

Prof. Sukhamoy Chakravarty's Contributions to Development and Indian Policy



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Prof. Sukhamoy Chakravarty

(1934-1990)

Prof. Sukhamoy Chakravarty, Founder Vice-Chairman of RIS (1983-1990), was India's foremost economist in matters of macroeconomic planning and policy. As a development economist he had an abiding interest in issues relating to the methodology and philosophy of economic planning and development. He was Chairman of the Council of Economic Advisers to the Indian Prime Minister and served three successive prime ministers. He had also served as a Member of the Indian Planning Commission during 1970s. His writings that include prominent books on the subject still form the bedrock of development planning in India.

He studied at Presidency College, Calcutta, and at the Netherlands School of Economics. Prof. Chakravarty had his Ph.D under the first Nobel-laureate Jan Tinbergen on the theory of planning. During his distinguished career he taught at the universities of Delhi, Cambridge, Erasmus, Johns Hopkins and MIT. He was also a Fellow of the International Economic Association; President of Indian Economic Association; and Chairman, Indian Council of Social Science Research (ICSSR).

Prof. Chakravarty's life was dedicated to spreading of knowledge and churning his brilliant mind to the task of making economic planning a useful exercise. He treated his students with tremendous affection as he taught them the fundamentals of rigorous analysis. His immense intellectual prowess, his deep commitment to the cause of India's development and above all his abiding faith in the nation's ability to change prevailing human conditions inspired these efforts.

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Prof. Sukhamoy Chakravarty's Contributions to Development and Indian Policy

Prof. Manmohan Singh, Prof. Ramaswamy, Kriti, Prof. Alagh, Dr. Panchmukhi, Dr. Seshadri, Dr. Chaturvedi and friends. I thank RIS for giving me this opportunity to talk about my beloved teacher Prof. Sukhamoy Chakravarty.

Prof. Chakravarty was a scholar with an astonishing range of knowledge. His unquenchable thirst for knowledge is shown, for instance, by asking the surgeon almost as he was being rolled into the operating theatre as to when he could start reading again. In the Netherlands in 1981 he was visited by professors from many different disciplines and they would engage in engrossing conversations as between equals. The only exception was when a mathematician visited him. Sukhamoy da asked him what he was working on. He replied don't ask Sukhamoy. You won't understand.

Even as an economist he engaged in a wide ranging set of activities. He was a teacher, a policy maker, a development economist trying to develop a new unified consensus on development theory and involved in developing research agenda. He headed many bodies that sought to push forward economic research including RIS. He was involved with RIS from its inception including its establishment. Given his world view, he believed in the need to enhance cooperation on research of how the international system interacted with the needs of developing countries. The research would lay the foundation for South-South Cooperation.

Objective of his work

Prof. Chakravarty became an economist because of his desire to understand the processes of economic development which was driven by his deep passion to improve the living conditions of those stuck in the poverty trap. His research shows a consistent concern with the issues thrown up as an overpopulated country tries to develop. However, economic growth was not an end onto itself. He had a much broader concept of well-being. His belief in socialism stemmed not so much from the idea that it would lead to a higher rate of growth or get ahead in the race for space but that it would lead to a better society. Economic development was the path to that better society. His writings are an early precursor of the notion of development as freedom. For him, not only the question of the distribution of the fruits of development, but the role of economics in the life of an individual and the nature of economic motivation mattered. As Trotsky said, and Mao attempted, the job was to build a socialist man based on cooperative value orientations. One wonders how much the notion that development is freedom was the result of discussions at the Delhi School of Economics. But his was not an authoritarian socialism, he was in the Netherlands in 1981 when the Solidarity movement was gaining popularity in Poland. The Dutch decided to light candles in their windows in support of Solidarity. And so did Sukhamoy and Lalita. He placed a strong emphasis on scholarship and democratic debate. He does not fit the stereotype of economists and policy makers interested merely in growth, despite his considerable familiarity with models of growth and his own contributions in that field. His thinking is also a counterexample to the belief that it is only recently that the concept of development has been broadened to become multi-dimensional. As he wrote, the Indian experience was not leading to a socialist society but he hoped that it would lead to a more humane society. But he wore his ideology discretely. From his classes on

mathematical economics, a highly technical subject, it would have been difficult to identify his ideology.

Approach to economics

He was renowned for his mathematical prowess. Yet mathematical economics was not an end in itself. Analysis of economic development and economic policy choices did not flow immediately from these abstract mathematical models. According to him, they emerged from the combination of such constructs and analysis of historical experience. “Economics as a discipline appears to me to be located at the edge of ‘history’ and ‘theory’.” History comes in not only as time is irreversible, but provides important insights into the emergence of institutions over time, an open ended process. Insights are not necessarily provided “by looking at institutions as solutions of suitably defined repeated games”. Chakravarty was keenly aware of the limitations of such models. However, they were not useless (1989) as they provide a basis for discussions with political decision makers. Optimal growth paths provide scenarios for a dialogue between planners and the policy makers (Chakravarty, 1988). His proficiency in mathematical modeling and reasoning as in the well known Chakravarty, Eckaus, Lefebvre Parikh model and his awareness of their limitations was one of his dualities, different to that pointed out by Prof. Samuelson of his being at home in both the sciences and humanities in his preface to his Capital and Development planning.

Prof. Chakravarty as a teacher

Before he became a member of the Planning Commission he taught the optional course on mathematical economics at the Delhi School of Economics. The course was a byword for its mathematical rigour and difficulty. There are legions of stories about his teaching centred round sometimes his occasional incomprehensibility and

sometimes the very precise language that he used. For instance, the first sentence he uttered in the first year undergraduate course on production theory at Presidency College was that the production function is concave because of super additivity. Since we had not even heard of additivity let alone super additivity, we couldn't understand a word of what he said. He, on his part, couldn't understand what we couldn't understand. On another occasion we had told him that we were learning complex numbers in algebra. He asked for the definition of a complex number. We told him it was $a + ib$. We were puzzled as to why he was dissatisfied until he defined it as an ordered pair of real numbers satisfying certain postulates. It was only much later that we understood the significance of his answer.

When he taught mathematical economics at the Delhi School of Economics the course was difficult but he was then able to explain better the material and answer the questions asked so we could usually understand the answers.

Those of us who attended his optional course on mathematical economics were struck by his ability to navigate through the different fields of mathematics. As needed he taught us linear algebra, linear inequalities, topology fixed point theorems the calculus of variations, etc. But despite the shock and awe the course was satisfying and trained us to follow the current literature independently and the importance of precision and rigour. Woolly thinking was not tolerated.

Later when he taught the macro course in the M.Phil at the Delhi School of Economics it was technically less demanding, but vast in the depth and breadth of its scope. It was more challenging as he dealt with the philosophical and epistemological foundations of general equilibrium systems. Appreciating required one to have

read widely and achieved a certain maturity. His lectures always set a benchmark for the serious student of economics. One's aspiration was to understand what was being taught. To understand it was to take the first steps towards becoming a professional economist.

When the Delhi School carried out a syllabus revision in the 1990s it was a template for the kind of thought, debate and consensus making process required for the design of an academic programme and Sukhamoy set the tone.

He was also very concerned about the welfare of the students. He got to know them well, particularly those who took his optional course and was very concerned about their professional and personal welfare. He combined his approach of no tolerance for sloppy thinking with a very strong interest in the welfare of his students. He would always ask them about life in the hostel and whether they were comfortable or missed their families. His humanism helped bridge the gap created for students by his approach to academics. Lalita shared this humanism. Innumerable are the jam sandwiches we ate at 7 University Road and one cannot hope to make a list of the many scholars one met. Many mothers of female students to whom he gave letters of recommendation were upset with him for doing so.

His research

His research deals with the following categories:

- i) Mathematical explorations of various development issues;
- ii) Conceptual basis of development economics stressing both its historical and intellectual origins;
- iii) Issues relating to Indian development, particularly planning; and

- iv) Monetary and financial aspects of development leading to an integration of real and financial issues in development economics.

However, there was a sharp discontinuity in his research before and after he worked as a member of the Planning Commission. This shift obviously reflected his experience with the real world as non-special case and is most obvious in his writings on development. There was a shift in his teaching also as reflected in his lectures on the foundations of macroeconomics.

Early research

Prof. Chakravarty's early research dwelt on technical issues connected with the process of planning. The sectoral composition of investment was the main theme of his book "The Logic of Investment Planning", 1959, using dynamic input-output techniques. The innovation was the attempt to incorporate investment in new industries or structural breaks as he called them and also to take account of differing gestation lags in different sectors. As he noted then and elsewhere, planning was needed for structural breaks. His further work along these lines dwelled on how to evaluate investment programmes and projects in the volume edited by Rosenstein-Rodan "Capital Formation and Economic Development", 1964. The stress, however, was on programme evaluation rather than project evaluation. In this book itself in some essays he moved away from such technical issues to deal with some elements of the broader choice involved in planning. These choice elements could be the length of the planning horizon, the initial level of consumption, the terminal capital stock and the growth of consumption during the plan period. In an article with Alan Manne he dealt with the problem of including the rate of growth of consumption in the objective function. In an article with Louis

Lefebvre he dealt with the question of maximizing employment as the objective rather than consumption or its utility.

The shift towards broader themes and strategies for development continued. The culmination of the first more mathematical research was his book “Capital and Development Planning”. Samuelson read a manuscript of the book and was so impressed that on his own he wrote an appreciation of the book which was included in the book as a preface. He was so excited about it that not only did he write it but came to class and read it out to the students. But Prof. Chakravarty’s analysis also serves to clarify how certain choices cannot be made divorced from practical considerations. For instance, in discussions of an appropriate rate of discount some believed that this should be zero while others argued for a positive rate of time discount. Prof. Chakravarty argued that the choice would depend on the resulting consumption path. If a zero rate of time discount resulted in a high savings rate at even low levels of income, intergenerational equity required use of a discount rate (1969). These exercises also clarified the shortcomings of the Mahalanobis model as a tool for planning and the lack of congruence between the actual numbers in the third plan and the optimal pattern. In particular these exercises showed that under Indian conditions the production of consumer goods rather than that of capital goods could be the effective constraint to investment levels an issue which remains relevant today. These exercises dealt with a closed economy and this would be the appropriate framework as long as the cost of a marginal unit of import substitution was less than that of exports

Development economics

Prof. Chakravarty’s experience showed the importance of a political consensus for consistent policy making over an extended period.

In the 1950s and 1960s there was a consensus about development policy as exemplified by the Report in 1951 of the UN expert group. The consensus lasted for over a quarter of a century before finally crumbling in the 1980s and the argument was made that the same economics applied to developed and developing economies despite their difference in income levels. Furthermore, how would this difference affect the path of developing economies.

He tried in his Marshall Lectures to provide a new consensus on development issues for overpopulated countries as it had become a contentious issue whether development economics was separate from the economics of developed countries. For this he went back both to classical economists and pioneers of development economics of the 1950s. While thinking that development had a long ancestry, the Keynesian revolution that pointed to the deficiencies in market outcomes, the role of wartime controls, the performance of planned economies and the emergence of many newly independent countries provided an impetus to the emergence of development economics as a separate discipline.

Prof. Chakravarty found the ideas of Marx and Schumpeter more congenial for this reconstruction than those of Marshall. The basis of Marshallian ideas was that growth was based on the pillars of a gradual accumulation of capital both human and physical, that all savings would be invested and that who saved was not important; it culminated in the Solow model. He found that they did not take into account discontinuities, externalities and how the surplus was generated and converted into capital. He placed considerable importance to the Marxian distinction between capital as a fund and capital as capital goods. Considerable problems were created in the analysis of the contribution of foreign capital by ignoring this distinction. Economic dynamism in Marx was provided by

the capitalist as he sought to maintain his rate of profit in the face of the increasing organic composition of capital. Dynamism in Schumpeterian was provided by the entrepreneur as an innovator. The temporary monopoly power created by an innovation helped to maintain a high rate of profit; but this monopoly power would be eroded over time. Combining the ideas of Marx and Schumpeter would provide a better characterization of the dynamics of an economy.

Some of the key ideas of classical reasoning were incorporated by Lewis in his model. Prof. Chakravarty believed that the Lewisian notion of an elastic supply curve of labour to be a very important concept for overpopulated countries. But this basic insight needed to be supplemented. The original Lewis model had ignored the role of agriculture or more generally of wage goods and the Indian experience since the mid-sixties had shown the importance of wage goods. But he felt that the two sector schema of Marx or of Lewis needed to be expanded to a three good one with consumer goods being divided into wage goods and luxury goods, as has been done by economists such as Passinetti. The role of luxury goods had been neglected by Lewis but played a critical role in Sukhamoy's analysis of the importance of marketed surplus.

Furthermore, since unassisted labour was not very effective as Rosenstein-Rodan had stressed, sufficient new capital was needed. This could come from foreign aid or from savings by the rich or by some institutional arrangement that resulted in the sharing of existing consumption so that the undernourished surplus labour could be effectively deployed. The prevalence of surplus was an indication of the lack of a complete set of markets and therefore of the non-existence of equilibrium rather than the lack of Pareto optimality.

Chakravarty extended the Lewis model to cover the needs of the agricultural sector, particularly for industrial inputs and the difficulties of extracting a marketed surplus. The growth of employment in the modern sector would be constrained by the growth of traditional agriculture or the inability to restrict luxury consumption. Also unlike Lewis one had to take account of the fact that savings would not be automatically invested and so shortage of demand could emerge. The demand constraint could prevent exploitation of economies of scale in the industrial sector.

Chakravarty believed that the dichotomy often proposed between reliance on the market and on planning was a false one. Both were instruments to achieve certain ends, each having their areas of comparative advantage. Planning was essential for certain tasks. By this he did not mean a particular form of planning but planning as a way of instrumental inference. The process of development meant accomplishing a number of structural changes, particularly, establishment of new industries. Because of missing markets this was a task in which the government had to be heavily involved. But how the government chose to intervene would depend on circumstances. In the East Asia case the state provided the direction and used various instruments to affect the behaviour of the private sector which was the actual agency to bring about the change.

Chakravarty also stressed the role of knowledge creation and diffusion in the process of development. He concurred with Kuznets that growth of knowledge was the most decisive factor in modern economic growth. He quoted Marx to note that there would be underinvestment in science if it was left to market forces. The need for diffusion of existing knowledge could come into conflict with the requirements of generation of new knowledge. The necessity to overcome externalities arising from complementarities in

production and threshold effects in order to generate development further bolstered the case for planning.

In brief, growth of agricultural productivity was necessary to bring about development. Only then could the surplus labour be transferred to industry. But for rapid growth it was necessary for capital goods production to grow rapidly. Together with the spread of education, health and nutrition it would lead to rapid growth and exploitation of the economies of scale that potentially exist in the industrial sector.

Prof. Chakravarty on Indian policy

He sought a paradigm to explain the performance of the Indian economy and that would provide the basis for analyzing possibilities and priorities for policy. He argued that the Lewis model based on Ricardian analysis provided a sound basis for analysing the Indian experience. As we have noted above, in the Lewis model the modern sector was self-sufficient and needed only labour from the traditional sector; the Indian experience showed that transfer of food from the rural areas had in fact proved to be the binding constraint in the mid sixties onwards as his exercises with Eckaus, Lefeber and Parikh confirmed. This also accorded well with Lewis' own later reflections on his model. Furthermore, he agreed with Lewis that the only way to avoid deteriorating terms of trade whether one exported primary products or labour intensive manufactures was to raise productivity in food cultivation. It is because of this and a number of other reasons that he stressed the need for increases in agricultural productivity.

Role of agriculture

The insight from the two-sector optimal growth model about the consumer goods sector being the binding constraint was later

developed into a full analysis of the role of agriculture in India's development. Inelasticity of marketed surplus was considered to be the single most important constraint to growth. Sustained rapid industrial growth could not be achieved with a backward agriculture. An expanding agricultural sector was needed to meet the demand emanating from the work force in the industrial sector as well as provide a market for the output of the industrial sector.

It was assumed in the initial plans that agricultural growth could be brought about by mild institutional change that exposed farmers to modern technology. Since this approach ran into problems in the mid-sixties agricultural growth has depended on induction of new technology that changed the nature of agriculture and its relation with industry. Before the green revolution the agricultural sector provided inputs to the industrial sector but did not demand industrial inputs. This triangularity in the input output matrix was broken by the green revolution as the agricultural sector demanded industrial inputs such as fertilizers, power, etc. By raising the resource requirements of the agricultural sector this placed further demands on scarce resources.

The essential question was to mobilise agricultural supplies to meet the increased demand for food from the industrial work force. This demand could be met by supplies from larger farmers which could be obtained either through taxation or provision of luxury goods to the large farmers. The latter alternative would lead to other distortions in the growth process. Also the spread effect of such a strategy would be limited, based as it was on import intensive inputs and the proclivity of such farmers for imported consumer goods. He believed that expansion of rural banking was better for resource mobilization than production of luxury goods. The green revolution also led to unbalanced growth between regions and social strata. The demands by large farmers, for instance, for price supports of

various kinds, ate into resources available to the state. He also very early became concerned about the environmental effects.

His preferred policy for agricultural development was to boost productivity of small farms. But this required deep rooted reform based on a proper assessment of the physical factor endowments, knowledge of techniques of production and property rights. According to him, a small holder based development path would produce crops preferred by poorer households and help draw out the potential surplus available on small holdings. After all this was the development strategy stressed in earlier writings on development. The potential implicit in rural employment patterns stressed by these early writings could be used for asset formation through a rural employment scheme.

Technological progress and the role of production of capital goods

He emphasised the importance of knowledge in his Marshall lectures. The basic development problem, which earlier centred around the process of capital accumulation, had shifted to problems more closely connected with issues of technology and knowledge. This could be disembodied. But also embodied as much is embodied in capital goods.

He stressed that one of the shortcomings of Indian performance was the inability to develop technological capabilities. Prof. Chakravarty agreed with Rosenberg that a domestic capital goods sector was necessary to have capital savings technical progress for the economy as a whole through increased efficiency of capital goods production. Technical progress in the capital goods producing industries has far reaching spread effects raising the productivity of all industries using these capital goods. The technological gap in Indian industry had increased. Imports of knowledge and capital

goods might be needed as much of technical progress is embodied. But imports should not stifle domestic capabilities. Also, reliance on FDI might not lead to the cheapening of capital goods which is the way that beneficial effects spread. He believed that the best way of acquiring foreign technology was the Japanese way which succeeded in separating import of technology from supply of capital, namely FDI.

Furthermore, investment in human capital was essential to enable appropriate learning by doing from foreign technology. He sought to raise the availability of human capital in India by creating conditions in the 1970s and 1980s for Indian working abroad to return. However, learning by doing requires doing and this requires production and capital goods. Thus while he continued to stress the importance of production of capital goods for India he had changed his views regarding the appropriate pattern of investment for a labour surplus economy from one stressing capital goods to one stressing investments which would bring about the agricultural transformation and increase production of goods consumed by the poor.

Growth and equity

There has been a long standing debate in development economics and so also in India about the relation between economic growth and poverty reduction or between economic growth and inequality. The exercises undertaken in the context of the formulation of the Fifth Plan showed that this dichotomy was a false one. They showed that even if all the incremental output was allocated for consumption by the poorer deciles it would lead to no significant reduction in poverty unless a high enough rate of growth was achieved. The subsequent experience has shown that rapid growth can lead to significant reduction in poverty even if not all indicators of social welfare show improvement.

Prof. Chakaravarty believed that a more equitable development strategy in the Indian context would centre round improving the productivity of small and medium farmers along with an employment guarantee scheme for rural areas and this to be supplemented by programmes of education, health and nutrition.

Trade policy and development

Prof. Chakravarty was very concerned about the sources of demand in a labour surplus economy. This concern was fuelled by the accumulation of food and foreign exchange reserves in the mid-seventies showing that there was a lack of demand.

His analysis shows that the main sources of demand were either rising agricultural incomes, the state or foreign demand.

The main source of demand in the initial plans was public investment. But this strategy collapsed in the face of the food and fuel crises that erupted in the mid-1960s and the cut-off of aid which implied that in the Fourth and Fifth Plans transition to a non-aid strategy had to be planned for. As already mentioned, his preference was for a small land medium farmer strategy. But this did not occur. In that case one is left only with foreign demand. It is interesting that for a variety of reasons Prof. Chakravarty did not believe that this would be successful. He did not entirely believe that Indian planners were imbued with export pessimism but concurred with their belief that industrialisation was a necessary precursor for growth of exports of manufactures. He agreed with Prof. Manmohan Singh's analysis that domestic policy rather than the international situation was responsible for the poor export performance. Policy makers did not adopt an export oriented strategy for political economy reasons. An export strategy at the time of the Second plan would have had to stress exports of textiles and this might have aggravated regional tensions as most of this

industry was located in the West. Also, given the need to provide for employment through the small scale textile sector policy makers were not in favour of export led textile growth that would have implied reliance on large plants. Furthermore, without agricultural productivity increased exports of labour saving exports would also face deteriorating terms of trade a la Lewis. It would be interesting to speculate how he was able to overcome the belief of his thesis supervisor Prof. Tinbergen about the role of exports in generating growth. It is also not clear from his writings whether he believed that a successful export strategy required better relations with the Western world in general and the US in particular.

Role of the state

Prof. Chakravarty stressed the role of the state. But he believed that the Indian state had been constrained by a number of factors. The state was unable to generate the resources necessary to maintain a high rate of growth of public investment so essential for the growth strategy adopted. The difficulty of raising direct tax revenues and levying user charges led to inordinate reliance on indirect taxes which created disproportionalities between fixed income groups and property owners. In these circumstances the functioning of Public Sector Enterprise (PSEs) could be improved or public investment privatized. Governments in recent years have chosen the latter alternative. But the results have not been too successful as can be seen by the large amount of NPAs. Furthermore, guaranteed returns in public private partnerships could lead to unjustified higher costs of investment as stressed in recent days by Shashi Tharoor when discussing the building of Indian railways under the British. A third option could be deficit financing through borrowing from the Reserve Bank. Sukhamoy made it very clear that he was not in favour of this third option. The subsequent increase in the money supply would raise the rate of inflation with deleterious effects on

the welfare of the poor and capital formation as had happened in the mid-sixties. Accordingly, in the Report on Monetary Policy he sought to limit the state's borrowings from the Reserve Bank to levels consistent with a 4 percent rate of inflation. But it is unclear why he chose control of M3 as the instrument because by then international experience had shown the difficulty of controlling any monetary aggregate. Today India has adopted inflation targeting.

He had identified in his Radhakrishnan lectures as the main responsibilities of the state being to complete the agrarian transition, to improve the capacity to assimilate new technology and to improve health and education facilities, all necessary for a transition to a more humane society. These remain to this day critical aspects for Indian policy.

For me he will always remain a teacher. It was 9.30 on a night before the exam and a student looking lost was standing near the Ratan Tata Library. Sukhamoy asked the student what the matter was. The student's problem was not understanding at all the capital controversy. Sukhamoy sat down on the steps near the library, tore a page from his small diary and spent half an hour explaining the controversy.

The last conversation I had with him was about dynamics and non-linearities. I mentioned to him what I had been reading and asked how I should proceed. He said that we would have a discussion when he got out of the hospital. Unfortunately, that conversation never took place. A lasting memory is of him striding through the Delhi School of Economics library in his sandals which one could hear from some distance carrying a bunch of books.



Prof. Manmohan Agarwal

Adjunct Senior Fellow, RIS

Prof. Manmohan Agarwal is currently the RBI Chair at Centre for Development Studies, Trivandrum and an adjunct senior fellow with RIS. He is a retired professor from Jawaharlal Nehru University, New Delhi, India where he taught for almost thirty years. More recently he was a senior fellow at the Centre for International Governance Innovation (CIGI) at Waterloo Canada where he worked on issues of the world economy including the G20 and South-South cooperation. Currently he is also an adjunct senior fellow with the Institute of Chinese Studies.

He also worked for a number of years at the World Bank and the International Monetary Fund. His research has been mainly in the area of international economics and development economics. More recently he has been working on the role of current account imbalances in generating the 2008 crisis, the impact of the crisis on developing countries, the G20 and macro coordination and the role of developing countries in the G20. In the area of development economics apart from South-South Cooperation he is working on MDGs and also the aid architecture including Southern development cooperation



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