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Pioneers in Development

A WORLD BANK PUBLICATION

elsewhere.¹⁴ I shall rather express reservations of a very different order that reflect the difficulties attending any attempt to treat political economy seriously. As soon as we endogenize politics and therefore policymaking, we have to worry that there may be no degree of freedom left to say what ought to be done from the policy viewpoint. For policy, having been endogenized, cannot be arbitrarily set at any level. Thus, consider the standard analysis of the effects of import competition on domestic income. In the orthodox $2 \times 2 \times 2$ model with two factors, two traded goods, and two countries, we know that free trade is the best policy for a small country without domestic distortions. Therefore, the "optimal" response to import competition—that is, terms of trade improvement—is to retain free trade and to profit from the improved terms of trade. But this standard economic policy prescription ceases to be relevant if we endogenize policy. Thus, if we were to model a two-party political system, so that the standard model is now a $2 \times 2 \times 2 \times 2$ model and there are cost functions for the political process of lobbying for and against a tariff, the model can be solved for an endogenous tariff.¹⁵ But as soon as we do this, the result of import competition is yet another endogenous tariff. To ask, in this model of endogenous policymaking, what free trade implies is to ask an unrealistic question, for who shall bring this free trade policy about?

I am afraid that Prebisch is caught in this dilemma and does not fully realize it. He transits from his second and third stages, where his analysis of what the periphery should do (implement the IS strategy) is very much in the old tradition of asking what an omniscient and benign periphery government ought to do, to his fifth stage, where the analysis shifts gear to how the capitalist system in the periphery is "deterministically" locked into a developing and unavoidable crisis. Then he still hopes that somehow market socialism will solve this crisis. But, even if it can, who will bring it into being? Perhaps the smart thing to do is to prognosticate, not advocate, and let history judge who is right.

14. "Comment on Raúl Prebisch, 'The Latin American Periphery in the Global System of Capitalism,'" in *Proceedings of the Congress of the International Economic Association*, Mexico City, 1980, vol. 1, Shigeto Tsuru, ed. (London: Macmillan, forthcoming).

15. See the tariff-making models of Robert Feenstra and Jagdish N. Bhagwati, "Tariff Seeking and the Efficient Tariff," and of Ronald Findlay and Stanislaw Wellisz, "Endogenous Tariffs, the Political Economy of Trade Restrictions, and Welfare," both in Jagdish N. Bhagwati, ed., *Import Competition and Response* (Chicago: University of Chicago Press, 1982).

Paul N. Rosenstein-Rodan

PAUL N. ROSENSTEIN-RODAN was born in Crakow, Poland, in 1902, and spent his early life in Vienna. He received his doctorate from the University of Vienna in 1925. In 1930 he became a British citizen and taught at University College of the University of London for the next seventeen years. In 1947 he went to the World Bank where he became the Assistant Director of the Economics Department and Head of the Economic Advisory Staff. He was Professor of Economics at the Massachusetts Institute of Technology, 1953–68, and at the University of Texas, 1968–72. His present position is Professor of Economics and Director of the Center for Latin American Development Studies at Boston University, where he has been since 1972.

Rosenstein-Rodan began his professional work in economics in 1925 with studies on the frontiers of the Austrian theory of consumer demand. His early studies were in pure economic theory—the concepts of complementarity in consumption and production, the time sequence of economic adjustments, and economies of scale. All of these later carried over to his applied work in development economics.

At MIT he pursued research on problems of economic development, especially as director of projects in Italy, India, and Chile. From 1962 to 1966 he served on the Committee of IX of the Alliance for Progress and became increasingly engaged in Latin American development research.

He has been honored with decorations from Italy (1958), Venezuela (1967), and Chile (1970), and became a Fellow of the American Academy of Arts and Sciences (1961), Fellow of the Institute of Social Studies, The Hague (1962), and Fellow of the Academia Pontifica Tiberina, Rome (1967).

His principal publications include "Grenznutzen" (Marginal Utility) (1927), translated in *International Economic Papers*, no. 10 (New York: Macmillan, 1960); "Das Zeitmoment in der Mathematischen Theorie des Wirtschaftlichen Gleichgewichtes," *Zeitschrift für Nationalökonomie*, vol. 1 (1929); "La Complementarietà: Prima delle Tre Etappe del Progresso della Teoria Economica Pura," *La Riforma Social*, vol. 44 (1933); "The Role of Time in Economic Theory," *Economica*, New Series (1934);

"Problems of Industrialization of Eastern and South-Eastern Europe," *Economic Journal* (June-September 1943); "The International Development of Economically Backward Areas," *International Affairs* (April 1944); "Disguised Unemployment and Underemployment in Agriculture" (Cambridge, Mass.: MIT Center for International Studies, 1956); "International Aid for Underdeveloped Countries," *Review of Economics and Statistics* (May 1961); "Notes on the Theory of the 'Big Push,'" (Cambridge, Mass.: MIT Center for International Studies, 1957), reprinted in *Economic Development for Latin America*, Proceedings of a conference held by the International Economic Association, Howard S. Ellis, ed. (London: Macmillan, 1961); as editor, *Capital Formation and Economic Development* (Cambridge, Mass.: MIT Press, 1964); "The Consortia Technique," *International Organization*, vol. 22, which also appeared in Richard Newton Gardner and Max F. Millikan, eds., *The Global Partnership* (New York: Praeger, 1968); "A Study on Independent International Evaluation of National Development Effort," TD/8&/Suppl. 15 (New Delhi: UNCTAD, December 11, 1967); "Criteria for Evaluation of National Development Effort," *Journal of Development Planning*, no. 1 (1969); "The Have's and Have-Not's Around the Year 2000," in Jagdish N. Bhagwati, ed., *Economics and World Order: From the 1970's to the 1990's* (New York: Macmillan, 1972); and *The New International Economic Order* (Boston, Mass.: Boston University, 1981).

Natura Facit Saltum: Analysis of the Disequilibrium Growth Process

DURING THE SECOND WORLD WAR, I proposed in London the formation of a group to study the problems of economically underdeveloped countries instead of the more usual work on current economic problems related to the war. If we were to emerge alive, we should want not to return to the previous status quo but to form a better world. A study group was organized at the Royal Institute for International Affairs (Chatham House) and worked from 1942 till 1945 on problems of "underdeveloped countries." This term appeared then for the first time. My 1943 article in the *Economic Journal* served as a basic document for the group and is now in many anthologies of economic studies of the Third World.¹

Eastern and Southeastern Europe were selected as a model not because of any special interest in those countries, but because their governments in exile were in London and because Eastern and Southeastern Europe (like Latin America) constitute a group of similar but not identical models. If one compares India, Spain, and Ecuador everything is different. What is cause and what is effect is anybody's guess. When one takes a group of similar countries, they differ from each other in one or two but not in all respects; it is then easier to examine what is cause and what is effect.

Natura Facit Saltum

If I were to give one characterization to my early thoughts about development, it would be "natura facit saltum"—nature does make a jump, the opposite of the motto "Natura non facit saltum" that Alfred Marshall thought appropriate for economics. Not traditional static equilibrium theory but an analysis of the disequilibrium growth process is what is essential for understanding economic development problems.

1. Paul N. Rosenstein-Rodan, "Problems of Industrialization of Eastern and South-Eastern Europe," *Economic Journal*, vol. 53 (June-September 1943), pp. 202-11. This was a chapter from the report of the Economic Group of the Committee on Reconstruction, the Royal Institute of International Affairs. Important predecessors of the theory of development are Harrod-Domar, Joan Robinson, Keynes, and Colin Clark.

The *Economic Journal* article of 1943 attempted to study the dynamic path toward equilibrium, not merely the conditions which must be satisfied at the point of equilibrium. What matters is "the pursuit curve."² The pursuit curve shows the dynamic path toward equilibrium—not only the conditions at the point of equilibrium. Equilibrium points are like a compass showing the direction toward the North Pole or South Pole without implying that one is on the North Pole or South Pole. We are therefore concerned not only with the question of the existence of equilibrium, but the possibilities of nonexistence of equilibrium.

The 1943 article introduced four innovations which subsequently became so generally accepted that it is difficult to understand why they originally aroused so much opposition. The first innovation was a concern with "excess agrarian population" (disguised unemployment), which, although a weakness, may represent a source of development and strength. The second was the concept of "pecuniary" external economies, which yielded economies of scale—that is, increasing returns which were fully treated in Alfred Marshall's footnotes but considered to be a "second order of smalls." To take advantage of them, however, planned industrialization comprising simultaneous planning of several complementary industries is needed. The third new idea was that before building consumer goods factories, a major indivisible block of social overhead capital or infrastructure must be built and sponsored because private market initiatives will not create it in time. Low wages should have been a sufficient incentive to create a textile industry in India in the post-Napoleonic era and not in Lancashire, England. Indian wages were 50 or 60 percent lower than the low wages in England. There was no danger of currency manipulation or trade obstacles under British control; the prospect of building a textile mill in Bombay instead of Manchester or Coventry seemed most attractive. Further analysis revealed, however, that in order to build a factory one would have to build a bridge or finish a road or a railway line or later an electric power station. Each of these elements in the so-called social overhead capital requires a minimum high quantum of investment which could serve, say, fifty factories but would cost far too much for one. One cannot build a bridge small enough to allow only a hundred crossings a day. The efficient minimum would be profitable for fifty factories but not for one. The necessary minimum capital outlay outside of the textile mill

2. A dog pursues a hare, without anticipation, along the shortest distance at which he sees him (a straight line). Meanwhile the hare runs from point 1 to point 2. When the dog sees him again in this new position he again runs along the shortest distance (a straight line) in which he sees him. Meanwhile the hare runs to point 3, and so on. The line along which the dog runs is what we want to explain. It is determined by a straight-line distance wherever the dog sees the hare. The overwhelming majority of the points of the pursuit curve are disequilibrium points. It may be called "state of equilibrium" if the dog ultimately catches the hare.

(Pareto had mentioned it but never worked it out.)

would more than compensate for the advantage of cheaper labor. Lower wages are not a sufficient incentive for investment.

Industrialization meant (and still means today) urbanization. What are towns compared with rural zones? They are areas of relatively higher wages. Industrialization proceeded by concentrating in areas of high wages (towns), not in the rural areas. The rich countries were the urban zones and the poorer countries the rural zones of the world economy. That was the reason for the widening gap between developed and underdeveloped countries. The market mechanism alone will not lead to the creation of social overhead capital, which normally accounts for 30 to 35 percent of total investment. That must be sponsored, planned, or programmed (usually by public investment). To take advantage of external economies (due to indivisibilities) required an "optimum" size of enterprises to be brought about by a simultaneous planning of several complementary industries. In the process of development, pecuniary external economies play the same role as technological ones.³

The fourth innovation was the emphasis on "technological external economies," which are not due to indivisibilities but very largely due to "inappropriability." Under a system of slavery it paid the owner to invest in training a slave because the increase in skills would benefit the investor. When slavery was abolished, a worker trained could contract with an outside employer who did not have to bear the cost of his training. Whoever invested in the training of the worker would run the risk of not being able to appropriate the benefit of increased productivity. The training and education of workers under competitive market conditions would therefore be below optimum. This is a widespread phenomenon, not so rare as the bucolic example in a pastoral economy of not knowing whose bees alight on whose apple trees to produce honey. This example suggested a bias that technological external economies are logically interesting but practically irrelevant. In fact, the process of industrialization of underdeveloped countries was and is largely based on the advantages of training, learning on the job, and the formation of human capital (without using this terminology). In other words, technological external economies are not a second order of smalls, as already stated in 1943 and later on in the theories of human capital (Jacob Mincer and T. W. Schultz).

The market mechanism does not realize the "optimum" either in one nation or between nations because it relies on such unrealistic assumptions as linear homogeneous production functions, no increasing returns or economies of scale or of agglomeration, and no phenomenon of minimum quantum or threshold. This obscures the nature of the development process and the risks involved. Nothing in theology or technology ordains that God created the world convex downwards.

3. As Tibor Scitovsky correctly interpreted in his article, "Two Concepts of External Economies," *Journal of Political Economy*, vol. 62, no. 2 (April 1954).

In terms of contemporary theory, the essence of the 1943 article may seem to rest on the basic question whether perfect future markets can exist for all the commodities in the context of a future which is both open-ended and uncertain.⁴ Although I recognized that future markets and future prices could provide necessary additional signaling devices, I stated that "It is a moot point whether perfect future markets for all goods can exist. [My] suspicion (without proof) is that they cannot exist for the same reasons for which perfect foresight is impossible. In reality they certainly do not exist."⁵

The seeds of my development analysis had been planted earlier when I became interested in the themes of complementarity and of the hierarchical structure of wants, together with the role of time—that is, the choice of an economic period over which an individual allocates his scarce resources.⁶ The dynamics of wants and their interrelatedness were much more important to me than the neoclassical attempt at precise characterization of the properties of the utility function. Consumption complementarities, the role of time, the pursuit curve, plus external economies—all these dynamic factors were not to be considered as a second order of smalls, but even more as pervasive in a less developed country.

Big Push

My thinking during the 1940s and 1950s led to the theory of the "big push."⁷ "There is a minimum level of resources that must be devoted to . . . a development program if it is to have any chance for success. Launching a country into self-sustaining growth is a little like getting an airplane off the ground. There is a critical ground speed which must be passed before the craft can become airborne."⁸ Proceeding bit by bit will not add up in its effects to the sum total of the single bits. A minimum

4. See Sikhamoy Chakravarty, "Paul Rosenstein-Rodan: An Appreciation," *World Development*, vol. 11, no. 1 (January 1983), p. 74.

5. Rosenstein-Rodan, "Notes on the Theory of the 'Big Push'" (Cambridge, Mass.: MIT Center for International Studies, 1957), reprinted in *Economic Development for Latin America*, Proceedings of a conference held by the International Economic Association, Howard S. Ellis, ed. (London: Macmillan, 1961).

6. Rosenstein-Rodan, "Grenznutzen," in *Handwörterbuch der Staatswissenschaften*, 4th ed. (Jena, 1927), vol. 4, pp. 1190–1213; translated into English by Wolfgang F. Stolper, in *International Economic Papers*, no. 10 (New York: Macmillan 1960), pp. 71–106; "La Complementarietà: Prima delle Tre Etappe del Progresso della Teoria Economica Pura," *La Riforma Sociale*, vol. 44 (1933), pp. 157–308; "The Role of Time in Economic Theory," *Economica*, New Series (1934), pp. 77–97.

7. "Notes on the Theory of the 'Big Push.'"

8. MIT Center for International Studies, Special Committee to Study the Foreign Aid Program, *The Objectives of U.S. Economic Assistance Programs* (Washington, D.C., 1957), p. 70.

quantum of investment is a necessary—though not sufficient—condition of success.

This theory of the big push contradicts the conclusions of traditional static equilibrium theory in three respects. First, it is based on a set of more realistic assumptions of certain indivisibilities and nonappropriabilities in the production functions. These give rise to increasing returns and to technological external economies. Second, the theory is meant to deal with the path to equilibrium. At a point of static equilibrium net investment is zero. The theory of growth must be very largely a theory of investment. Third, in addition to the risk phenomena and imperfections characterizing investment, the markets in underdeveloped countries are even more imperfect than in developed countries. The price mechanism in such imperfect markets cannot therefore be relied upon to provide the signals that guide a perfectly competitive economy toward an optimum position.

Underlying the need for a big push is the pervasiveness of rural underdevelopment—excess agrarian population. Given that mass migration and resettlement are not feasible, I stated that "The movement of machinery and capital towards labor, instead of moving labor towards capital, is the process of industrialization which, together with agrarian improvement, is the most important aspect of the economic development of the depressed areas."⁹

Industrialization has to be promoted not because of terms of trade, but because external economies are greater in industry than in agriculture alone. Rejecting a strategy of self-sufficiency or an inward-looking strategy of industrialization, I argued for industrialization with the help of international investment and for a pattern of industrialization that would preserve the advantages of an international division of labor and would therefore, in the end, produce more wealth for everybody.

The crucial task of a development program was to achieve sufficient investment to mobilize the unemployed and underemployed for the purpose of industrialization. To reach an optimum size of the industrial enterprises, however, the area of industrialization must be sufficiently large. This calls for planned industrialization by the simultaneous planning of several complementary industries.

These four themes (disguised unemployment, pecuniary external economies, social overhead capital, and technological external economies) were then studied in more detail, first in Italy. Special attention was given to disguised unemployment and consequent dualism as well as the possibility of using welfare-improving policy interventions to realize a rate of growth 60 percent higher than in the previous century (that is, 5 percent a year rather than the previous 3 percent). The studies were followed up in India with special emphasis on analysis of the capital-output ratio, which was

9. "The International Development of Economically Backward Areas," *International Affairs*, vol. 20, no. 2 (April 1944), p. 161.

assumed to be too low in the India five-year plan, being in reality nearer 3 to 1 than 2 to 1. We also pointed out the importance of shadow pricing, especially the shadow price of capital exemplified by investments in electric power.

General principles of an international aid policy were first studied at the U.N. Economic Commission for Latin America (ECLA) preparatory conference for Quintandinha in the summer of 1954. These principles were used for the doctrine of aid policy in my 1961 paper¹⁰ and later used and applied in the Alliance for Progress. The role of aid policy is ultimately a value judgment but one whose implications were spelled out best in the Alliance for Progress. The philosophy of development remains as valid as ever—it was the real operational manifesto for a New International Economic Order—although it failed by the “trahison des clercs”—that is, the sabotage of the Alliance for Progress by both the U.S. and Latin American bureaucracies.

Disguised Unemployment and Underemployment

The concept of “agrarian excess” or “surplus population” or of “disguised unemployment in agriculture” emerged in the late 1920s. But it was made one of the cornerstones of the theory of development in the 1940s and 1950s, despite the denial of its existence by such critics as Jacob Viner, Gottfried Haberler, and T. W. Schultz. Schultz had said, “I know of no evidence for any poor country anywhere that would even suggest that a transfer of some small fraction, say 5 per cent, of the existing labour force out of agriculture, with other things equal, could be made without reducing its production.”¹¹

In contrast to this view, I believed that disguised unemployment of more than 5 percent exists in many—though not all—underdeveloped countries. As proof of this, I offered a description and measurement of disguised underemployment in southern Italy.¹² Focusing on the direct method of measuring the static surplus—that is, an empirical sample enquiry to determine the amount of population in agriculture that can be removed from it (for forty-eight to fifty weeks a year) without any change in the method of cultivation and without any reduction in output—I

10. “International Aid for Underdeveloped Countries,” *Review of Economics and Statistics*, vol. 43, no. 2 (May 1961); and “The Consortia Technique” (Cambridge, Mass.: MIT Center for International Studies, 1968).

11. T. W. Schultz, “The Role of Government in Promoting Economic Growth,” in Leonard D. White, ed., *The State of the Social Sciences* (Chicago: University of Chicago Press, 1956).

12. “Disguised Unemployment and Underemployment in Agriculture” (Cambridge, Mass.: MIT Center for International Studies, 1956); and Food and Agriculture Organization, *Monthly Bulletin of Agricultural Economics and Statistics* (1956).

estimated three types of underoccupation: removal, equivalent to true disguised unemployment; irremovable frictional unemployment; and seasonal underemployment.

Disguised underemployment was important for models of dualism. It also placed emphasis on labor-intensive methods of industrialization that involve investing in consumption industries while importing heavy industry products.

Pecuniary External Economies

I had been impressed by Allyn Young’s analysis that increasing returns accrue to a firm not only with the growth of its size but also with the growth of the industry and of the industrial system as a whole.¹³ I believed more emphasis should be given to increasing returns through attention to the indivisibility of demand and indivisibility in the production function.

The indivisibility or the complementarity of demand means that in reality various investment decisions are not independent. Investment projects have high risks because of uncertainty whether their products will find a market. But if investment occurs on a wide front, then what is not true in the case of a single investment project will become true for the complementary system of many investment projects: the new producers will be each other’s customers, and the complementarity of demand will reduce the risk of not finding a market. Risk reduction is in this sense a special case of external economies. Reducing such interdependent risks increases naturally the incentive to invest.

The low elasticities of demand in low-income countries make it much more difficult, however, to fit supplies to demands. The difficulty of fitting demand to supply on a small scale constitutes a higher risk in a small market than in a large and growing one. The complementarity of demand will reduce the marginal risk of growing and diversified investments, but it will be below a minimum “sensible” for small doses of investment. There is therefore a minimum threshold at which the complementarity of demand manifests itself. The discontinuity in the complementarity of demand may be called indivisibility of demand. To reach the threshold and take advantage of complementarity in demand, a minimum quantum of investment is required to produce the bulk of additional wage goods on which additionally employed workers will spend their additional income.¹⁴ On the supply side, a high optimum size of firm may be required because of indivisibilities of inputs, processes, or outputs that give rise to increasing returns.

13. Allyn A. Young, “Increasing Returns and Economic Progress,” *Economic Journal*, vol. 38 (December 1928), pp. 527–42.

14. Rosenstein-Rodan, “Notes on the Theory of the ‘Big Push,’” section 4.

Social Overhead Capital

A most important instance of indivisibility and externalities is social overhead capital. Although subject to long gestation periods and delayed yields, the provision of social overhead capital creates investment opportunities in other industries. The provision of such "overhead costs" for the economy as a whole requires a large minimum size of investment in each infrastructure project and an irreducible minimum industry mix of different public utilities. A high initial investment in social overhead capital is necessary to pave the way for additional, more quickly yielding, directly productive investments. I considered this indivisibility one of the main obstacles to development.

Indivisibility in the supply of savings was also viewed as a major problem in low-income countries. To provide for a high minimum quantum of investment, the marginal rate of saving out of increased income must become much higher than the average rate of saving. The zero (or very low) price elasticity of the supply of savings and the high income elasticity of savings were somewhat loosely described as a "third indivisibility."

Technological External Economies

Another significant source of technological external economies was the training of labor.

The first task of industrialization is to provide for training and "skilling" of labor which is to transform [Eastern European] peasants into full-time or part-time industrial workers. The automatism of *laissez-faire* never worked properly in that field. It broke down because it is not profitable for a private entrepreneur to invest in training labor. There are no mortgages on workers—an entrepreneur who invests in training workers may lose capital if these workers contract with another firm. Although not a good investment for a private firm, it is the best investment for the State. It is also a good investment for the bulk of industries to be created when taken as a whole, although it may represent irrecoverable costs for a smaller unit. It constitutes an important instance of the Pigovian divergence between "private and social marginal net product" where the latter is greater than the former.¹⁵

15. "Problems of Industrialization of Eastern and South-Eastern Europe," pp. 204-05; also, "The International Development of Economically Backward Areas," p. 160.

The indivisibilities and the external economies to which they give rise plus the technological external economies of training labor were the theoretical foundations for my advocacy of an integrating, synchronizing "big push" to "jump" over the economic obstacles to development.

The Market and Programming

The recognition of the complementarity of all investment projects introduced a new set of determinants of optimum investment criteria. They rely on the *delegation* of a "plan" which must be elaborated, while the market mechanism relies on the dispersal of decisions when the program emerges as a *result* not as a previously worked out "plan" of a campaign. A program approach was considered to be logically precedent to project analysis. The dispersal of single investment decisions based on maximization of profit as the only criterion will not lead to the optimum combination. This is for the following reasons:

- The investor maximizes the private, not the social, net marginal product. External economies are not sufficiently exploited. Complementarity of industries is so great that simultaneous inducement rather than hope for autonomous coincidence of investment is called for.
- The lifetime of equipment is so long that the investor's foresight is likely to be more imperfect than that of the buyer and seller or of the producer. The individual investor's risk may be higher than that confronting an overall investment program. The costs of an erroneous investment decision are high; punishment in the form of loss of capital afflicts not only the investor but also the national economy.
- Because of the indivisibility (lumpiness) of capital, large rather than small changes are involved. Yet the price mechanism works perfectly only under the assumption of small changes.
- Capital markets are notoriously imperfect markets, governed not only by prices but also by institutional or traditional rationing quotas.¹⁶

For these reasons, it was stated that other criteria—especially external economies and diseconomies—had to be added to those considered by the individual investor. Program-using methods of delegation were advocated to supplement the single investor's insufficient knowledge and induce changes in his decisions or supplement them by a set of public investment projects.

16. Rosenstein-Rodan, "Programming in Theory and in Italian Practice" (Cambridge, Mass.: MIT Center for International Studies, December 1955), pp. 2-3.

Investment Programming

The programming of investment in a developing country is necessary to correct for such distortions as indivisibilities, externalities, and information failures. "Programming" is just another word for rational, deliberate, consistent, and coordinated economic policy.¹⁷

While a development program must be spelled out in projects, it is not a mere sum or shopping list of projects. Single-project analysis cannot simply consider each project in turn, see whether it passes the test, and accordingly decide whether to include it in the program. The various projects constituting a development program are interrelated and reinforce each other. This balance depends on whether complementary activities have been planned on the required scale. A program approach, not a project approach, is therefore necessary to determine the criteria for the productive use of capital. A change in one project may require a reshuffling and change in several other projects. Each investment project's contribution to national income depends on what other investments have been, are being, or will be realized. The complementarities introduce a new set of determinants of optimum investment, and a program approach therefore dominates project analysis.

A Shorthand Method

A bridge between the two is to establish shadow prices to correct for distorted market prices. In the late 1950s, as we focused on development programs in Italy, India, and Indonesia, our research at the Center for International Studies at MIT emphasized the shadow rate of interest, the shadow rate of foreign exchange, and the shadow rate of wages.¹⁸ These shadow prices were to be used as a computational shorthand method for each project so that it was not necessary to solve each time the optimization problem for the investment program as a whole, of which the project is a part.

Programming is thus to be a supplement to the price mechanism and also an instrument for supplying additional information which the market mechanism cannot supply. The development program is to make use of the market mechanism, but is not to be dominated by it.

17. "Programming in Theory and in Italian Practice," p. 4.

18. See, for example, Sikhamoy Chakravarty, "The Use of Shadow Prices in Programme Evaluation," India Project C/61-18 (Cambridge, Mass.: MIT Center for International Studies, 1961).

International Aid Policy

The aim of international aid was not to achieve equality of income, but equality of opportunity. Aid should continue to a point at which a satisfactory rate of growth can be achieved on a self-sustaining basis. Ideally, aid was therefore to be allocated where it would have the maximum catalytic effect in mobilizing additional national effort. I suggested that the primary principle is to maximize additional effort, not to maximize income created per dollar of aid.¹⁹

Major attention was to be given to the absorptive capacity of the developing country and its capacity to repay. The first limit to be determined was the amount of aid. The second was the method of financing it. Where the capacity to repay in low-income countries is below their absorptive capacity, a proportion of aid should be given in grants, in "soft loans" (forty- to ninety-nine-year loans with a ten- to twenty-year grace period and a low rate of interest), or in loans repayable in local currency which will be re-lent for subsequent investment.²⁰

The rational strategy is not to reduce a country's foreign indebtedness to zero. The rational question to ask is: How much foreign indebtedness can a country maintain in the long run? Just as any national debt or corporate debt need not be reduced if it is within sound limits, the foreign debt of debtor countries need not be amortized to zero in a sound world economy.

Retrospect and Prospect

Looking back, I now see we were overoptimistic in believing that the reservoir of disguised unemployment could be so readily absorbed. A central question that remains for development studies is why the difference between urban and rural wages has remained so high.

A basic restructuring of agriculture—involving far more than agrarian reform—is necessary to reduce the inequality between the rural and urban areas. When assessing the crisis in the Alliance for Progress, I submitted that excessive protectionism had kept the level of industrial prices so high that the domestic terms of trade between agricultural and industrial products were even worse than the world market ones. A thorough reform of tariff policy was advocated. Only when an investment actually materializes should a tariff (or subsidy) be applied. Imperfection in marketing and distribution also had to be reduced. Incentives for modernization of

19. "International Aid for Underdeveloped Countries," pp. 107-38.

20. "International Aid for Underdeveloped Countries," p. 109.

agricultural production must be provided in the form of subsidies for some inputs as well as minimum prices for two or three years at a time—"continuity is as important as the amount"—in order to reduce risks and uncertainty of selling.²¹ Such policy reforms are still needed to accelerate agricultural development.

In order to reduce the inequality between the employed and the unemployed, it is necessary to establish a right to work as the minimum of equality of opportunity that modern society must provide. Full employment is an objective that cannot be replaced or compensated by anything else. Yet we are nowhere near its solution in most developing countries. A high rate of growth is necessary to provide an industrial drive sufficient to absorb the present and growing unemployment. Full employment and access to educational facilities undoubtedly remain the fundamental requirements for providing a minimum of equality of opportunity.

It may be asked: If, as we have maintained, the basic purpose of aid is to catalyze additional national effort in developing countries, who then is to judge whether this effect is forthcoming and whether it is adequate? If aid to developing countries is an income tax, the use of the tax should be decided by a consensus of all the parties. Partnership implies a consensus. The Pearson and Brandt reports foresaw both rights and duties—but the discussion stresses rights more than duties.²²

Another problem neglected in the Pearson report is that of the multinational corporations. They present two aspects: they are very efficient in transferring capital, technology, and management; but their oligopolistic structure raises problems, not because multinationals are foreign—a national shark bites as much as a foreign one—but because they are monopolistic. All guidelines or codes of private international investment are in fact second-best attempts at an antimonopoly law. "The trouble in the past was there was not enough freedom of trade and too much freedom of international movement of capital."²³

Today's method is unsuitable and often counterproductive; the very discussion by a credit-giving country of what the receiving country should do invariably raises objections that the latter's national sovereignty is being infringed upon. Under such circumstances, the discussion is either

21. Rosenstein-Rodan, "La Marcha de la Alianza para el Progreso," *Progreso* (Vision), 1966.

22. Lester B. Pearson and others, *Partners in Development*, Report of the Commission on International Development (New York: Praeger, 1969); *North-South: A Program for Survival*, Report of the Independent Commission on International Development Issues, Willy Brandt, chairman (Cambridge, Mass.: MIT Press, 1980).

23. Rosenstein-Rodan, "Problems of Private Foreign Investment and Multinational Corporations," in *Multinational Investment in the Economic Development and Integration of Latin America* (Washington, D.C.: International Development Bank, 1968).

incomplete and not explicitly articulated or it is bound to give rise to mutual recrimination.

The only way out of this vicious circle is to establish a committee, which is not appointed by and not responsible to either creditor or debtor governments, to make an independent evaluation of national development effort and a consequent recommendation of the amount of aid to be allocated. It is indifferent whether we call it international arbitration or mediation. It should evolve into a de facto "International Court of Economic Justice." Clearly a new form of impartial international evaluation of that sort must be adopted, which should command confidence and respect on both sides.

Today we have competence, finance, and no democracy in the international banks—and democracy and no finance in the United Nations. The 1954 ECLA report proclaimed the need for a separation of programming and financing. An independent body—not responsible to either creditors or debtors—should evaluate the programs, and resources should be allocated according to that verdict. The World Bank has a good staff (at least in the past twenty-five years), but the developing countries have no confidence in the vote of its board because creditor countries have the overwhelming majority; the developed countries, on the other hand, have no confidence in the United Nations. It is part of national sovereignty for each nation to limit its own rights. There will be no satisfactory solution to this problem without some sort of arbitration. Only an International Development Council—an International Court of Economic Justice—can solve the problem. The Committee of IX of the Alliance for Progress was an attempt to apply such an international arbitration. It failed because of sabotage on both sides, but all great ideas first fail. All progress is first proclaimed to be impossible but is then realized.

Evaluation of the Development Effort

After some four decades of concerted attention to the challenge of development, we might ask how much economics can explain. Economic theory can determine the necessary, though not the sufficient, conditions of growth. The so-called noneconomic factors account for the gap between the necessary and the sufficient. Any evaluation of development can only state that the necessary conditions for growth exist or are being created; it cannot predict with certainty that growth will actually take place. One can learn a lot from past performance, but the criteria of evaluation are ex ante concepts. They yield a probability judgment and have, therefore, to be continually checked.

Most differences of opinion among economists originate from two sources: different interpretation of data, since data are often deficient; and

different interpretation of or assumptions about objectives, since the social welfare function is seldom explicitly given or even consistently felt. If both data and objectives were given, there would be a large consensus as to how to apply economic techniques, and few differences of opinion among economists would remain. Data must, however, cover not only available material and human resources, technological possibilities, and psychological preferences but also attitudes of mind and the ability to change them. A good part of the last-named factors (social attitudes) are unknown rather than given quantities, so that the data are never available. And the objectives are largely subconscious—neither quite given nor quite unknown.

A technical problem deals with multiplicity of means and *one* end: for instance, how to cross a river by boat, bridge, or some other way. We can use monetary, fiscal, foreign exchange, and commercial policy in various blends and combinations if the objective is clear. An economic problem consists of a multiplicity of means *and* multiplicity of ends. The "rationalist" assumption that we know what we want and think before making a decision is neither right nor wrong: it is an exaggeration. Our diverse *aims* ("social welfare function") are in partial conflict with each other—we can fulfill more of one and less of the other; moreover we can do it at different rates (more today, less tomorrow or vice versa) in different periods. This system of preferences is like an underdeveloped film: no contour lines are visible, but they are there. Programming (development planning) is the fluid that "develops" them: the contour lines then appear on the film.²⁴ The different aims—growth, employment, better income distribution—were at once emphasized; growth was only a means to achieve the other ends, since it is easier to reshuffle a growing than a stagnant income. Meeting basic needs and the assault on poverty were implicit but became more explicit in the late 1960s and 1970s.

The development momentum is now passing through a low point. The transfer of financial and technological resources to developing countries has also been disappointing. In the moral crisis of today we see in many developed countries a movement of an international Poujadism: an income tax strike. The richest country in the world, the United States, which pioneered in the field of aid, is the worst offender. When their income per head was merely 40 percent of what it now is, U.S. citizens gave 2 percent of GNP to the Marshall Plan. Today when their income is 2.5 times higher they give less than 0.25 percent for economic aid. The original philosophy of aid is still correct, and present cynics are not justified. People need and want ideals, and ideals are ultimately powerful. A great deal has been achieved in the development effort. The postwar period of development is a history of triumph—not of failure. The increase in life expectancy, the

24. Rosenstein-Rodan, "Criteria for Evaluation of National Development Effort," *Journal of Development Planning*, vol. 1, no. 1 (1970).

fall in infant mortality, the rates of growth, the achievements in any number of developing countries—nobody at the end of the Second World War would have expected so much. A billion people are still hungry, but it would now be 2 billion without the achievements that have been made.

What got lost, however, in the 1970s was international solidarity. The objective of international full employment disappeared in cynicism after Vietnam. The transition from the national welfare state to the international level must still be made. Not to do enough about inequality of opportunity and poverty when our world resources are sufficient to improve the situation is the real moral crisis of the present world, just as it was at the end of the Second World War. General cynicism is at least as unrealistic as naive idealism. We know what has to be done—we have to mobilize the will to do it.

Comment

Dragoslav Avramovic

MY COMMENTS FOCUS ON THREE POINTS. First, I want to trace the evolution of Paul Rosenstein-Rodan from a neoclassical theorist to a protagonist of a massive, organized structural change. This may be helpful in light of the resurgence of neoclassicism in development writing in recent years. Second, I shall try to identify which of Dr. Rodan's conceptual contributions have proven of use in actual development planning and policy—usually a good test of a theory. Third, I shall conclude by drawing attention to the financial crisis now affecting a large part of the developing world. It is likely to result in many changes in developing countries, and it will almost inevitably give rise to new thinking on theory and policy.

From Marginal Utility to the Big Push

Joseph A. Schumpeter, in his monumental *History of Economic Analysis*, has this to say of the early work of Professor Rodan: "A brilliant and compact survey of arguments and counterarguments [concerning the Austrian School theory of utility in equilibrium analysis] has been presented by P. N. Rosenstein-Rodan in the article 'Grenznutzen' (marginal utility) in the German encyclopedia, 4th edition, Volume IV, 1927."¹

A long time later, in the preface to *Development and Planning: Essays in Honor of Paul Rosenstein-Rodan*, Jagdish N. Bhagwati and Richard S. Eckaus wrote: "For thirty years Paul Rosenstein-Rodan has been a leader in the efforts of the economics profession to understand the problems of the poor nations of the world and to assist in their development. He has not merely been the doyen of development theorists: he has also dedicated much of his life to policy-making by international organizations for development and to domestic policy formation within many of the less developed countries."²

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1. New York: Oxford University Press, 1954, p. 1056.

2. London: Allen and Unwin, 1972, p. 7.

When I was first asked to comment on Professor Rodan's work on growth economics, I thought that the full extent of his contribution to development theory and policy could be appreciated only if it was realized that he had come to development economics after he had mastered and contributed to neoclassical theory. How did it happen and why? Here are his answers:

In Vienna in the 1920s I was only interested in the theory of choice, i.e., utility theory, Austrian variety, and considered any applied economics to be "impure" and of no interest. It is only later on after a year in Italy, 1929, and certainly in London that I became interested in economics as a basis for economic policy. In the Vienna days I published the main article on marginal utility in 1927 (an Italian translation in 1930 and a translation of a part of it by Stolper in English), but it is not worth referring to; these are past days.³ The same applies to one article on complementarity in Italian, which is quoted by J. R. Hicks as having stimulated him in his theory, but is also antediluvian. More important is an early version in 1929, No. 1 of *Zeitschrift für Nationalökonomie* on "The Role of Time in Economic Theory," which had its second and considerably modified appearance in *Economica* in 1934. That one influenced somewhat my interest in development theory later on. (Letter of May 18, 1982.)

I pressed the point of the Vienna days further, suspecting that some of the essential ingredients of the development theory might already have been there. Professor Rodan's reply confirmed the suspicions: "I agree that the earlier micro-theory was relevant to development theorists very largely because the Austrian School (unlike the Lausanne School) paid major attention to the *path* towards equilibrium and not only to the conditions of stability which must be satisfied if a point is to be a point of equilibrium." (Letter of July 1, 1982.)

Specifically, as Sikhamoy Chakravarty has noted, three distinct themes can be discerned in the marginal utility article of 1927: (a) complementarity, which forms an important part of the subsequent and by now classic 1943 article, "Problems of Industrialization of Eastern and South-Eastern Europe," dealing with the basic rationale of planning, and of Rodan's later elaboration in the doctrine of the "big push"; (b) the hierarchical structure of wants, later linked to income elasticities of demand in developing countries, although its significance for planning has not yet been completely realized; and (c) the choice of an economic period over which scarce resources are allocated.⁴

3. The English translation by Wolfgang F. Stolper was published in *International Economic Papers*, no. 10 (New York: Macmillan, 1960).

4. Sikhamoy Chakravarty, "Paul Rosenstein-Rodan: An Appreciation," *World Development*, vol. 11, no. 1 (January 1983), pp. 73–75.

These arguments are summarized by Professor Rodan himself in his present paper, "Natura Facit Saltum": "The dynamics of wants and their interrelatedness were much more important to me than the neoclassical attempt at precise characterization of the properties of the utility function. Consumption complementarities, the role of time, the pursuit curve [the dynamic path toward equilibrium], plus external economies—all these dynamic factors were not to be considered as a second order of smalls, but even more as pervasive in a less developed country."

There is no doubt in my mind that the catastrophic experience of the 1930s was a major influence on the evolution of Dr. Rodan's doctrine. Implicit in the 1943 thesis was the assumption of a limited absorptive capacity of the world market. This and the example of Soviet planning must have had an effect on the Chatham House group studying the future of Eastern Europe, over which Dr. Rodan presided, although he stated clearly in the 1943 article that the Chatham House model relied on international trade, capital movements, and a mixed economy and was therefore substantially different from the Soviet model.

Programs, Projects, and Commodity Cycles

In the 1943 article the essence of national programming was laid out:

- An organized institutional framework is necessary for the successful industrialization of international depressed areas.
- A minimum of social overhead capital is necessary to induce industrialization; the supply of this minimum is beyond the capacity of individual entrepreneurs.
- The first task of industrialization is to provide training to transform peasants into industrial workers. The automatism of laissez-faire never worked properly because it is not profitable for a private entrepreneur to invest in training labor.
- Complementarity of different industries is the most important argument for large-scale planned industrialization. It would create its own additional market, thus allowing an expansion of world output with the minimum disturbance of the world markets. The planned creation of such a complementary system reduces the risk of not being able to sell, and, since risk can be considered as cost, it reduces costs.
- It is usually tacitly assumed that the divergence between the private and social marginal net product is not very considerable. This assumption may be too optimistic even in the case of a mature competitive economy. It is certainly not true in the case of a fundamental structural change in the international depressed area.
- The existing institutions of international and national investment do not take advantage of external economies of the kind described. There

is no incentive within their framework for many investments which are profitable in terms of social marginal product, but do not appear profitable in terms of private marginal product. The main driving force of investment is the profit expectation of an individual entrepreneur, which is based on past experience. Experience of the past is partly irrelevant, however, when the whole economic structure of a region is to be changed. If we create a sufficiently large investment unit by including all the new industries of the region, external economies will become internal profits out of which dividends may be paid easily.

- Government guarantees are necessary to induce the necessary movements of capital internationally.⁵

In his years at the World Bank and subsequently, Dr. Rodan made a major effort to broaden the concept of investment projects and to bring about an acceptance of country development programs as a whole as suitable bases for external financing. It has been an uphill struggle which is by no means finished. It has followed directly from the theory of internalization of external economies. Linked to the programming concept has been the use of shadow prices. Of course, Professor Rodan was not alone in advocating this approach. The widespread emergence of planning offices in developing countries, and experimentation with overall and sectoral programming and projections and with project appraisal models and techniques, can in part be attributed to the influence of development theory, to which Dr. Rodan has made such a distinguished contribution.

The late 1920s and early 1930s led to the development of the cobweb theorem: commodity prices in one period determine the quantities supplied in the subsequent period, which in turn, combined with any demand shift that may have taken place, determine later prices, and so on. The resulting fluctuations may be converging toward equilibrium, remaining neutral, or leading to a growing disequilibrium. Professor Rodan was one of several authors who seem to have contributed to the formulation of the theory at approximately the same time—according to Lionel Robbins, he was ahead of the others.⁶ It is the divergent disequilibria which are particularly damaging. The damage may be especially large in commodities with a long gestation period, and may lead to overinvestment and subsequent protracted periods of depressed prices and incomes. It was from this perspective that Dr. Rodan, while at the World Bank, wrote in the late 1940s a study anticipating a massive increase in coffee prices. He warned that unless managed through an active fiscal policy, the price rise would

5. P. N. Rosenstein-Rodan, "Problems of Industrialization of Eastern and South-Eastern Europe," *Economic Journal*, vol. 53 (June-September 1943).

6. "The Role of Time in Economic Theory," *Economica*, New Series (1934), pp. 77-97. Other authors were Arthur Hanaau, Henry Schultz, Jan Tinbergen, and Umberto Ricci. The term "cobweb" was apparently first suggested by Nicholas Kaldor in 1934.

lead to inflation, overproduction, and subsequent decline, but if controlled it could be used for financing diversified investments.⁷ However, he did not pursue further the commodity analysis. It was Prebisch and Singer who focused on the commodity problem, including its income and investment effects, and proposed international remedies.

Crisis of the 1980s

Professor Rodan ends his present paper by drawing attention to what he calls the moral crisis of the present world, which prevents the transition of the welfare state from the national to the international level. By now, in early 1984, it is clear that what is involved is a major threat to development itself. The near collapse of capital market lending to developing countries in August 1982, the massive fall in commodity prices in 1981–82 which was only partly reversed in 1983, the enormous increase in the real international rate of interest, the cutthroat competition in the market for standard manufactures, the appreciation of the U.S. dollar—the main creditor currency—coupled with capital flight and domestic policy errors, have imposed on the major debtor countries and on most of the African continent a burden of adjustment on the order of the 1930s. Some forty to fifty developing countries are involved in debt-rescheduling negotiations or are in arrears with payments. Their internal financial situations are frequently desperate: in a number of newly industrializing countries, much of the large-scale industry is today in effect bankrupt.⁸ It is caught in a squeeze of stagnating or falling domestic sales, foreign market restrictions, devaluation-induced explosions in debt service abroad, and domestic interest rates which in real terms reach 30 to 40 percent a year. The slogan of debt-led growth, proclaimed in the 1970s, has ended in a disaster. Some other slogans are on trial. Major institutional changes are under way in many developing countries; new priorities and systems of planning and management will emerge; the international scene is unlikely to remain the same; and new theories will probably be born.

7. "Increased Dollar Earnings and Coffee Inflation in Latin America," E-69a (Washington, D.C.: The World Bank, November 21, 1949).

8. Pedro-Pablo Kuczynski, "Latin American Debt: Act Two," *Foreign Affairs* (Winter 1983).

Walt Whitman Rostow

W. W. ROSTOW was born in 1916 in New York City. At the age of fifteen he won a scholarship to Yale University, then received his B.A. from Yale in 1936, his Ph.D. from Yale in 1939, and an M.A. from Oxford, where he was a Rhodes Scholar, in 1938.

His teaching career in economics and history began in 1940 at Columbia University. He returned to Oxford as the Harmsworth Professor of American History, 1946–47. In 1949 he was the Pitt Professor of American History at Cambridge University. From 1950 to 1961 he was Professor of Economic History at the Massachusetts Institute of Technology, and from 1951 to 1961 he was also a staff member of the Center for International Studies at MIT.

In 1958 he spent another year at Cambridge University, where he lectured and wrote about a subject that Keynes and his followers had neglected—that of economic development. His lectures on the "process of industrialization" led to his noted book, *The Stages of Economic Growth* (1960). In 1969 he became Professor of Economics and History at the University of Texas at Austin, where he is currently the Rex G. Baker Jr. Professor of Political Economy.

He was Assistant to the Executive Secretary of the Economic Community for Europe, 1947–49. Between 1961 and 1969 he held a succession of government posts: Deputy Special Assistant to the President for National Security Affairs, Counsellor and Chairman of the Policy Planning Council at the Department of State, U.S. Member of the Inter-American Committee on the Alliance for Progress, and Special Assistant to the President for National Security Affairs in the White House.

Rostow received the Order of the British Empire (1945), the Legion of Merit (1945), and the Presidential Medal of Freedom (1969).

His books include: *Essays on the British Economy of the Nineteenth Century* (Oxford: Clarendon Press, 1948); *The Process of Economic Growth* (New York: Norton, 1952; Oxford: Clarendon Press, 1953; 2d ed., 1960); with Richard W. Hatch, *An American Policy in Asia* (New York: Technology Press, MIT, and John Wiley, 1955); with Max F. Millikan, *A Proposal: Key to an Effective Foreign Policy* (New York: Harper,

