear that everyone will be better off if passenger cars are banned completely from the downtown area in order to make possible a faster, more efficient public transportation system.