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URBANIZATION AND ECONOMIC GROWTH IN VENEZUELA

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The author is presently associated with the Institute of Urban and Regional Development, University of California, Berkeley. He has recently served as an economic advisor to the Venezuelan Government, under contract with PADCO, Washington, D.C. He is indebted to Dr. M. Corao, Dr. J. Herbert, Prof. M. Webber, and Dr. J. Yaber for discussion.

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I. URBAN PROSPECTS AND ISSUES

In 1950, about 40 percent of the Latin American population -- 61 million people -- lived in urban centers of more than 2,000 inhabitants, while some 60 percent -- 95 million people -- lived in rural areas. Ten years later, the urban population so defined had increased its share to well over 45 percent. Today, in 1970 some 130 million people, or roughly one half of Latin America's total population, live in urban areas.

Although urbanization is no recent phenomenon in Latin America, population growth in the form of large cities is:

Until 1930 Buenos Aires was Latin America's only city with more than a million inhabitants. Mexico City, Rio de Janeiro and Sao Paulo soon joined it. Havana, Lima and Santiago were million-cities by 1950; Bogota, Caracas and Montevideo were added by 1960.¹

The country with the highest rate of urbanization in Latin America is Uruguay. Using a definition originally suggested by McKenzie, Rama concludes that "all of Uruguay forms part of Montevideo's metropolitan area." Incidentally, this serves as a helpful analogy for some of our later discussion on the role of Caracas in Venezuela.²

We should perhaps remind ourselves here that the process of identifying urban and rural dwellers, in population censuses and other forms of fact-gathering, is fraught with deficiencies. Indeed, there is some reason to believe that the fuzziness in observation and measurement has led to somewhat exaggerated measures of urbanization in Latin America.³

Nevertheless, the underlying trends over the past few decades in Latin America are well revealed in the population statistics, namely

(1) that the fall in mortality rates, especially in urban areas, coupled with continued high birth-rates, has led to rapid national rates of population growth; and

(2) that migration from rural to urban areas has accounted for roughly one half of the growth of city populations.

As mentioned, the percentage of the total population in Latin America living in urban areas (of 2,000 or more inhabitants) is presently about 50. In Venezuela, the corresponding figure of urbanization is today about 70 percent. Nearly one fourth of the total Venezuelan population lives presently in Caracas, narrowly defined as Distrito Federal-Distrito Sucre-Distrito Guaicaipuro. Extending the definition of the Caracas-region to Valencia and Puerto Cabello, we find that a third of the nation's population lives in this area.⁴

In the 1950 to 1960 decade, Caracas increased its population by seven percent per year, and if anything, this annual rate of population growth appears to have increased somewhat during the past decade.

The annual rate of economic growth in Caracas -- measured as its contribution to Venezuela's "Producto Nacional Bruto" -- has been close to 15 percent on the average, during the last 20 years. In a global perspective, this rate of growth is high, but not spectacularly so. Richard Meier suggests that the rate of growth of Seoul-Inchon in Korea has exceeded 25 percent in the last two years, after six years of 13-20 percent annual growth rates. These rates are measured in terms of "gross regional products" and are thus in principle components in the

Korean Gross National Product. Using the same yardstick, he finds that the economic growth rate in Greater Tokyo has been 18-20 percent annually for a period greater than two decades.⁵

Meier also reproduces tabular information on land values in Seoul, which indicates that commercial land in 1968 was priced about 15 times as high as in 1961, implying an annual rate of growth in land values of 48 percent.⁶ On the face of it, and considering that other prices grew only slowly during the period, such a rate of increase in land values appears fabulous; but in the context of the vastly increased economic efficiency of Seoul, and in anticipation of much further economic growth to come, there is really nothing highly surprising about such a figure. (Needless to say, it could not be sustained over a very long period of time.)

In economic terms, a very large and rapidly growing city will find that the demand for sites with high accessibility to centers of decision making -- central government offices, banks, insurance companies and other financial institutions, as well as headquarters of large corporations -- and with high accessibility to large numbers of people, is extremely intense. Whoever controls such a site, by ownership or otherwise, will find it profitable to apply very large quantities of capital and labor to the site. The skyscraper is the visual expression of this intense substitution of capital and labor for land. To put this in a different way, each unit of land at the site of the skyscraper, say each m^2 , has -- or is expected to have -- an extremely high marginal productivity, since it is combined with such a large bundle of labor -- primarily those employed in the building -- and capital -- the building itself and its contents of equipment.

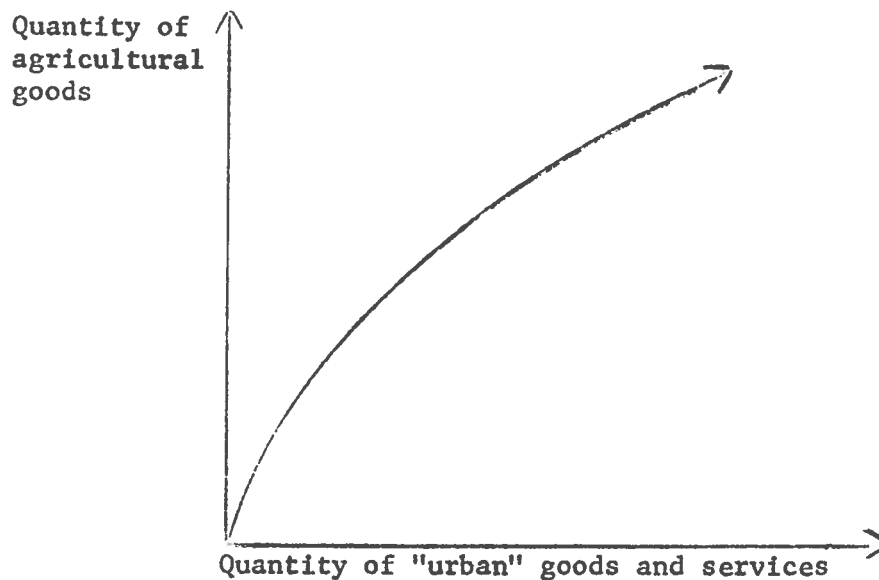
However, we have jumped the gun. Let us back-track somewhat by asking a more fundamental question: why do cities grow?

II. CONCEPTS USEFUL IN COMPREHENDING URBAN GROWTH

Some General Factors and Their Venezuelan Significance

Although the topic is a fascinating one, it would take us too far afield to delve into questions of the historical origins of cities. We shall instead drastically limit our analysis in time -- to the recent past -- and in space -- to Venezuela. This means that we take as our starting point a situation in which there is already growth: Growth in the size of the nation's population, growth in terms of the nation's economic resources -- labor, capital, and utilization of land -- and growth in terms of the quantities of goods and services produced and distributed to the average family. Assuming that resources are not completely immobile or inert, it turns out that the increase in family income alone is a sufficient factor to explain some migration to urban areas.⁷ The key concept here is that of the degree of income elasticity of demand. This is illustrated in the diagram below, which shows the path of consumption of foods (and other agricultural products), measured along the vertical axis, and of all other consumer goods (here called "urban" goods and services), measured along the horizontal axis, as income increases.

Diagram 1. Income elasticities of demand, foods and non-foods



As income grows over time, there will be some reallocation in the average family's expenditures, as illustrated in the diagram above. Relatively less of the total income will be allocated to food and thus relatively more to other types of goods and service. We say that the demand for food-stuffs and other agricultural commodities has a low income elasticity.⁸

The higher income elasticity for non-agricultural -- or, for short, "urban" -- goods and services is thus a behavioral characteristic, an inherent quality of consumption, if we wish, which will induce a reallocation of resources to urban areas (where the "urban" goods and services are, or can be produced) as incomes grow.

Now, this tendency is reinforced by several factors on the production side. First, with increases both in the size of population and the size of average incomes, markets will increase, and as markets increase in size, specialization of labor -- directly through the variety of trades, skills and occupations, and indirectly through an increasing use of capital goods, such as machines, equipment and buildings -- will

occur. "The division of labor in society is determined by the size of the markets."

Second, increased division of labor is associated with learning. Improvements in performance and what we usually refer to as "technical changes" will take place.

Although we have referred to these two phenomena, the division of labor and learning, as factors on the production side, this is clearly a simplification. Both factors exert a strong influence also on the consumption side. For instance, many tasks are continually being shifted from the home to the factory. However, in the present context the main point we wish to make is that the increasing division of labor and the cumulative processes of learning have been closely interwoven with urbanization and city growth.

This close relationship between learning and the increasing division of labor, on the one side, and city growth on the other, has several causes, among which it is helpful to single out the following two.

First, the increasing division of labor manifests itself in an increasing number of service establishments. Banking and other financial institutions proliferate. Attorney's offices and other consulting firms -- of increasing degrees of specialization among and within them -- are established. Hospitals and an array of medical specialties will grow in size and number and the same goes for universities and all other institutions of higher learning as well as for government agencies of all kinds.

The very formation and growth of service establishments of the kinds illustrated, will in turn create demands for new specialists --

such as in the information field where agencies will multiply in number to become specialized in the gathering, processing, storing and retrieving of information, and in printing, in repair services, in laboratory work and other producers' services.

In a sense, none of these establishments create new services or functions. The very same tasks were performed previously by farmers, by artisans, by manufacturers and by householders. But they have been or become "shiftable" -- and the result is usually increased over-all efficiency in the economy.

The increasing division of labor also shows up in a proliferation of wholesale, retail and similar activities. There is a common tendency in the literature to speak in derogatory terms about this particular form of division of labor. Words such as "an excessive tertiary sector," "petty commerce," "unemployment in disguise" are often used to describe these activities. We beg permission to disagree with this view of the commercial activities. Putting them in their proper time-space perspective, we see these commercial phenomena as just another set of elements in the ongoing process of increasing division of labor in society. Even the street-vendor in central Caracas often performs an important role in shortening the "distance" between producer and ultimate consumer, not the least by providing information about new products. "Mercados libres" serve similar functions. One of the best examples of all is the "por puesto" taxi, which appears as a highly efficient and flexible component of the Caracas transportation system.

But -- one might ask -- are not service industries the ones which we associate with low productivity and perhaps more importantly, with little growth in productivity over time?

The answer to this question is at least fourfold.

(1) There is an inherent deficiency in many economic indicators, namely that they tend to measure quantities and "volumes" (in so-called "constant" prices), to the neglect of qualitative aspects. The tendency is very strong everywhere to measure the "quality of life" in terms of the quantities of goods and services produced or consumed. The problem is particularly severe for services. Measures of the output of services are often hard to assign, and short of any good output measures the analyst often reverts to measuring the services in input terms, that is to say, in terms of the labor costs etc., incurred in providing the services. There is, generally speaking, a downward bias in this procedure, so that the service component in national measures of output is underestimated. For example, when a government office in Caracas begins to use a Xerox machine for duplicating documents, or a computer, for processing information, it will increase its productivity very considerably, but the available statistics will show an increase in costs and probably no increase in productivity.

(2) Statistical studies of productivity behavior in manufacturing and service industries show only small differences in productivity growth between them. Indeed, some studies have been unable to reject the null hypothesis of identical productivity behavior in manufacturing and service industries. In other words, these tests have not supported the popular notion that productivity in the service industries is lagging far behind productivity in manufacturing.⁹

(3) Fabricant, Salter, and others, have shown in their empirical work that if a manufacturing industry grows rapidly, it is likely to show a rapid productivity increase. Fuchs has extended this work to service

industries and he and his associates find similar results.¹⁰ So that if a service industry is growing rapidly, it tends also to show rapid increase in productivity.

(4) Finally, whatever such studies of an individual industry's productivity show, they miss part of the picture. As we have already stressed, the expansion of service industries should be viewed within the framework of all economic life, as a manifestation of the continuing increase in specialization in society.

Now, many -- not to say, most -- of the activities discussed above are city-located activities. The reasons why cities offer comparative advantages for service production vary. In some instances only the very large city can provide a market big enough for some specialized service activity. In other instances face-to-face contacts are an essential, and as yet indispensable, ingredient of the service activity itself. Indeed, there is evidence to indicate that the demand for some service activities is even greater, relatively speaking, in developing countries than in highly industrialized countries. This point is very well taken by Alonso.¹¹ Although he does not refer specifically to service industries, his comments about the role of personal contacts in developing countries are lucid and relevant. He speaks about "the subtle but enormous importance of face-to-face relations . . . in developing countries," and he continues:

At the most obvious level, developing countries have poorer communications systems. Telephones are scarcer and less dependable, mail is slower and may fail to arrive, air connections are rarer. Consequently, distance between persons is a more formidable barrier to communication and this leads to the spatial concentration of those who must do business together.

Social forces, however, may exert an even stronger force toward spatial concentration. In developing countries most messages are

less impersonal and standardized than in developed countries where much information is transmitted by trade journals, catalogues, government publications, and other means. At the same time, in developed countries, contracts, terms of finance and details of payment and delivery, specification of the product, and a thousand other forms of contact tend to follow established forms. In developing countries, communications depend far more on word of mouth, and procedures are far less standardized and call for discussion and negotiation. These circumstances require that people come together. Further, the rituals of social contact when two-way communication is necessary are more elaborate. In many countries considerable time must be devoted to expressions of mutual respect, and no haste to get to the substance of the meeting may be shown. Even the substance of the conversation must be treated with a subtlety and indirection which often baffle those used to procedures in developed countries. There are ways of saying yes which mean no, price and time estimates which mean something else, gentle probings and subtle hints. An order blank, a long-distance telephone call, a cable or a business letter are instruments which are too blunt and insensitive for these complexities.

Before concluding this section, we take note of the fact that the United States was the first nation in history to have more than half its working population gainfully employed in activities that provide services rather than goods.¹² Other industrialized nations are moving in the same direction, in transition to becoming service economies. Thus, if we were to rank order the world's countries according to some economic measure such as per capita income, and according to the percentage of their respective populations gainfully employed in service activities, we would find a very high degree of co-variation between the two measures. Knowing the rank-order of one of the two measures for any given country, one should be able to venture a sizable bet that the country's rank according to the other measure would be about the same. However, and this is a most noteworthy observation in the present context, making such a bet on Venezuela would be a money-losing proposition today. Venezuela would not rank very high in terms of per capita income, but it would be in the top echelon of countries as far as service employment is concerned. Although this fact has been noted in the literature,¹³

we feel that some crucial implications hereof have not been drawn, and we shall therefore come back to this question, concerning the large present role of service activities in the Venezuelan economy, in a later section.

Based on the argumentations in the preceding paragraphs, we now conclude: The increasing division of labor that characterizes a growing economy, will strongly stimulate city growth, principally because the increased labor specialization will manifest itself in a proliferation of service industries -- and these are city activities.

So much for the first factor, the increased-division-of-labor phenomenon, and its association with city growth. Another basic factor is learning and technical change. Even if we do not fully subscribe to the views recently expressed by Jane Jacobs, according to whom practically all technical changes in society are city-born, it has been well demonstrated by her as well as others, how highly conducive the city environment is to learning and technical change.¹⁴ The city is an educational device. Migrating to the city means exposure to learning in various ways -- from the more formal education obtained in school, the more or less formal learning at the place of work, to the highly informal learning that comes from simply being in the city and watching city phenomena, city people, city traffic, stores, TV, etc.

Learning and technical change in society are strongly intertwined with economic growth. The essence of the argument -- to the effect that the strong economic currents are also bringing about large-city growth -- thus lies in the city's role of providing innumerable opportunities for learning and technical change, inclusive of adoption of inventions made in other countries.

Turning to the Venezuelan experience, the goal with the highest priority in Venezuela today, concerns -- if our impressions serve us correctly -- education: To improve, successively, educational standards and to spread education to ever larger numbers in the total population. Now, the fact is that by far the greatest -- present as well as potential -- means of education in Venezuela are in Caracas. Most of the highly skilled people in Venezuela live in Caracas -- and they exert educational influences on their environment in many different ways. A substantial part of the formal-educational resources in Venezuela are also located in Caracas. Furthermore, Caracas possesses already a fairly well developed TV-system. The population density in the Caracas region is such that its various TV channels reach a far larger number of viewers than any other TV stations elsewhere in the country. The enormous potential of TV as an educational means -- and a relatively inexpensive one -- has probably not been fully exploited anywhere in the world; we can only point to its potential in Caracas.

However, it would be a serious distortion of fact to imply that all learning and technical change in Venezuela is concentrated in Caracas, in Maracaibo, in Ciudad Guayana, in Barquisimeto, in San Cristobal, in Ciudad Bolivar, in Valencia, Maracay and the other urban centers of Venezuela. Indeed, Venezuelan agriculture has made great strides in recent years. Much technical change and mechanization have been adopted, and very considerable increases in agricultural production, especially of rice, vegetable oils, meat, poultry, and dairy products, have been achieved during the 1960's.¹⁵ The rapid growth in agricultural production has not led to any significant increase in agricultural employment due to the productivity increases, the consequence being a push of population away from rural areas. It is beyond the scope of this paper to probe further into this particular aspect of the spatial allocation of resources. The problem has recently been analyzed in a very insightful manner by Moscovitch, who concludes that there are great possibilities of further development in Venezuela agriculture, to the benefit of the national economy.¹⁶

Our view of the phenomena governing urbanization and city growth in a developing economy like Venezuela can now be summarized. An interaction of population growth, processes of learning, and the increasing division of labor have -- in juxtaposition with the relatively higher income elasticity for urban goods and services -- brought about the "push" of human resources away from rural areas and the "pull" of resources into urban areas, especially into the Caracas region.

In the most highly differentiated city, Caracas, growth has also been associated with considerable gains from what Isard called "economies which stem from a higher level of use of the general apparatus of an

urban structure (such as transportation facilities, gas and water mains, and the like) and from a finer articulation of economic activities (daily, seasonally, and interindustrially)."¹⁷ Closely related are phenomena which we shall classify under the following two headings:

(1) Indivisibilities in production (incl. transportation), associated, for example, with increasing returns to scale;

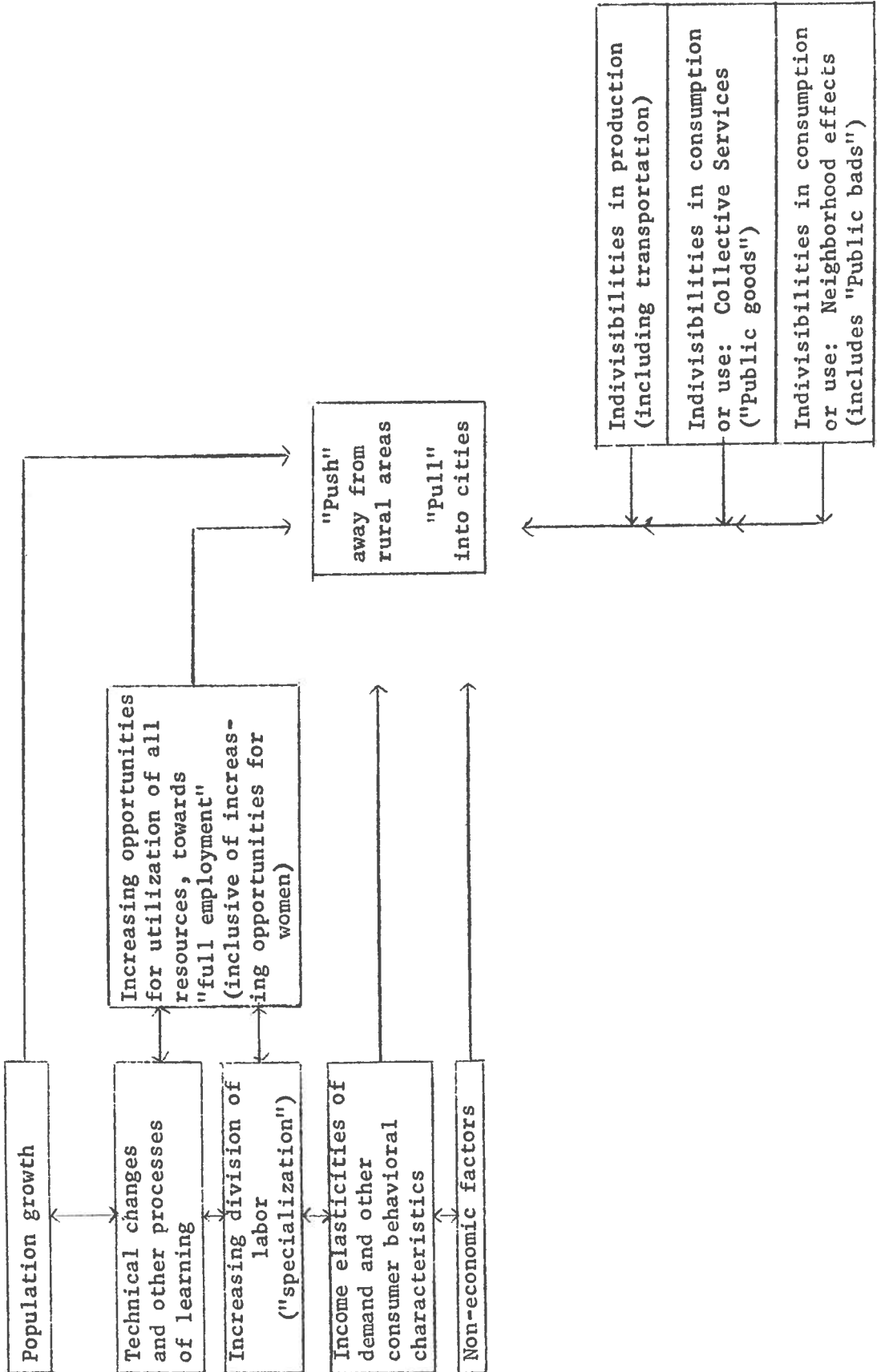
(2) Indivisibilities in consumption or use, associated with "collective services" or "public goods."

On the other hand, the city-building forces are gradually being weakened by a set of phenomena, which we shall classify under the following heading:

(3) Indivisibilities in consumption or use, associated with "public bads," or neighborhood effects.

In the next few sections, we shall take a closer look at these phenomena. In a following section we shall also emphasize Caracas' role in providing increasing opportunities for utilization of all human resources, towards "full employment," and particularly towards greater opportunities for women. The various concepts used here have been summarized in Diagram 2.

Diagram 2. Major concepts used in this report to explain urbanization and city growth



The Effects of Indivisibilities in Production Upon City Growth

"Suppose you are running a plant or other process in the most efficient way possible. Then, if you double all the inputs, output will (at most) double, too." Statements of this seemingly innocent nature illustrate a very fundamental assumption in much of microeconomic theory. Namely that phenomena exhibit constant (or decreasing) returns to scale. This assumption is a cornerstone in the theoretical structure of economics, for one thing because it makes for great analytical convenience. In particular, it enables the analytically inclined economist to draw on the powerful and elegant mathematical apparatus of convex sets.

Unfortunately, many phenomena in the real world do not seem to obey the rules of the game of convex sets. Indeed, by their very physical nature, city phenomena in particular are apt to be violators of the convexity assumptions. A building in the city, be it an office building, a hotel, an apartment house, a department store, or a parking structure, has a capacity to hold people, goods or cars -- an "output capacity" of sorts -- which varies much faster than the quantity of inputs used (building material, etc.), with variations in the scale of the building. The inputs vary roughly in proportion to the surface areas, the output varies in proportion to the cubic volume of the building. Similarly, increasing the width of a street or bridge, will increase its capacity to move traffic proportionately more. Indeed, there is seemingly no end to the number of examples of this nature that we can find in the city.

A closely related phenomenon is that certain resources have lower-bound constraints: They are characterized by what are often called minimum-size thresholds. Given the present technology, many machines can only be produced and used, if they possess some minimum size.

Admittedly, this concept of a minimum-size threshold level is a very fuzzy one. A pipe connecting two plants, or a bridge across a river, are often cited as examples of these minimum sizes. After all, one cannot build the bridge half-way across the water. However, this does miss the point that the width of the bridge could be narrowed almost indefinitely. Even a sub-way project in a large city could conceivably be varied within rather wide upper and lower bounds. By and large, though, the existence of minimum-sized resources appears to be a valid assumption. The applicability of this concept is in no way limited to capital resources, such as bridges, buildings and machines. It is also of importance as related to human resources. Indeed, it helps to explain the thrust towards greater specialization observable in the urban society, which we have discussed in a previous section of this report.

The unifying feature in the phenomena discussed is that of indivisibility, and in the following we shall refer to them as indivisible assets. There is some confusion in the literature about these phenomena, especially when they are referred to as "external economies." Now, that is quite a misleading classification. Indeed, the term "externalities" has become a catch-all for an enormous variety of fundamentally quite different phenomena. Paradoxically, when a concept is stretched to cover so many different phenomena, it becomes vacuous; in the present paper, we shall avoid using the term "externality" altogether.

We started our discussion by way of reference to standard economic theory with its reliance on such concepts as constant or decreasing returns to scale. The indivisibility phenomenon that we have discussed above, may show up in what are called "increasing returns to scale." To relate to our initial example, if we double the quantities of all inputs,

and find that the output more than doubles, then we say that there are increasing returns to scale.

There is, however, no one-to-one correspondence between indivisibility and increasing returns to scale. The reason for this is somewhat technical: Increasing returns are defined in terms of homogeneous functions, which means that the optimal input-mix, with given input prices, will remain unchanged, but the point is that the very nature of the indivisibility may imply changes in the optimal input-mix. Thus, indivisibility is the broader concept. With input prices constant, increasing returns (or "economies of scale") imply decreasing costs, but on the other hand decreasing costs can result from many other indivisibilities than those associated with increasing returns.

Now, a central economic problem that indivisible assets give rise to, is that of pricing. According to the famous duality theorem of Welfare Economics, in an economy characterized by perfect competition and decentralized decision-making among households and business firms, there exists a correspondence between a set of equilibrium points for the economy and a set of "efficient" (Pareto-optimal) allocations of all economic resources. In the face of increasing returns or other indivisibilities, the duality theorem goes out the window. The reason for its failure lies in the fact that increasing returns to scale imply decreasing (average) costs. In turn, this means that if the producers (using the indivisible assets) set their prices according to marginal cost, they will incur permanent losses, on account of the fact that their average cost will continually be higher than their price, and the producers would then not be inclined to continue to invest in the indivisible assets. Alternatively, the producers might collude and

charge monopoly prices, and as we know that will also distort the allocation of resources, meaning that either too much or too little will be invested in assets of the indivisible nature. Other alternatives, mixtures of the perfect-competition and monopoly forms of pricing, do not seem to work either. In fact, large indivisibilities give rise to pricing problems for which no apparent solutions do exist in a decentralized market economy.

The purpose of our discussion above has been twofold. First to point out that the urban scene abounds with what we have here referred to as indivisibilities in production. Second, that the large potential gains (from an efficiency point of view) that are associated with the indivisibilities, are impossible to extract fully without some form of government planning and interference with the market.

The message we wish to convey is this: Indications are that the Caracas-region (bounded by El Tuy, Valencia and Puerto Cabello) is vastly more efficient, as an economic entity, than the rest of the country. However, its utilization of existing indivisible assets and, above all, its investment in new indivisible assets (among them the infrastructure in El Tuy and the subway system) can be increased very substantially with much further potential over-all efficiency gains as a result; and since these problems, as we have indicated, cannot be left to the "invisible hand" of the free market and can hardly be left to the municipal governments, there are both economic and administrative grounds for the federal government to take a highly active role in the actual city-building process, as well as in the management or regulation of these indivisible assets through an appropriate pricing-taxation policy. This appears to be a task eminently suited for the new Ministry

of Urban Development and Housing, in close cooperation with municipal authorities as well as Ministerio de Hacienda.

To assist in this, much fundamental research is needed. A high-priority research topic would be to measure the benefits and costs to the nation of continued rapid growth in the Caracas area -- under varying assumptions about public policy related to indivisible assets, their acquisition or regulation as well as their management.

Effects of Indivisibilities in Consumption (or Use) Upon Urban Growth

The question of public management of (or regulation of the use of) indivisible assets is distinct from questions involving provision of so-called "public goods." Public regulation or management of indivisible assets have the economic rationale and aim of producing services at prices, varying from zero and up, such that efficiency in the economy at large is increased -- in comparison with what the efficiency would be, were these indivisible assets acquired and managed by the private sector. As we argued previously, the difficulty of resource allocation arises because of the inherent indivisibilities in the assets concerned, when they are used in production of goods and services.

Now, the problem of "public goods" arises because of an inherent indivisibility in consumption. TV emission may serve as an illustration. If one more viewer joins the number of people watching a particular program, their "consumption" of the program is not affected. The addition of the new viewer is made at zero cost. Note that this is a zero marginal cost of consumption. Marginal cost of production would not be zero. Indeed, in contrast to the increasing returns case, the marginal cost of production might be increasing.

Other examples of public goods are "national defense," "law and order," "fluoridation of water," and much "research." Since, as hinted

above, the terminology in current use -- "public goods," etc. -- is apt to be somewhat confusing, we shall in the following use the term "collective services" to describe the phenomena concerned.

Collective services are characterized by the fact that their consumption is joint. If more of such a collective service is provided to one individual, more is provided to at least one other individual, and possibly to a very great many other individuals. We say that collective services are due to an indivisibility in consumption. There is an intrinsic non-separability about the consumption or use of these collective services, which is the essence of the difficulty posed by them from a financing as well as pricing point of view. The market mechanism, with its "signaling" device -- the price system -- fails, because the consumer is not motivated to pay for the collective service on an individual basis: Due to its indivisible nature, he cannot easily be excluded from using or consuming the service (independent of whether he pays or not).

Now, and this is really the primary reason why we are here taking up a separate section on collective services, there exists a very large bundle of such services which have a definite spatial and site aspect. A public park in Caracas provides "collective services" -- but only up to some maximum limit, for the simple reason that it contains only a limited amount of space and, also, because the site of the park limits its accessibility. At least with the technology presently being used, the same is true about TV programs broadcast in Caracas, they reach only so far.

Similarly, education and public health have important collective service characteristics, but again there are spatial limits -- not

sharp but fuzzy ones, as with the sound when someone whistles -- imposed on the "spillover" and related collective effects of these services. Indeed, what we usually refer to as "infra-structure" in a city -- including streets, bridges, water and sewerage facilities, fire and police stations -- provides collective services with similar spatial boundaries.

Thus, the denser an area is settled by population, the greater are the potential gains to be obtained from collective service. It boils down to a question of summation: In a large city, there are more consumers of the collective service, total "enjoyment" from the collective service is therefore greater.

It is clear from the kind of examples of collective services that we have given above, that there does exist an over-lap, such as in the case of "infra-structure," between collective services and what we have previously called management of indivisible assets. However, the difference between the two is an important one -- in concept, and not the least in terms of appropriate policy actions -- and we reiterate that collective services are characterized by indivisibility in consumption, whereas the previously discussed phenomena are indivisible in production.

As mentioned, the private market mechanism cannot handle collective services in such a way that the over-all economic and social effects are in any meaningful sense "efficient" or "optimal." Some public interference in their provision is necessary.

Once again, the conclusions seem inevitable. There is presently no other area in Venezuela, where the potential gains from an increased supply of collective services are so great as in the Caracas area. Also, because of the over-lap with minimum-size threshold

(indivisibilities-in-production) type of phenomena, there are many options in selecting new collective-service bundles available to Caracas -- which are not available to any other places in Venezuela today because of their much smaller size and density. Secondly, the Venezuelan federal government is in a better position than any other entity to supply these collective services.

What we have now said, raises -- anew -- the need for research in Venezuela, research dealing with criteria, such as selection of social welfare functions, and with pure measurement problems, such as measuring the gains and the costs associated with particular indivisible assets or with particular collective services.

For reasons discussed above, even a perfectly operating market system produces "too little" of collective services. Now, there exists a closely related set of phenomena, of which the perfect markets produce "too much." These phenomena are also indivisible in consumption and they are sometimes called "public bads." Examples of these are air, water, and sound-wave pollution, traffic jams, crowding of parks and beaches, and other manifestations of social congestion. These "public bads" result from exploitation of assets that provide collective services, such as streets, parks and beaches, or from exploitation of such public property as the atmosphere, lakes and rivers and, again, their "nuisance" effects are felt by many individuals, due to the same inseparability phenomenon that we discussed in connection with collective services. The assets concerned have a limited capacity -- and the "environment" also has a limited capacity to assimilate the public bads.

These phenomena have been dealt with recently in an interesting paper by Ayres and Kneese.¹⁸ They point out that, by the laws of

conservation of energy and matter, there is a materials balance in nature. "Nature does not permit the destruction of matter except by annihilation with antimatter, and the means of disposal of unwanted residuals which maximizes the internal return of decentralized decision units is by discharge to the environment, principally watercourses and the atmosphere."¹⁹ They also stress the deceptiveness in the language when we speak about such things as "consumption of goods": "Almost all of standard economic theory is in reality concerned with services. Material objects are merely the vehicles which carry some of these services, and they are exchanged because of consumer preferences for the services associated with their use or because they can help to add value in the manufacturing process. Yet we persist in referring to the 'final consumption' of goods as though material objects such as fuels, materials, and finished goods somehow disappeared into the void -- a practice which was relatively harmless so long as air and water were almost literally free goods."²⁰

The "disservices" associated with these phenomena usually have an important spatial and site aspect. Meaningful measures of the disservices concerned are often expressed in the form of densities, that is, so much per unit of space of the public resource concerned (streets, air, water, etc.): For this reason, it is convenient to describe the disservices as "neighborhood effects."

Now, in an ordering of national priorities in Venezuela, the mitigation of neighborhood effects may appear rather low on the list, at the present stage of the country's development. However, there are dangers in such an attitude, especially as far as Caracas is concerned. Neighborhood effects may very seriously constrain further rapid increases

in well-being in the Caracas region, as the following numerical calculation attempts to illustrate. Assuming that the annual population growth in Caracas over the next 10 years is in the six to seven percent range, and that economic growth, in per capita terms, continues high, say at an annual rate of increase in the 8 to 11 percent range, then we can fairly safely predict that the neighborhood effects (increased air pollution etc.) will grow at least six-fold, and conceivably as much as tenfold in Caracas, over the next ten years. Thus, even if one feels that the nuisance caused by neighborhood effects today, in the form of congestion, pollution etc., are well within tolerable limits, this situation may change very rapidly. To illustrate, if one's conception of the tolerable levels of nuisance are such that the present actual levels are, say, a third of the upper limits, they would still reach at least twice the tolerable levels within ten years -- that is, if nothing is done to mitigate these trends in the growth of "public bads."

Above, we have discussed three types of phenomena, namely:

- (1) Indivisible assets (e.g. a bridge or freeway)
- (2) Collective services (e.g. TV broadcasting)
- (3) Negative neighborhood effects (e.g. congestion or pollution)

These phenomena have some common characteristics of great relevance to the present study. (a) All three have a strong bearing on the further growth of the Venezuelan economy, especially by way of their effects on the Caracas area. The first two are strong stimulants to further growth and well-being in Venezuela, the third is an increasingly serious deterrent to growth and well-being. (b) All three are characterized by the fact that the private market mechanism cannot be counted on to generate in any sense "optimal" quantities of these goods and

services (and disservices). Government capital investments and government management or regulation of these phenomena are necessary. (c) All three are strongly non-linear phenomena. This raises serious analytical problems in attempts to formalize relationships involving these phenomena.

Utilization of Resources

Unemployment is high in Venezuela, especially in rural areas but also in many urban centers. (Not the least are the much heralded new towns plagued by unemployment.) The problems associated with severe unemployment will not go away soon in Venezuela -- for one important reason because they have their root in lack of education, and educational processes are very time-consuming. Yet, there are many indications that the future will provide more and more opportunities for increased utilization of all resources, towards "full employment," and towards richer utilization of all resources. One of the stronger rays of hope emanates from the high priority assigned to education in national policy-making -- coupled with the (comparatively speaking) very considerable financial power of the federal government in Venezuela. The emphasis on education will imply that more and more resources -- more teachers, more equipment and buildings -- will be allocated to the education sector. Thus, much further growth in this important "service industry" can be expected. On the other hand, expansion of the education industry means a dampening of the growth in the nation's labor supply: Greater and greater numbers among the young will enroll in schools, and they will remain there longer, and will thus not as previously be added to the labor supply.

As pointed out in "La Economía Venezolana en los Últimos Veinticinco años," Venezuela has a population pyramid much more heavily weighted towards the base than such countries as England, France, Sweden and the United States. According to the 1961 Population Census, no less than 54 percent of the population in Venezuela was of age 18 or less. Thus, even if the country's resources were much greater than they presently are, the investment burden implied in providing education would be a heavy one. But, that is a primary area in which the solution to the nation's unemployment problem is to be sought. To put it bluntly, with its highly mechanized petroleum and natural gas industry, iron and steel works, and aluminum smelting, and with its Guri dam and hydroelectric plants, and with its very large service sector in Caracas, Venezuela has the potential of an extremely efficient economic structure -- but it is, as yet, only a potential, because the country cannot now match this structure with the necessary labor skills.

With continued economic growth, the incentives to substitute capital for labor in the performance of any given task, will undoubtedly increase -- and, invariably, unskilled labor is replaced more easily than skilled labor. But this tendency will be slow, as long as heavy in-migration to the larger cities of uneducated labor continues. As described in "Plan de la Nación," many of these unskilled workers have been absorbed into the service sector -- " . . . el comercio en cierto sentido ha servido de esponja para absorber mano de obra desocupada, principalmente aquella de baja calificación"²¹ -- and there is no end in sight to this concomitant of economic growth.

However, there is an entirely different aspect of the large and still rapidly growing city-oriented service sector in Venezuela, which

deserves attention. This has to do with the fact that as service industries grow in size and variety, there will be more and more, and richer and richer, opportunities for women in the labor market.

It is noteworthy that in the United States today, of all jobs in manufacturing industries only one out of five is held down by a woman; in contrast, one-half of all jobs in the U. S. service sector are filled by female employees. In all likelihood, Venezuela is nowhere near this ratio yet, but the number of jobs held by women is increasing rapidly. In Caracas, a large number of women have found employment in government agencies, in the education sector, and in many other service industries. Caracas has in all likelihood a much greater proportion of women gainfully employed than any other community in Venezuela. In some cases, these women are bread-winners on their own, in many other cases they contribute sizably to the family income. Our crude estimate is that income per capita is at least twice and possibly as much as two-and-a-half times as high in Caracas than in the rest of the country. The higher employment frequency among women in Caracas has contributed to this difference.

The repercussions of this phenomenon extend a long way beyond the narrowly economic ones. The vastly increased, and increasing, employment opportunities are giving the Venezuelan woman greater independence, greater freedom of choice; it is part of her emancipation. The consequences are likely to show up in different ways in the coming decades, not the least in the form of lowered fertility rates.

Needless to say, urbanization and large-city growth are also interacting with other non-economic factors. Juvenile delinquency, and crime rates generally, may increase with the growth of cities, as the rules governing social behavior -- including religion -- are loosened.

Unquestionably, the scarcest resource in Venezuela is skilled labor. The demand is very great for financial and marketing experts, for high-level administrators and executives and for craftsmen.²² In comparison with this scarcity of skilled labor, capital in Venezuela is quite abundant. However, the country is so rich in natural resources -- large reserves of petroleum, natural gas, and high-grade iron ore, a great hydroelectric-power potential, excellent waterways for shipping, and forests possible suitable for pulping -- that the marginal yields to applications of capital are very great. A very rough calculation of the marginal productivity of capital is made in Appendix 2.

III. PLANNING AND MANAGEMENT OF URBAN DEVELOPMENT IN VENEZUELA

On the Choice of a Frame of Reference

The planning and management of urban development in a growing economy contains problems of enormous complexity. Those who have had to grapple with the theoretical issues involved have naturally tried various simplifications in their choice of approach. One of the most interesting attempts ever at modeling urban phenomena is Jay Forrester's work on simulation of a central city.²³ The lasting and valuable contribution of his study lies in its strong emphasis on the interdependencies and many "feedback loops" involved in urban development. But his study design can be criticized as somewhat myopic -- too much concerned with problem analysis "in the small," rather than "in the large" -- when related to the kinds of simulation to which he has subjected his urban model.

Forrester used a computer simulation program to examine various policy programs in a city. Among his findings was that a government program of massive construction of low-income housing in his simulated city was absolutely detrimental. It attracted low-income families and unskilled workers to the city in large numbers, with the effect that governmental burdens, as well as city unemployment rates, rose considerably. But the point is that his findings might have been quite different, had he not been preoccupied with one city in a limitless environment, but with the totality of all cities -- and if such programs had been effected in all the cities.

There is a certain affinity between the Forrester work and the recent studies of Ciudad Guayana, a much planned new-town development in southeastern Venezuela. If the rather myopic planning and implementation for Ciudad Guayana had really worked in the ways in which planners meant them to work, Ciudad Guayana would by now have been flooded by poor migrants, so-called "rancho" families. Conditions there would have been so attractive to the prospective in-migrant, in terms of expectations of finding both jobs and housing, in comparison with the alternatives, that the area would have acted like a magnet for rancho families. Gradually, the plans would have been self-defeating, as more rancho-dwellers than one could cope with, per unit of time, would arrive.

Many urban studies are prepared within a frame of reference which we may call the "hierarchy philosophy." This is illustrated by much of the current work on urban spatial models, and perhaps especially the work done on transportation models. Those who work on urban spatial models -- including gravity models of all shades and varieties -- usually accept statements provided to them about future changes in the area's population size and composition, about the area's industry-mix and its future changes, about the location of "the" city center, and about the city's spatial relations to other cities. These phenomena are taken as givens -- left to be explained by some other models or theories, but as a matter of fact, they never are explained satisfactorily. There is of course need for division of labor in our attempts to comprehend urban phenomena -- by means of models or otherwise -- but it appears that, by their neglect of important feedback loops, the approaches referred to might prompt serious mistakes in actual decision-making and implementation of plans. A good illustration of the point is provided by the prolific

work done with so-called gravity models in transportation studies over the last ten years or so, especially in the United States. It is instructive to look at some of these models, and we are helped in this task by Goldner who has reviewed the workings of many of the models and who has very aptly entitled his paper "The Lowry Model Heritage," after a model used by Lowry in a study of Pittsburgh, U.S.A.²⁴

As Goldner describes in his paper, there has been a large number of followers to the original Lowry model. They differ in detail from the original, but generally speaking they are just more of the same. The usual procedure in these models is to take as givens:

- (1) a set of national projections of population and its composition, and of production and consumption, and their sectoral disaggregation;
- (2) a regional (or state) disaggregation of the national totals, usually by means of very primitive methods, such as shift-and-share analysis;
- (3) a disaggregation of the regional totals (usually also by some such device as share analysis), to provide the population, industry-mix, etc., for the city under study.

Using all these "givens" as a starting-point, the first step in Lowry-type of models is then to assume as yet another given the future location within the city of a large chunk of all economic activity, with a misnomer called "basic" industry. Size of employment is used as the single measure of the locations of these "basic" activities, with little or no attention paid to capital assets, or, more generally speaking with little attention paid to the physical structures -- present and planned, private and public.

The second step, usually, consists of distributing spatially the employees of the "basic" activities. The purpose is to assign

residential locations to these workers, and the means is a gravity-type of model. The third step is to use a similar gravity approach to distribute, spatially, employment in so-called population-serving activities (retail trade etc.) on the basis of the residential allocations in step two. Fourth, and in analogy with step two, the employees of these population-serving activities are assigned residential locations. There are some iterations involved in these distributions, (e.g. based on holding capacities of the areal units), but generally speaking the procedure is a rather mechanistic one-way-street sort of approach.

The trouble is that the real world does not seem to operate in this fashion. Instead, there seem to be important feedback-loops embedded in the processes, so that the basic one-way sort of assumptions concerning future population size, industry-mix, location of various service industries, etc. are seriously violated.

To choose Venezuelan examples of this same hierarchy philosophy, it does not seem meaningful to extrapolate present demographic trends for Venezuela as a whole and then, as a second step, allocate these population totals regionally. As we go sufficiently far into the future, the two steps are intertwined: With a continued rapid increase in population in Caracas during the coming decades, there is likely to be a considerably slower national population growth, caused by lower fertility rates among the urbanized women (and only partially mitigated by falling infant-death rates). So, a total population figure at some future date cannot be very meaningfully interpreted unless it is accompanied by information of assumed urbanization rates, and especially of growth in the population in Caracas.

The examples above are in no way oddities, or isolated cases. It is easy to find many other examples of the fallacy of the hierarchical approaches. Enlargements and improvements in the educational system in Venezuela will have repercussions that will feed back to and change the very starting premises in the methods discussed above. Some of the more subtle, but over the long-range, no less significant among the feedback loops are environmental in nature. Indeed, much of our previous discussion points to some of the inherent deficiencies in approaches that do not specifically account for important feedback loops. As was mentioned in connection with the discussion of indivisibilities in production and in consumption, the analytical difficulties that one faces in attempts to "build in" such feedbacks is that the phenomena are often highly non-convex in nature. If we attempt to comprehend these phenomena in terms of some conceptual framework which utilizes linear models, such as input-output analysis or linear programming, we are starting out by assuming away the very relationships which seem to be at the heart of the matter of understanding urban phenomena.

In this paper, we have so far avoided altogether the use of a concept which is still in much vogue in discussions of urban phenomena, namely that of "the economic base." Although the so-called "economic base theory" -- with its exceedingly simplistic emphasis on "exports" of a city and on the so-called "export-base" multiplier -- has probably been laid to rest, as an essentially useless approach (and as particularly irrelevant in comprehending continued growth of existing large cities), one often hears references to the effect that the economic base of this or that city is such and such. The danger with the "economic base" sort of verbiage is that it may tempt us into some highly misleading thinking, so we shall devote a few words to the concept here.

As is well reflected in the priority assigned to education, the economic base of Venezuela is its people. Since most of the highly skilled people, and a good many of the less skilled and unskilled, live in Caracas, where as mentioned previously, also a substantial part of the educational resources are to be found, one might with some justification argue that Caracas is Venezuela's economic base.

But what about regions like Ciudad Guayana and Maracaibo? Do they not constitute the "real" economic base of Venezuela? After all, they have the petroleum, the iron ore, the natural gas, and they are generating the hydroelectric power for aluminum smelting and so many other uses.

The answer to these questions, in our view, is that the regions mentioned are "economic bases" only in a very limited sense. They provide natural resources and the processing of these resources -- and we should of course not forget that a considerable portion of both export revenue and of federal government revenue is generated in these regions. But the conclusion that these are the regions to which, through political and economic means, one should attract migrants, is -- we believe -- a mistaken conclusion. This is indeed where a fallacy of the economic base "philosophy" shows up, because economic base-reasoning is usually couched in terms of employment. Now, practically all the economic activities that we today associate with Maracaibo and Ciudad Guayana and similar regions, are highly capital-intensive in nature: They require very large amounts of capital, but not large quantities of labor.

Considering that Venezuela still has only ten million inhabitants, and that Caracas is already a large and highly differentiated city, with very considerable attracting-power upon the rest of the Nation, our

view is that planning for very large population centers in other parts of Venezuela is presently not a meaningful economic proposition.²⁵ We emphasize presently, because the situation may change in the next century, and we emphasize population centers, because, as we have already indicated above, capital investments -- in processing and shipping facilities in Maracaibo, in Ciudad Guayana, etc., -- will continue to have high productivity. But heavy investments in infra-structure in these regions -- in housing, streets, and various public facilities -- involve very substantial risks of creating high "sunk costs," which in turn might inhibit desired later mobility of people and other resources. In the sense of being able to provide jobs, rising incomes, stimulating and interesting environments, for very large numbers of "seekers," none of the mentioned places is presently an "economic base." This raises the question of the worthwhileness of the major costs associated with centers such as Ciudad Guayana, both the opportunity costs of the substantial infrastructure and the dislocation and other costs for the migrants seeking but not finding employment.

Clearly, these views reflect our emphasis on the indivisibility phenomena which we believe to be so germane to our understanding of large-city phenomena. These views also arise from our belief that two national priorities overwhelm all others in their urgency and importance in Venezuela -- to extend and improve educational standards and to increase and enrich the utilization of resources -- and that the Caracas-region contains vastly superior potential for serving both these needs. Caracas will continue to play an increasing role in the future economic and social growth of Venezuela. The vitality and efficiency of Caracas will continue to exert a significant influence on those who are most

impoverished and underprivileged in the Venezuelan society. Caracas has an incomparably greater capacity to absorb new migrants than any other area in Venezuela. For the migrants, for the rancho families, there is much more information, much more learning, to be gained in Caracas than anywhere else. And beyond the economic and social attractions of the capital, it has the lure of a very pleasant climate and of proximity to the ocean and beaches.

Leibenstein has suggested some hypotheses to explain why different countries, different regions within a country, and even different industries within a region, exhibit very different rates of speed in the diffusion of new technologies, and more generally in adaptations to change.²⁶ He thinks in terms of double threshold-levels in decision-making in the sense of a bounded area of inertia or "frictional inactivity." Stimuli whose impacts are in the inert area will lead to no action on the part of the decision-maker. It appears reasonable to assume that such upper and lower bounds of inertia are "closer" together in a large city -- thus, again a factor likely to make the large city a more efficient device for resource allocation.

Increased efficiency in the economy and increased utilization of human resources mean that more will be produced with available resources. To the extent that more production can contribute to the well-being of the population, and to the enrichment and enhancement of the environment in which people live and work, increased efficiency seems to serve worthwhile ends. However, there is a hitch. What is good for Caracas is not necessarily good for the Nation.

The problem is that the economic advantages of the Caracas area, in comparison with most other parts of Venezuela, attract so many

resources to the capital that other parts of the Nation suffer. Family incomes, educational opportunities and standards, the variety of choices of life generally, are very much greater and richer to the Caracas-resident than to the average resident in the rest of the Nation. This raises the issue of equity. The emphasis on national economic efficiency (which in all likelihood favors Caracas) may violate national goals about reasonably equal (material and opportunity) standards for all Venezuelan citizens, independent of where they live.

Thus, equity considerations may induce a re-ordering of the Nation's priorities such that resources -- public and indirectly also private -- are re-allocated to provide a different bundle of goods and services, than what efficiency considerations might warrant, different not only in terms of its composition but also in terms of its allocation over space (and possibly time). The trade-off between these two is ultimately determined by political considerations.²⁷

One possibility is to assign certain minimum standards throughout the Nation -- that is, highly specific standards for all kinds of infrastructure and for resources provided for educational purposes (teaching staff, school buildings, liberal scholarships for gifted students in other parts of the country to study in Caracas or other university cities, etc.), to give just two examples. These minimum standards would thus serve as the "operational" targets, as far as the equity-criterion is concerned, for government policy. Granted that at least these minimum standards be attained everywhere, other public resources would generally be allocated to remove impediments (such as negative neighborhood effects) to well-being and growth in the Venezuelan economy at large.

The Construction Industry as the Key Link Between Economic Planning
and Physical Planning

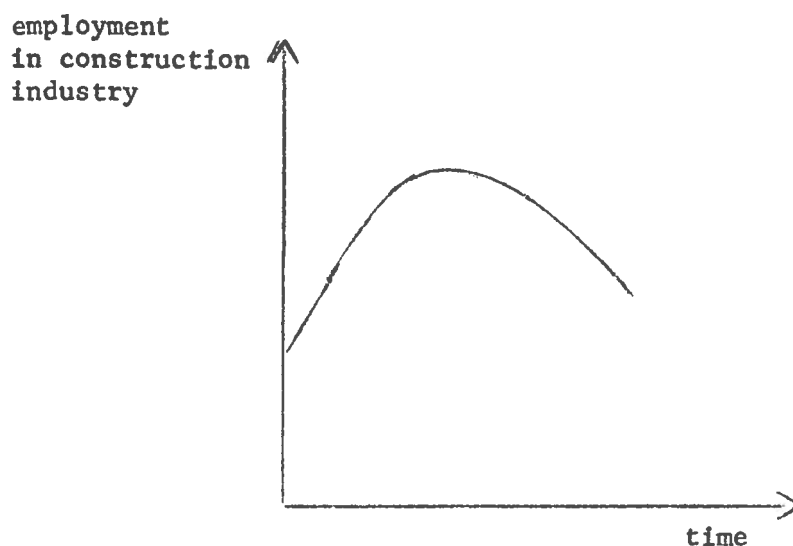
City-building is a means to the furtherance of national ends in Venezuela. In the city-building process, the construction industry plays a key role. The decisions made with respect to construction shape much of public resource allocation, in space as well as time. Many of the public construction projects -- like the Guri dam, the planned new airport at Maiquetia, and the planned metro-system of collective transportation in Caracas -- constitute extremely large indivisible assets. Some of them, like the metro project, will be city-structure forming: They will thereby have a strong influence also on private resource allocation.

Construction activity thus serves as an instrument for implementing physical planning. It is at the same time a powerful instrument of economic planning. In an economy like Venezuela's, with a high potential to finance greatly increased construction activity on the one hand, and with a considerable excess supply of labor on the other, the use of construction activity as a vehicle for an expansionary economic policy is not to be neglected.

In Venezuela today there is a great interest in the development of new towns. A common characteristic of the study reports that we have seen, pertaining to such areas as Ciudad Guayana, El Tuy, and El Tablazo, is that they envision and assume a rapid build-up in construction activity, with the result that the share of construction employment in total employment also increases significantly. However, after a decade or two -- depending on the city -- they also assume a sharp reduction in construction employment. A graph of the simplest possible form, indicating time on

the horizontal axis and the size of construction employment on the vertical axis, would for the cities mentioned look something like this:

Diagram 2.1. Illustration of the implied time-phasing of construction activity in Ciudad Guayana, El Tablazo, etc.

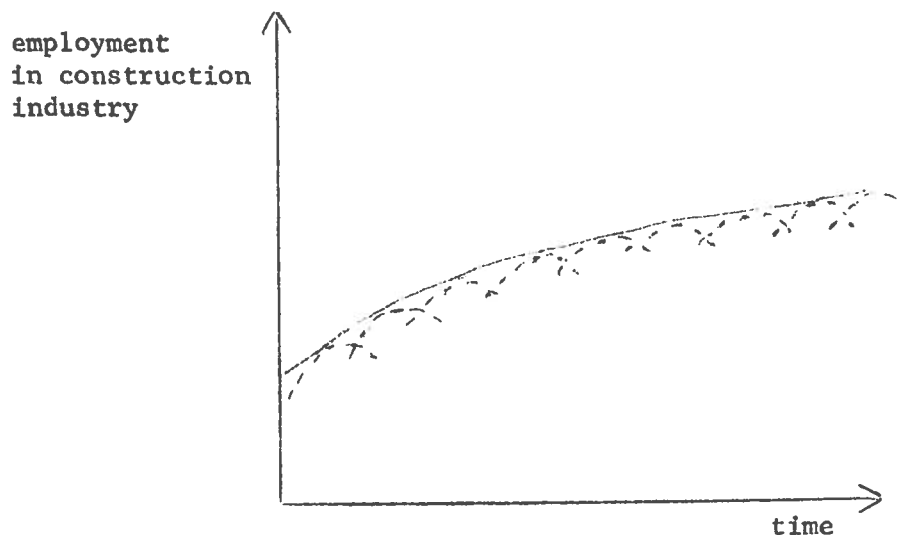


If instead of using absolute employment on the vertical axis, we used the percentage of all employment that the construction industry absorbs in the city, we would find that the curve would peak earlier and fall sharper.

Now, this sort of cycle in local construction activity would have very sharply retarding effects on all economic activity in the mentioned cities -- just as rapidly expanding construction would have strongly stimulating effects initially. Thus, we believe that the time-phasing of construction activity related to these cities cannot be isolated from the economic growth of the cities -- but, rather, will impose a strong business-cycle type of fluctuation on the over-all economic activity within the cities.

In our view, a high priority in federal government policy will be to maintain a high and rising level of employment in the construction industry -- nationally, and as far as possible, also locally. This may, at times, take some rather delicate economic policy maneuvering to achieve. It is likely that over the longer range it can be attained only by much stronger commitment to active fiscal and monetary policies -- and by coordination and synchronization of activities now carried out by different and autonomous administrative arms of the federal government. We thus feel that much closer attention is to be given to the time-phasing of construction activity, both nationally and locally, so that the general pattern on a simple time-graph would look something like this:

Diagram 2.2. Alternative time-phasing scheme of construction activity



The construction of individual projects -- the creation of new indivisible assets, if you wish -- would still show the cycle-phasing, with generally only maintenance activity once the project is completed. But total construction activity would be the envelope of these individual projects, properly time-phased.

Since the potential productivity of large new indivisible assets in Venezuela in such fields as transportation, communication and other forms of public infrastructure, is very high indeed, it is probably realistic to assume that demand for new construction activity will continually outpace available resources, for many decades to come. It would seem, therefore, that the federal government can exert sufficient leverage and moderating powers over all construction activity -- public and private -- such that time-phasing along the lines suggested is entirely feasible. In Caracas, in particular, construction activity can be planned to increase indefinitely. The primary reason for this is that even highly indivisible and physically long-lasting assets in Caracas will depreciate very fast, simply because of the rapid growth rate in the metropolitan area. Even if the recent rate of economic growth in Caracas were to slow down drastically -- say to a figure as low as 10 percent per year -- total production of goods and services around the year 2000 in Caracas would still be nearly twenty times as large as it is today. Whatever little we can say about such a high level of future production, it is clear that it will require a production apparatus and a spatial structure quite different from the one in use today. Consequently, it seems imperative to think in terms of rather short lengths of economic life of even some physically very long-lived indivisible assets, in other words, to calculate with very high rates of economic obsolescence of structures.

Needless to say, mistakes and misjudgements will inevitably be made by both private and public decision-makers in their capital investments. Sometimes too pessimistic, sometimes too optimistic, forecasts of the growth of individual cities will be made -- leading to erroneous

dimensioning of indivisible assets -- and possibly consequent re-allocations of resources, spatially.

Furthermore, there are always some risks in having a very large construction industry develop. Strong trade union power may mean very heavy elements of friction. Limits of entry to the ranks of construction workers may be imposed on new employees. Strong compartmentalization among the various building trades may make for duplication of efforts and generally for waste of resources. Hostile attitudes among the trade unions towards technical change may retard processes of capital-for-labor substitutions. Undue political power may be exerted by the trade unions, and so on. On the employers' side, continued high demands for construction works may tempt both public and private employers to a lenient position in bargaining with the unions, conducive to rapid increases in wage rates, which in turn might have spiralling effects upon other sectors of the economy -- and thus be inflationary.

Nevertheless, when all this is said and done, it still appears that the gains for the economy as a whole of having an expanding construction sector are vastly greater.

In its attempts to stimulate and support construction activity, the government has many options. It can subsidize the construction industry (e.g. in providing low income housing); it can subsidize the suppliers of the construction industry (for instance, to enable rancho families to buy building materials cheaply, for their very substantial do-it-yourself construction activity); it can subsidize households to increase their effective demands for housing (for instance by subsidizing loans); it can sponsor training programs for construction industry trades (electricians, brick-layers etc.); it can subsidize the acquisition

of land; it can engage in actual construction work of its own; and so forth. Indeed, the government is already engaged in many of these as well as other "options," and the primary problem is one of allocation among them.

There is a need for a monitoring-system that will continually and quickly provide current information on all construction activity (private as well as public), in Venezuela, so that warning-signals will also serve to avert too fast build-ups in local construction activity. (For instance, it appears reasonable to assume that the extremely intense surge in construction activity in Ciudad Guayana that occurred a few years ago, was very costly in terms of over-time pay and in terms of high wages and salaries to skilled labor, and possibly also in terms of high transportation costs in rushing material to work-places.)

Presently, much of the published information about the construction industry is in "constant bolivars," a rather suspect measure since the deflation procedures used to derive this information are in doubt. Such a measure is what one might call "synthetic." It seems to us that for a monitoring system, it would be of greater use to have directly observable and measurable indicators of construction activity. In view of the unemployment problems that the country faces, it would be useful to have information on the labor-absorbing characteristics of various types of construction projects, information on other resource use, as well as some output measures, such as number of room units completed. It appears that a great many public investment projects in large indivisible assets -- and the metro-system in Caracas and the airport in Maiquetia are good examples -- will have extremely high productivity, and will provide immediate sizable returns to the Venezuelan economy at large. It would be unfortunate if the Federal government

through misplaced frugality were to severely curtail such investment activity.

This is an issue which has ramifications well beyond the new Ministry of Urban Development and Housing. It has to do with the fact that the Venezuelan government is financing a considerable proportion of all public investment through its own savings. Sizable as these savings are, they are not sufficient to cover all capital investment projects -- and there is really no reason why they should. On the contrary, the question of whether the total government budget is balanced or not, lacks significance against the background of the broader national goals of increasing the utilization of resources (towards full employment) and removing impediments to economic and social growth in the national economy. We might add that the Venezuelan national debt is small in comparison with the debts of most other countries. Indeed, an increase in Venezuelan federal government debt instruments might improve the workings of financial markets in the country.

However, a more active budget policy, along the lines hinted, may invite political demagoguery, and it may not presently be politically realistic to move vigorously in the direction of increased federal domestic borrowing. Perhaps one should, therefore, put stronger emphasis, in financing, on changing the tax structure in Venezuela, and especially in a direction that would substantially increase its elasticity -- that is to say, to increase its responsiveness to growth in incomes and profits and rents in the Venezuelan economy.

The crucial linkage here is that, as more construction activity is started in the economy, there will be a more rapid increase in incomes, profits, and rents -- which in turn are the base for increased

tax revenues. With an elastic tax structure, the government would recoup a significant proportion of the increased incomes generated.

This is an example of a problem where the new Ministry will have to cooperate very closely with other Ministries, such as Ministerio de Hacienda. With the prevalent autonomy between Ministries, and even among agencies within a Ministry, can such cooperation and coordination be achieved?

FOOTNOTES

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2. Rama, C. M. De la singularidad de la urbanizacion en el Uruguay (Revista de Ciencias Sociales, Vol. VI, No. 2, June 1962, p. 183).
3. Shoup, C. S. and other, The Fiscal System of Venezuela (1959, p. 48). For a formal analysis of the problem of coverage in available statistics, see Appendix 1.
4. These figures are based on estimates given in the following documents:
 - a) MOP/DP, Poblacion para 1970, 1980, y 1990 de los Principales Poblados en Venezuela (1969).
 - b) MOP/DP, Programa 104, (1969).
 - c) El Plan de la Nacion, 1965-1968 (1967), p. 84.
 - d) MOP/DP, Proyecto de Bases para una Ley de Planificacion Territorial y Urbana (1970), p. 18.
5. Meier, R. L., The Developmental Features of Great Cities of Asia (Center for Planning and Development Research, U.C. Berkeley, 1969).
6. Meier, op. cit., p. 50.
7. For an interesting analysis and proof, see H. Simon, Effects of Increased Productivity upon the Ratio of Urban to Rural Population, (Econometrica, Vol. 15 (1947), pp. 31-42).
8. Needless to say, within the bundle of agricultural commodities we will find some for which the income elasticity is in fact quite high, i.e., some fruits, berries and nuts, but we are here speaking of only the broad aggregate of agricultural products.
9. Perhaps the best known of these studies is Dhrymes, P. J., A Comparison of Productivity Behavior in Manufacturing and Service Industries (The Review of Economics and Statistics, 1963, pp. 64-69).
10. See Fuchs, R. (ed.), Production and Productivity in the Service Industries (1969), pp. 11-12.
11. Alonso, W., Industrial Location and Regional Policy in Economic Development (Center for Planning and Development Research, U.C., Berkeley, 1968), pp. 23-24.

12. See Fuchs, V. R., The Service Economy (1968).
13. See, for instance, the section on "Poblacion" in: La Economia Venezolana en los ultimos veinticinco anos (Banco Central de Venezuela, 1966) and Plan de la Nacion 1965-1968 (CORDIPLAN, 1967), pp. 84-91.
14. Jacobs, J. The Economy of Cities (1969).
15. See IV Plan de la Nacion, Sector Agricola, 1970-1974, especially pp. 9-22.
16. Moscovitch, Employment Effects of the Urban-Rural Investment Choice (In: Rodwin, L., Planning Urban Growth and Regional Development [1969]).
17. Isard, W., Location and Space-Economy (1956), pp. 182-183.
18. Ayres, R. U. & Kneese, A. V., Production, Consumption, and Externalities (American Economic Review, June 1969, pp. 282-297).
19. Ayres, Kneese, op. cit., p. 283.
20. Op. cit., p. 284.
21. Plan de la Nacion, 1965-1968, p. 91.
22. That relaxation of such bottlenecks in industry by means of immigration can be a touchy issue, is hinted in the following excerpt from a recent statement by President Caldera in one of his Thursday evening press conferences on T.V. "Quiero decirle a los trabajadores una cosa que a mi me parece muy importante: a veces la inmigracion de algunos tecnicos, lejos de quitarle oportunidades a los obreros venezolanos, les permite mayores oportunidades de trabajo; porque cuando una obra se paraliza, o no se emprende, o se desarrolla a medias, debido a que faltan algunos tecnicos en determinados ramos, entonces sufren no solamente los trabajadores de ese ramo, sino todos los demas que tienen que cumplir una tarea. Por ejemplo, si estamos en una construccion y faltan electricistas, entonces se puede parar toda la obra o hay que esperar que se concluya esa, para emprender otras; y son centenares de trabajadores los que tienen que quedar cesantes por la ausencia de cinco o diez electricistas. Asi ocurre en muchas actividades en las cuales al romperse el ciclo de produccion porque falta, en un determinado aspecto, el numero de trabajadores suficientes, entonces sufren danos todos los demas que participan en el resto de la produccion."
23. Forrester, J. W., Urban Dynamics (1969).
24. Goldner, W., The Lowry Model Heritage (Institute of Transportation and Traffic Engineering, U.C., Berkeley, 1970).

25. Support for the opposite view is given in: Friedmann, J., Regional Development Policy: A Case Study of Venezuela (1966), and Rodwin, L. (ed.), Planning Urban Growth and Regional Development: The Experience of the Guayana Program of Venezuela (1969).
26. Leibenstein, H. Organizational or Frictional Equilibria, X-Efficiency, and the Rate of Innovation (Quarterly Journal of Economics, Nov. 1969, pp. 600-623).
27. An interesting approach to this problem is used by McGuire and Garn in a recent paper. They suggest the use of a welfare, or preference, function which explicitly contains a "trade-off" between equity and efficiency criteria. They have applied their formula on an experimental basis in the selection of regional development projects for the United States Economic Development Administration, an agency which makes grants-in-aid (and loans) to economically depressed localities in the United States. See McGuire, M. & Garn, H., The Integration of Equity and Efficiency Criteria in Public Project Selection, (Economic Journal, Dec. 1969, pp. 882-893).

APPENDIX 1

A Simple Note Intended to Illustrate the Biases in
Published Data Which Arise Because of Unevenness in Coverage

Proposition: Published data tend to overestimate the rate of urbanization, as measured between any two points in time, if -- at the earlier point in time -- the rural population is underestimated relative to the urban population, and even if the coverage increases between the two points, as long as the coverage increases at the same rate in both rural and urban areas.

Notations: Actual rural population at time $t = R(t)$

Actual urban population at time $t = U(t)$

Measured rural population at time $t = aR(t)$

Measured urban population at time $t = bU(t)$

Here, a and b are percentage coefficients measuring coverage.

We define, for simplicity, the rate of urbanization at time t as $\frac{U(t)}{R(t)} = k(t)$

Assumptions: (i) $1 \geq b > a > 0$

(ii) $k(1) > k(0)$

Proof: Using the above symbols, we can write the actual fraction of people living in rural areas at time 0:

$$\frac{R(0)}{R(0) + U(0)}$$

And, correspondingly, at time 1: $\frac{R(1)}{R(1) + U(1)}$

However, the measured fraction of people living in rural areas at the two points in time is, respectively:

$$\text{at time } 0 \quad \frac{aR(0)}{aR(0) + bU(0)}$$

$$\text{at time } 1 \quad \frac{aR(1)}{aR(1) + bU(1)}$$

Using the definition of $k(t)$, the actual fractions of people living in rural areas at times 0 and 1, are:

$$\frac{1}{1 + k(0)} \quad \text{and} \quad \frac{1}{1 + k(1)}, \quad \text{respectively.}$$

Similarly, the measured fractions of people living in rural areas are:

$$\frac{1}{1 + \frac{b}{a} k(0)} \quad \text{and} \quad \frac{1}{1 + \frac{b}{a} k(1)}$$

Dividing the first two percentage fractions (to obtain the change in the fraction of people living in rural areas between the two points in time) into one another, we have

$$(iii) \quad \frac{1 + k(0)}{1 + k(1)}$$

Similarly, obtaining a ratio of the measured fractions:

$$(iv) \quad \frac{1 + \frac{b}{a} k(0)}{1 + \frac{b}{a} k(1)}$$

By our assumptions (see first page), both ratios will show a fall in the ratio of people living in rural areas between the two points in time, but according to our proposition

$$(v) \quad \frac{1 + k(0)}{1 + k(1)} > \frac{1 + \frac{b}{a} k(0)}{1 + \frac{b}{a} k(1)}$$

(The actual fall in the rural fraction is smaller than the fall in the measured fraction.)

By assumption,

$$(vi) \quad k(1) - k(0) > 0$$

$$(vii) \quad 1 - \frac{b}{a} < 0$$

$$(viii) \quad \text{So} \quad (k(1) - k(0)) \left(1 - \frac{b}{a}\right) < 0$$

Multiplying through and adding $1 + \frac{b}{a} k(0) k(1)$ on both sides, we have:

$$(ix) \quad 1 + k(1) + \frac{b}{a} k(0) - k(0) - \frac{b}{a} k(1) + \frac{b}{a} k(0)k(1) < 1 + \frac{b}{a} k(0)k(1)$$

Transposing $k(0)$ and $\frac{b}{a} k(1)$ and factoring, we have

$$(x) \quad (1 + k(1)) \left(1 + \frac{b}{a} k(0)\right) < (1 + k(0)) \left(1 + \frac{b}{a} k(1)\right)$$

Dividing on both sides by $(1 + k(1)) \left(1 + \frac{b}{a} k(1)\right)$

the expression in (v), above is obtained. Since the right-hand side of (v) is homogeneous of degree, zero in the coverage rates, a and b , the proposition follows, and the proof is completed.

APPENDIX 2

A Rough Calculation of Marginal
Productivity of Capital in Venezuela

Net Capital Investment, I, is some share of total output (Net Domestic Product), Y,

$$I = aY$$

Total Capital stock to output is some ratio

$$\frac{K}{Y} \approx b \quad (\text{may change over time but slowly})$$

Then, the rate of growth of capital stock is

$$\Rightarrow \frac{I}{K} = \frac{a}{b}$$

Rate of growth of output = g

$$\frac{\dot{Y}}{Y} = g$$

Rate of growth of population = q

$$\frac{\dot{P}}{P} = q$$

Rate of change in output per capita

$$\frac{\frac{\Delta \left(\frac{Y}{P} \right)}{\frac{Y}{P}}}{\frac{Y}{P}} = \frac{\frac{P\Delta Y - Y\Delta P}{P^2}}{\frac{Y}{P}} = \frac{\Delta Y}{Y} - \frac{\Delta P}{P}$$

$$\frac{\Delta\left(\frac{Y}{P}\right)}{\frac{Y}{P}} = g - q$$

Some of the increment in the capital stock is needed simply to provide the new workers (= new entrants to the total work force) with the same average amount of capital as the present work force has (per worker).

Assuming, as a rough approximation, constant returns to scale in the Venezuelan economy as a whole, we take this needed rate of increase in the total capital stock to be q .

The remainder of the rate of increment to the capital stock is called capital deepening: it goes to increase the capital stock available to each worker (newcome or not).

$$\begin{aligned} \frac{\Delta\left(\frac{K}{P}\right)}{\frac{K}{P}} &= \frac{\dot{K}}{K} - \frac{\dot{P}}{P} = \frac{I}{K} - \frac{\dot{P}}{P} \\ &= \frac{a}{b} - q \end{aligned}$$

Under the constant-returns assumption:

$$\frac{\Delta\left(\frac{Y}{P}\right)}{\Delta\left(\frac{K}{P}\right)} = \frac{\partial Y}{\partial K}$$

Now, $\Delta\left(\frac{Y}{P}\right) = (g - q) \frac{Y}{P}$

$$\Delta\left(\frac{K}{P}\right) = \left(\frac{a}{b} - q\right) \frac{K}{P}$$

$$\Rightarrow \frac{\Delta\left(\frac{Y}{P}\right)}{\Delta\left(\frac{K}{P}\right)} = \frac{(g - q) Y}{\left(\frac{a}{b} - q\right) K} = \frac{(g - q) Y}{\left(\frac{a}{b} - q\right) Yb} = \frac{g - q}{\left(\frac{a}{b} - q\right) \cdot b}$$

$$\Rightarrow \frac{g - q}{\left(\frac{a}{b} - q\right) b} = \frac{\partial Y}{\partial K}$$

We can use information available in "El Plan de la Nacion 1965-1968" and in "La Economia Venezolana en los ultimos veinticinco anos" (Caracas 1966) to make some numerical calculations. Since the available statistics are somewhat unreliable, we use intervals, rather than points, on the line. Calling the numerator N and the denominator D on the left-hand side of the equality above, we come out with the following ranges for N and D:

$$0.035 \leq N \leq 0.06$$

$$0.07 \leq D \leq 0.10$$

From this, it appears that the marginal rate of capital productivity in Venezuela (averaged out for private and public capital) is at least 35 percent. (A corresponding calculation for the U.S. would probably give a value of 20 percent or less.)