Volume Title: Capital in Transportation, Communications, and Public Utilities: Its Formation and Financing

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Volume Publisher: UMI

Volume ISBN: 0-870-14102-3

Volume URL: http://www.nber.org/books/ulme60-1

Publication Date: 1960

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Chapter URL: http://www.nber.org/chapters/c1493

Chapter pages in book: (p. 77 - 92)

CHAPTER 5

Factors Underlying Long-Term Trends: Output

OUR previous analysis has led us through an examination of the secular trends in capital formation, in output, and in the capital-product ratio. Distinctive patterns, it was observed, characterize each. It should be recalled, however, that investment in the regulated industries constitutes the principal interest of this study, and it is only insofar as this central core is thereby illumined, that the trends in the other variables have warranted attention. That all three variables—capital formation, output, and the capital-product ratio—are related in a complex system of mutual interaction, common to most objects of economic study, is obvious. Yet in an analysis confined to secular trends in particular industries, it is possible to simplify. The trend in capital formation may be viewed, *in the main*, as the net result of the factors underlying the trend in output on the one hand, and those underlying the trend in the capital-product ratio on the other. This is a hypothesis on which we shall amplify later. It may be summarized in the equation:

$$\frac{\Delta O}{\Delta t} \cdot \frac{\Delta C}{\Delta O} = \frac{\Delta C}{\Delta t} \tag{1}$$

where O stands for output, C for the stock of reproducible capital, and t for time measured in some convenient unit.

The equation is of course a truism. It serves here, however, as a frame of reference convenient for assembling the host of events and conditions which together have influenced the pace of investment in the regulated industries. We shall be concerned in this chapter with one compartment of this framework—those factors which have affected the secular trend of output.

In our previous discussion of output, one outstanding characteristic observed was the secular tendency for its *percentage* rate of increase to diminish over time. The decline set in at a very early date—in every component and in the total for regulated industries as a whole. Another characteristic concerns the *absolute* rate of change in production. We noted the tendency of the regulated industries to follow a path marked by at least one or more of the following stages:

Stage	*Output*	*Change in Output*
I	Increases by increasing amounts	Increases by increasing amounts
II	Increases by increasing amounts	Increases by decreasing amounts
III	Increases by decreasing amounts	Decreases by increasing amounts but remains positive

Stage	OUTPUT	
	Output	*Change in Output*
IV	Decreases by increasing amounts	Becomes negative and decreases by decreasing amounts
V	Decreases by decreasing amounts	Increases by increasing amounts but remains negative
VI	Decreases by decreasing amounts until it reaches zero	Increases by decreasing amounts, remaining negative until it reaches zero

The aggregate of all regulated industries, it will be recalled, remained in stage I throughout the 1880–1950 span for which data are available. So did three of the components—electric light and power, telephones, and the all other group. The steam railroads and local bus lines, on the other hand, had by 1950 progressed to stage III. Thus, for these components the peak of output increments had been passed, and total production was advancing by diminishing amounts. Street and electric railways had progressed to stage V, with production moving secularly downward at a pace which had finally begun to level off.

This pattern of relative as well as absolute changes in production is not confined to the regulated industries. Previous studies have established that it is common to the growth of output in most industrial segments of the economy,[1] though progress beyond stage III is rare in the United States. We may inquire now concerning the factors which combined to determine this behavior in the regulated industries.

The Vacuum Effect

The uppermost limit to the growth of a new industry is set by the size of its principal market—in the case of most regulated industries, the size and the purchasing power of the national population. In none of our components would it have been technologically or financially possible for the first productive units to satisfy fully the ultimate demands of the then existing population. Typically, there was—and perforce *had* to be—an experimental period, in which the beginnings made were modest in the extreme. In this category were the first railroad line, operated with thirteen miles of track by the Baltimore and Ohio in 1830; the first electric company, with a distribution area of less than a mile, in New York City; and the first telephone exchange, with twenty-one subscribers, in New Haven.

In this experimental period the commercial feasibility of the productive process, as well as the receptivity of consumers, was tried.

[1] Cf. Simon Kuznets, *Secular Movements in Production and Prices* (Houghton Mifflin, 1930), and Arthur F. Burns, *Production Trends in the United States since 1870* (National Bureau of Economic Research, 1934).

As both tests were passed, innovators were free to expand and imitators were inspired to activity. Each year brought larger, more ambitious productive units, and elicited them in greater number over an ever-widening circle. Given this modest start and the subsequent tendency toward cumulative expansion, which in the earliest days even business depressions fail to retard, spectacular rates of increase in output were virtually inevitable. The data of Table 17 start at or close to the beginnings of electric light and power, telephones, and local bus lines. They show percentage rates of increase for these components ranging from 7 to 15 per cent *per year* during the first two decades of operation. Of course under these circumstances, too, growth at least for a time in the manner of stage 1 above acquired a high degree of probability.

But there were other factors which helped to generate this swift advance. The market potential itself grew progressively. The population of the United States prior to World War I expanded by increasing amounts, and even in subsequent years has grown substantially. Per capita incomes increased steadily. The point at which decreasing returns might have retarded the growth of output was continuously raised to higher levels, and was so raised throughout much of the eighty-year time span covered by this study. In the absence of a check, it was to be expected that output would rise with the spectacular vigor evidenced by the data for all components in the earlier decades covered by Table 17.

Nor does this exhaust the list of stimulating factors which operated in the earlier days of the regulated industries. The first essays in a new productive process are typically crude, and the possibilities for improving efficiency are correspondingly manifold. Such improvements, reducing costs and increasing sales, further stimulated output. Combined with this was the gradual extenuation of consumer resistance. For before general acceptance is accorded, each new product must surmount a threshold of habit and inertia. And along with these factors was the conflict with, and the final victories—total or limited—over, competing products. Thus the success of the early railroads overcame the opposition of wagon and stagecoach operators, water carriers, and canal enterprises.

Hence the equilibrium point—at which production might stabilize—was, at the beginning, far above the capacity of the first tentative units established. And before it was even approached, a host of factors operated to raise this point rapidly and progressively to higher levels, each new obstacle overcome disclosing a wider range of profit opportunities. Meanwhile, the report of these opportunities was communicated over more extensive geographical

and financial ranges. Stated alternatively, in their beginnings the regulated industries were ones in which the marginal efficiency of capital was much higher than the rate of interest or the prospective rates of return in most other lines, and they were generally in a position to have their situation widely publicized. The response of the economy may be likened to the rush of air into a vacuum.

Brief mention may be made of the role of financing—a topic treated more fully in Chapter 7—in shaping this stage in the pattern of development. The vacuum effect is symbolic of the rush of resources into a pocket of the economy in which the prospective returns are unusually high. How swiftly it moves depends in part on how quickly capital is mobilized for its use. In this respect, the regulated industries enjoyed a distinct advantage. For the individual firm in this segment of the economy is by nature large, endowed with high prestige, and some degree of monopoly, along with an apparent promise of substantial profit and *relatively* small risk. Hence capital in larger amounts and over a greater area was made available with less reservation than would have been true of the average industry in the United States. It was a factor which lent additional power to the vacuum effect in the regulated industries. This is not to say that raising all the capital desired was at no point a difficulty for any of the regulated industries—e.g. the railroads. It obviously was an obstacle at a number of stages in their development. It must be recalled, however, that their requirements were huge. The only point made here is that the requirements were satisfied more easily *because* of the special characteristics of the regulated industries, than they would have been otherwise.

Output and National Aggregates: The Vigorous Industries

Quantitatively, the vacuum effect may be defined as an advance in production substantially in excess of the long-run growth of an industry's potential market. It is characterized by an initial rush which gradually subsides—slowly or swiftly petering out, depending upon the relative strength of retarding or stimulating factors in an industry's history. But that it must diminish in intensity rather quickly, at least in some degree, is clearly evident from the data of Table 22.

For example, in 1896 electric light and power output represented 0.07 per cent of the gross national product. By 1906 this percentage had grown to 0.28, despite the fact that the national aggregate had itself expanded substantially. Now if the advance of this component had continued at the same percentage rate in subsequent years as had prevailed in the decade prior to 1906, its output would have

amounted to more than 80 per cent of the gross national product by 1950. Even if we allow for the fact, previously pointed out, that electric output is measured on a "gross" basis,[2] this extrapolation is obviously far beyond the realm of practical possibility. Nor does this conclusion apply only to electric power. Study of the rates of growth prevailing in the earlier years in *any* of our components would yield roughly similar results. Note that this includes railroads and street and electric railways, even though in these components the full strength of the vacuum effect had been appreciably attenuated by the earliest years for which data are available. In every case rates of growth had been established which could not possibly have been sustained.

Yet in some of our components the pace of expansion remained remarkably high throughout the period of study. These are the ones which, throughout this period, were in stage 1 of the model pattern. They are grouped in Table 22. Their output is compared in this tabulation with the progress of population, income, and urbanization. For these factors set limits of a kind to the development of nearly any industry, though—depending upon other factors—they may be far from definite. Of course, the phenomena described above—under the vacuum effect—explain the fact that in the earlier years the growth of production in the regulated industries far outstripped that of population and of income too. But for the components in Table 22 the continued rise in output, relative to the national aggregates, went far beyond this. That it persisted over so long a period—indeed through the entire span of study—can only be explained by the development of especially favorable circumstances. One factor or another served over the years to sustain demand for the output of these vigorously growing components, relative to the national income. Chief among these factors appear to have been:

1. The development of new uses for the product. This almost always involved technological advance, as embodied, for example, in the electric dishwasher, the vacuum cleaner, and other appliances.

It often involved, also, continued victories over competition, as illustrated by the displacement of gas stoves and iceboxes by electric models.

2. Virtual immunity to competition. This was the case for telephones, for which no reasonably close substitute has been developed. Accordingly, the industry was free to expand unimpeded, as its service was transformed from a luxury item to an everyday household necessity.

3. Technological innovations and economies of mass production, permitting a secular decline in price relative to the price level in

[2] See Chapter 4, section on *The Data.*

TABLE 22

Output of Vigorously Growing Industries in Relation to National Income and Population

(based on nine-year averages, constant dollar values)

Central Year of Nine-Year Average	ALL REGULATED INDUSTRIES			ELECTRIC LIGHT AND POWER			TELEPHONES			ALL OTHER GROUP		
	As percentage of:			As percentage of:			As percentage of:			As percentage of:		
	Gross National Product	Urban Population Income	Per Capita	Gross National Product	Urban Population Income	Per Capita	Gross National Product	Urban Population Income	Per Capita	Gross National Product	Urban Population Income	Per Capita
1886	5.9	20.2	$ 21.7	...	...	...	...	...	...	...	...	...
1890	6.9	21.6	26.4	...	...	...	...	...	...	...	...	...
1896	7.8	22.8	32.6	0.07	0.2	$ 0.31	0.15	0.4	$ 0.62	0.86	2.5	$ 3.60
1900	9.0	25.0	41.8	0.14	0.4	0.67	0.31	0.9	1.46	1.07	3.0	5.00
1906	11.1	28.5	59.5	0.28	0.7	1.50	0.65	1.7	3.47	1.46	3.8	7.86
1910	12.4	30.5	69.0	0.39	0.9	2.15	0.83	2.0	4.60	1.75	4.3	9.70
1916	14.5	33.4	86.4	0.72	1.7	4.23	0.97	2.2	5.72	2.20	5.1	12.95
1920	14.5	32.0	94.3	1.00	2.2	6.48	1.06	2.3	6.86	2.36	5.2	15.30
1926	13.9	29.0	101.4	1.58	3.3	11.5	1.21	2.5	8.81	2.69	5.6	19.50
1930	14.1	28.5	94.3	2.20	4.2	14.0	1.34	2.7	8.92	3.07	6.2	20.40
1936	14.1	28.4	92.4	2.69	5.4	17.6	1.31	2.6	8.60	3.95	6.5	25.80
1940	16.2	32.6	133.2	3.00	6.1	24.6	1.25	2.5	10.30	4.44	9.0	36.60
1946	18.3	36.1	185.5	3.60	7.1	36.4	1.45	2.9	14.65	5.58	10.9	56.50
1950[a]	17.5	33.0	191.5	4.12	7.75	45.2	1.57	3.0	17.20	6.24	11.7	68.30

[a] Based on data for 1950 only.

Source: Gross national product in 1929 dollars, from revised annual estimates of Simon Kuznets, National Bureau of Economic Research (Variant I); urban population income, from Table 23; total continental population, from Bureau of the Census.

general. This was an influential factor in both telephones and electric light and power. It obviously encouraged the expansion of consumption in relation to that of the national income.

4. A favorable shift in consumer tastes. We use the term "tastes" here in the objective sense of the propensity to purchase in a given environment of income and price structure. Tastes, in this sense, may be altered by other changes in the environment, including urbanization, advertising, mode of employment, and other influences in great number. The growing complexity of modern life has, through this channel, promoted the use of both telephones and electric power. Swift and frequent communication, via the telephone, and abundant illumination are attributes especially of city life. Hence progressive urbanization powerfully raised the level of demand in both cases. So did the revolutionary changes during the last seventy-five years in the commercial and industrial configuration of the country. The gradual movement of wives from housework to industry and professional careers is an additional example of a social change stimulating the use of electric power—in this case, through accelerated adoption of household electric appliances.

All of these factors in combination account for the continued gains, over the entire 1880–1950 period, of output of telephone service and electric light and power relative to population and income, as measured by the data of Table 22. In addition, the development of new industries help to explain the similar results shown for the all other group and for all regulated industries in the aggregate. Figured on a per capita basis, production actually rose by increasing amounts over the seventy-year span in each of the vigorously growing groups. Production of all regulated industries in the aggregate advanced from $26 per person in 1890 to $69 in 1910, to $94 in 1930, and to $191 in 1950. The general pace of the rise is of similar order for telephones, electric light and power, and the all other group. It should be borne in mind that the cyclical influence in the data of Table 22 have been partially smoothed by the use of nine-year averages.

The movement of the national income over time, of course, reflects the advance in population and the steady ascension of per capita incomes in combination. The gains in output of the vigorously growing industries, relative to this aggregate, are therefore somewhat less spectacular than when population was considered alone, though they are very substantial still, as Table 22 shows. Production of all regulated industries amounted to 7 per cent of the gross national product in 1890, to 12 per cent in 1910, to 14 per cent in 1930, and to 17 per cent in 1950. There is some suggestion here that the pace

of the relative advance—though still quite large—was leveling off. Similar evidence is apparent in the behavior of the separate industry groups. In telephone service, where this tendency was most pronounced, output accounted for 0.8 per cent of the gross national product in 1910, 1.3 per cent in 1930, and 1.6 per cent in 1950. In no case, however, is there doubt concerning the persistence of the relative gains, secularly, throughout the entire period.

Though our interest is primarily in the trends evidenced by these figures, attention may be called once again to the nature of our output data. They are gross figures, in the sense described earlier,[3] and hence tend to overstate the importance of our components relative to national income. The degree of overstatement is generally about one-third: that is, if calculated on a "net" basis, fully comparable to the income data, output of the regulated industries would have amounted to about 12 per cent of the gross national product in 1950 rather than the 17.5 per cent shown. But this matter does not affect the relative trends of these series, in which our interest now centers.

Reference has already been made to the influence of urbanization on the demand for the products of the regulated industries. This consideration leads to the calculation of another tentative ascending "limiting" factor—the data shown in Table 23. This series represents the product of the urban population and the per capita income of the total population in each period. It is somewhat less than the true figure for urban income, since per capita incomes in cities (for which no figures are available over the period of interest) were higher and probably rose somewhat more than did per capita incomes in the nation as a whole. The difference in the aggregate, however, would not be great,[4] and our series in any event retains the advantage of representing in combination the shift to cities superimposed upon the growth of population and the rise in per capita incomes. Does the expansion of our vigorously growing components outstrip this even higher and more swiftly rising "ceiling"? For all regulated industries in the aggregate, the answer must be in the negative. In the proportion of their output to urban population income, there is but little evidence of a secular trend over the last thirty-five years, as the relevant data in Table 22 show. From the period of World War I, and perhaps from some years earlier, through 1950, this percentage has remained roughly stable. But the result reflects, in part, the downward pull of retarded and declining

[3] See Chapter 4, section on *The Data*.

[4] Particularly because the urban population was important in the total throughout the period and since 1910 has been in the majority.

TABLE 23

Nine-Year Averages of Urban Population Income

(billions of 1929 dollars)

Central Year of Nine-Year Average	*Urban Population Income*
1886	6.2
1890	7.7
1896	10.1
1900	12.7
1906	17.8
1910	20.8
1916	26.1
1920	31.1
1926	41.1
1930	40.5
1936	41.8
1940	53.6
1946	71.9
1950	87.8[a]

Figures are nine-year averages of net national product per capita of total population, multiplied by urban population. Net national product is from revised annual data of Simon Kuznets, National Bureau of Economic Research (Variant I); total and urban population, from Bureau of the Census, with intercensal years interpolated.

[a] Based on data for 1950 only.

industries included in the total. For when attention is centered upon the vigorously growing components, it will be seen from Table 22 that they pierce this higher ceiling too.

Output of electric light and power amounted to 0.9 per cent of urban population income in 1910, to somewhat more than 4 per cent in 1930, and to nearly 8 per cent in 1950. Output of telephone service grew from about 2 per cent of urban population income in 1910 to 2.7 per cent in 1930, and to 3.0 per cent in 1950. The all other group, with an influx of new industries, also advanced progressively. However, the pace of this *relative* increase in output of electric light and power, and in even greater degree, of telephones, clearly leveled off in later years. The comparatively modest gains in percentage over the last decade or two was by a wide margin smaller than those which had been scored before. It is clear that in the rising population, in the shift to cities, and in the advance in per capita incomes, we have in combination the principal factors underlying the continued powerful upward surge in output by these components in recent years.

But these are not the only factors. Nor do these influences in any event operate in isolation from those other specific considerations described earlier. The development of new uses, the favorable swing of consumer tastes, the price-reducing inventions, and continued success against actual or potential competition, would in some part have been necessary of production in these components even to keep pace with the sharp rise in urban population income. That the advance in output was still greater throughout the 1880–1950 period is a tribute to their power.

It would appear reasonably clear, too, that the somewhat poorer performance of telephones, when compared with electric light and power, may be explained in terms of the relative force of such attendant circumstances. Thus, new product uses have obviously proved more influential in the latter component than in the former. It is possible, also, that telecommunication has approached the point of market saturation; that is to say, its use has been spread, approximately, as widely as possible within the existing market, and further expansion is dependent more directly upon over-all national growth. The aggregate income elasticity of demand for telephone service, for this reason, may have begun to diminish more rapidly, though it may still remain above the critical level of unity. Surely this is a natural development, ultimately, for a commodity which has reached the stage of mass distribution, unless fully counteracted by the gestation of new uses and the evolution of favorable environmental circumstances affecting tastes. It is a development which would stem from the limits of the average family budgetary income itself as well as from the "law" of diminishing utility. And it is a hypothesis which is consistent with the behavior of the relevant data in Table 22. But this raises the question of retarding influences, which are by definition barely evident in the vigorously growing industries. We turn now to a discussion of their nature and their effect upon the other components.

Retarding Influences

One important factor making for a subsequent retardation of growth is the very force of the vacuum effect. As observed above, it established in the regulated industries a rate of expansion that could not possibly be maintained. Some diminution was inevitable. Thus, in the 1890's and 1900's, the secular rate of increase in the gross national product was about 5 or 6 per cent per annum.[5] The yearly

[5] Simon Kuznets, *Long-Term Changes in the National Income of the United States of America since 1870* (Preliminary manuscript of Part I, National Bureau of Economic Research), pp. 28–32.

increase in production during the same period in electric light and power was nearly 20 per cent. In telephone service, output rose by more than 20 per cent per year. Even in street railways, where the full power of the vacuum effect had appreciably subsided, the rate of growth achieved in this period was nearly 10 per cent per year, and in railroads about 7 per cent. In the post-World War I period, when the growth of the national product was materially slower than in previous years, output in local bus lines rose by about 7 or 8 per cent per year. All these rates of growth declined substantially later on. But in the especially favored industries, the rate remained well above that of the national income even in the most recent decades for which our record was prepared. By 1950, when the secular rate of increase in the gross national product was about 2 or 3 per cent, electric output was still headed upward at a rate approaching 8 per cent per year. Telephone service was expanding by about 7 per cent per year. In other components (except for the all other group), growth had declined close to, or below, the expansion rate of the gross national product. This difference in behavior reflects the more forceful impact in the latter components of the particular retarding influences to which we now turn briefly.

One of these is the tendency for income elasticities of demand to decline, once a product ceases to be a luxury and achieves mass distribution, and once older competition has been thoroughly routed or subdued. The power of this tendency is especially great in industries which by their nature lack resiliency—in lines in which the development of new uses is not feasible, and quality upgrading is narrowly limited. Another retarding factor is the rise of new and effective competition of related goods and services. Unless counteracted, it is nearly certain to enter the scene, sooner or later, wherever technological and institutional conditions permit. Its effect is obviously to cut, or to limit the growth of, the industry's market. It intensifies the decline in the income elasticity of demand, or stimulates its reduction if not already under way. And in extreme cases it relieves the industry of its market entirely.

Both of these retarding factors are evident even in our vigorously growing components, although in these cases their influence has been over-shadowed by others. Some reduction in the income elasticity of demand for telephone service seems apparent in the secular trend of this component's output relative to the national income, as observed above. But thus far it has been moderate. In electric light and power, the competition of government projects has assumed increasing significance. Publicly owned facilities accounted for less than 3 per cent of the nation's total generating capacity in 1920, and for fully

16 per cent thirty years later.[6] But in these industries, there were counterpoising factors stimulating growth, as pointed out in the previous section. A similar degree of resiliency (as in electric light and power) or virtual immunity to competition (as in telephones) did not prevail in the other components.

Thus the rise of motor vehicles and air transportation have materially limited the growth of railroad freight and passenger business. Bus service and automobiles dampened the growth of, and then reduced drastically the business of, street and electric railways. In local bus service, with the continued rise in levels of living and the expanding ownership of passenger automobiles, there is evidence that the income elasticity of demand has declined to less than one.[7] Railroads and local bus lines had by 1950 progressed to stage III of the model pattern; their production continued to increase, though at a rate which was diminishing. Street railways ran almost the gamut of the model pattern of development, and by 1950 was in stage V.

It is not without significance that once retardation appeared in these industries, it persisted, or was intensified. There are a number of reasons why a retardation in the secular rate of growth, once established, is seldom reversed. If a decline in the income elasticity of demand has set in, it is most unlikely that it can be turned back—though it may be slowed. A "rich man's good" does not become a "poor man's good" and then a rich man's good again; and, secularly, per capita incomes in the United States have moved progressively upward. If the industry's looming difficulties have stemmed from successful competition, this too will most likely prove to be a self-perpetuating, dilating obstacle to continued growth. For inter-industry competitive advantages ordinarily inhere in the nature of the industries and their products. They are not easily obliterated and reversed. The advantages of the automobile over the railroad (say the flexibility of its routes) and of the airplane over the auto (say its speed) are indelible, technical characteristics of the vehicles concerned. Their economic effects endure accordingly.

True, the pressure of competition may be steady rather than overwhelming, gentle rather than devastasting, and the decline in the income elasticity of demand over time may be slight. If so, there may be no apparent limit to the duration of stage III of the model pattern—the position of railroads and local bus lines in 1950. But on the other hand, the inroads of competition may be swift and comprehensive. Then progress from stages III to IV and onward will be relatively quick and certain, with production plunging. This was the fate of street railways.

[6] See Appendix D, Table 32.

[7] See pages 90 and 92.

Combined with these factors is the observation that the pace of favorable technical changes slackens as an industry matures. This may be due, as described in an illuminating essay by Kuznets,[8] to the fact that the flood of early technological and organizational advances gradually leaves less and less in the productive process subject to further improvement. Moreover, as Kuznets points out, the gains accruing from additional innovations tend in the long run to peter out, for as the price of a product is reduced, its price elasticity of demand may be expected, ultimately, to decline.

Output and National Aggregates: Retarded and Declining Industries

To summarize, railroads, street railways, and local bus lines clearly lack the relative immunity to competition with which telephones have been favored. They lack the numerous facets for new uses characteristic of electric light and power. To only a limited extent have they been able to produce services over a range of grades sufficient to counterbalance the tendency toward a declining income elasticity of demand. Though cost-reducing innovations have been steady—especially in railroads, but also in local bus lines and streetcars—they have not been sufficiently profound and persistent to permit substantial and continued price reductions relative to the general price level.

True, all of these components have been favored by the growth of the nation at large—a common supporting influence for all industry. They have also benefited, particularly, from the growth of cities. But in their earlier years—in every case—output advanced at a rate which far outstripped these general sustaining factors. Given the retarding influences which gradually dominated these components, it was a rate which was bound to diminish by large amounts in subsequent decades.

Railroad output amounted to less than 5 per cent of the gross national product in the 1880's and to about 16 per cent of urban population income,[9] as Table 24 shows. Thirty years later these proportions had been stepped up to 9 per cent and 21 per cent, respectively. It should be borne in mind that railroads had their beginnings in the 1830's. It is testimony to the size of their market, as well as to the magnitude of the construction job faced, that so large a differential rate of growth could have persisted after nearly

[8] Simon Kuznets, *Economic Change: Selected Essays in Business Cycles, National Income, and Economic Growth* (Norton, 1953), Chapter 9.

[9] Since the output figures were not computed on the same basis as the national income, the comparisons given in this section overstate the relative importance of the regulated industries by about one-third. See pages 64–65.

TABLE 24

Output of Retarded and Declining Industries in Relation to National Income and Population

(*based on nine-year averages, constant dollar values*)

Central Year of Nine-Year Average	RAILROADS			STREET AND ELECTRIC RAILWAYS			LOCAL BUS LINES		
	As percentage of:			*As percentage of:*			*As percentage of:*		
	Gross National Product	*Urban Population Income*	*Per Capita*	*Gross National Product*	*Urban Population Income*	*Per Capita*	*Gross National Product*	*Urban Population Income*	*Per Capita*
1886	4.8	16.3	$17.5	...	...	...	...	...	...
1890	5.6	17.3	21.1	...	...	...	...	...	...
1896	6.0	17.6	25.1	0.71	2.09	$2.98	...	...	...
1900	6.6	18.4	30.7	0.84	2.34	3.91	...	...	...
1906	7.6	19.4	40.7	1.10	2.85	5.93	...	...	...
1910	8.2	20.1	45.5	1.28	3.13	7.08	...	...	...
1916	9.3	21.3	54.5	1.36	3.12	7.98	...	...	...
1920	8.8	19.3	56.9	1.30	2.87	8.45	...	...	...
1926	7.3	15.2	53.2	1.05	2.18	7.61	0.13	0.26	$0.92
1930	6.4	13.0	42.8	0.91	1.83	5.80	0.18	0.36	1.18
1936	5.3	10.6	34.7	0.64	1.28	4.18	0.22	0.45	1.47
1940	6.7	13.5	54.9	0.50	1.01	4.09	0.28	0.56	2.28
1946	7.0	13.7	70.4	0.38	0.76	3.92	0.34	0.66	3.41
1950[a]	5.1	9.7	56.3	0.21	0.39	2.25	0.25	0.47	2.73

[a] The comparisons are based on data for 1950 only.

Source: Gross national product in 1929 dollars, from revised annual estimates of Simon Kuznets, National Bureau of Economic Research (Variant I); urban population income, from Table 23; total continental population, from Bureau of the Census.

eighty years. This was a period, of course, in which expansion thrived, at least in part, at the expense of older industries, as previously described. But once these had been definitely downed, given the characteristics cited above, reduction in the proportion of this component's output to national income was clearly in the offing. The way was open for the more dramatic manifestations of retarding factors.

Streetcars, too, had established a rate of growth in their early days, that exceeded the pace of the general sustaining influences upon which it must in the long run be dependent. Indeed, the differential rate of growth in this case was even greater, though it should be borne in mind that with the establishment of the first successful electrified streetcar system in 1887 there arose a virtually new industry, while the railroads at this time were roughly fifty years old. In the 1890's the output of the street railway component represented 0.7 per cent of the gross national product, and in just twenty years this ratio had nearly doubled. Its proportion of the swiftly growing urban population income in the same period rose from 2 to 3 per cent. Underlying this advance was a speculative splurge which reached almost every city, large or small, in the country. It is virtually certain that some modification of this differential rate of increase would have occurred, given this industry's characteristics, even if competition had not entered the scene. There is some evidence of this in the gradual tendency toward stability in the ratio of street railway output to urban population income, even before bus lines and other motor vehicles had become an important element.

The vacuum effect displays its typical power also in the case of local bus lines. In a mere ten years the proportion of its output to the gross national product had advanced from 0.13 per cent in the 1920's to 0.22 per cent in the 1930's, and the proportion to urban income in the same period from 0.26 to 0.45 per cent.

Thus, in all three cases initial rates of advance had been established which seemed destined for later reduction. The effects of competition, and other retarding factors, insured and intensified a radical change in trend. For street railways, of course, this was a sharp and drastic decline—sharp in relation to urban income and to national income as well as to the population. By 1950 production by this component amounted to 0.2 per cent of the gross national product, less than one-sixth of the percentage prevailing at the peak. For railroads the rate of increase dropped from one which far exceeded that of the gross national product to one which appeared to match roughly the growth of population, if we ignore the abnormal bulge in the period of World War II and make due allowance for cyclical swings. In

1950 railroad output amounted to about 56 dollars per person, about the same as thirty years earlier.

The picture is somewhat distorted for local bus lines—particularly in the light of the brevity of historical experience in this case—by behavior in the war years. For in this period use of bus service was greatly augmented by the prevailing limitations on the use of passenger automobiles. The decline in the ratio of the production of this component to the national income from the 1940's to 1950, therefore, must be in some part discounted. Even so, it will be noted that this ratio in 1950 was only slightly more than that prevailing in the mid-1930's—a difference which contrasts signficantly with the very sharp advances prevailing in earlier years. There seems little doubt that the income elasticity of demand for local bus service had declined materially between these periods, as pointed out in the preceding section. And judging from behavior in post-World War II years, there is the suggestion that it may have fallen below unity. If so, unless some new element is introduced in this situation, future increases in national income will bring less than proportional advances in the output of the local bus component.[10] In this respect, then, it will more closely resemble the behavior of the other industries treated in this section.

[10] Whether something new is on the horizon is not easily determined. The parking and traffic problem in many large cities has thrown many car owners back on bus service, and as this problem worsens bus service will continue to profit. But at the same time there is a trend toward the two- or even three-car family, a factor which reduces the use of buses for many local purposes.

Furthermore, the growth in popularity of the small car, and the geographical dispersion of industry too, help to alleviate the parking problem.