3. Delhi

The two-year course I enrolled in at the Indian Statistical Institute (ISI), Calcutta was a precursor to the soon-to-come M.Stat degree in Statistics. The ISI was declared an institute of national importance and endowed with degree-granting authority around that time, and ours was the last batch of students given a certificate instead of a degree. We had some excellent teachers. It was a pleasure to listen to lectures by R.R.Bahadur, Debabrata Basu, Sujit Mitra and Jogabrata Roy, not to speak of the great man C.R.Rao himself, who headed the ISI. They were all masters in their fields of specializations in statistics and the craft of good teaching came naturally to them through that mastery. Apart from these teachers, there was a formidable quartet of research scholars (described in some circles as the famous four): V.S.Varadarajan, K.R.Pathasarathy, R.Ranga Rao and S.R.S Varadan – who all later earned much international acclaim in fields allied to theoretical statistics and mathematics. Varadan was in 2007 awarded the Abel prize – a Nobel equivalent in Mathematics said to be harder to get than the Swedish honour. At the end of the first year we had options for specialization that included theoretical statistics, econometrics and planning, statistical quality control, biometry, psychometrics etc,. However, we were not given any choice in the matter. The great dictator (without a moustache) C.R.Rao decided unilaterally who should study what. So I had to join six of my classmates on our journey to Delhi to get trained in agricultural statistics at the Institute of Agricultural Research Statistics (IARS), an institute under the umbrella of the Indian Council of Agricultural Research (ICAR).

Institute of Economic Growth.

I joined the Institute of Economic Growth (IEG) in 1962 as a research assistant to Professor A.M.Khusro. A Hyderabadi sophisticate to the core, Khusro Saab treated me and his many doctoral students as younger friends for exchanging information and ideas and not as intellectually inferior beings, as boxes for dropping nuggets of wisdom. But he knew our limitations and pushed us in the right directions to acquire knowledge: of standard economic theory and of the Indian economic

reality as it was emerging then. For example, he made me read Keynes in the original and referred me to the standard texts in microeconomics. On my part, I could add rigour and substance with my background in statistical theory to his empirical work on Indian agriculture based on some simple quantitative tools as well as the occasional regression. Most of my work involved some tabulation to exhibit obvious economic relationships.

During the next one-year or so, K.Krishnamurty (KK) and Ashok Parikh (AP) joined the IEG. KK did his PhD under the supervision of Lawrence Klein – foremost among econometricians of that time - and Ashok acquired the standard expertise in econometrics at the London School of Economics. At the IEG, Raj Krishna, a good economist by any standard, was posing (and throwing his weight about with students and inexperienced researchers) as an econometrician, having been to Chicago and run some regressions – most exciting for him - for a paper he did there (on the rational behavior of Indian farmers, if I remember right, later published in the *Economic Journal*). With a competent econometric team (KK, Ashok Parikh and I as a tail ender) in position Raj Krishna passed on the responsibility of guiding students through the alleys of Econometrics to the new team, not perhaps wholly happy doing so. He then reverted to his own brand of economics – incisive and analytical enough by certain accepted standards, not necessarily based on sophisticated quantitative tools. In the Delhi School of Economics and its environs this brand was somewhat derisively described at that time as 'percentage economics' since it depended mostly on simple calculations involving the variables under study. Research scholars at the DSE adored models and the teachers who'd tell them how to build them. Economists who calculate percentages and simple growth rates to draw useful inferences were a vanishing breed to live with, before the Empire of Econometrics would strike to extinguish the dinosaurs in the profession I must tell you here two things. One, many economists in India who made substantial contributions to economic theory and policy (till about the mid-1960s) never ran regressions: Let me list a few of them I knew personally: M.L.Dantwala, Bhabatosh Dutta, V.K.R.V.Rao, K.N.Raj, and V.M.Dandekar (who despite his basic training in statistics did not run many regressions in his vast oeuvre). Raj Krishna went on, later, to serve the government with distinction in various positions, mainly as a member

of a Finance Commission as well as of the Planning Commission. Second, regressions ran by those without a good grasp of the underlying theory often turn out to be grossly misleading. Krishnamurty used to call them regret functions. But those who somehow earn a publication via invalid and questionable models overlooked in reviews by careless referees would certainly have had no regrets for trespassing into regression analysis and feeling bloated about it – all because of the easy access to research assistants who'd slog daylong on their calculating machines, many (of those times) primitive in design and awfully tiring to produce regressions for their masters.

KK brought from the US the newly published book on econometrics by Goldberger and I worked through it in due time: it was basically an elaboration of the simple linear model in statistical theory and its extension to more than one equation, with modifications in specification necessary for economic models derived from theory. But reading the book alongside Klein's works suggested to me that the practice of econometrics requires a thorough grasp of economic theory – neoclassical, Marxist, institutional, or whatever - besides a grounding in statistics as well as the ability to do certain types of mathematical manipulation. The all-important thing was of course to understand the structure behind what is being modelled and what leads from a specific theory to given data. How well the data support a theory by acceptable standards can be known only after a valid and satisfactory model is built, with the usual statistical criteria for errors in inference. Reading the relevant literature and looking at the work at the IEG and other places in India, I developed a firm view that the key to modeling lies in what I'd call data-generating processes – how exactly (in one's perception, at least) the data have come into being – for each specific case under study. For example, is it all right to use macro consumption and national income data to estimate the marginal propensity to consume via a simple regression? The answer is no, as pointed out by the ever-irreverent Ashok Rudra, because a whole lot of assumptions about savings and income are made (with implied ratios of consumption to income for some categories of the population) in the making of the national aggregates.

(A relevant digression: Aggregate production functions for agriculture may fit data well, but some thought on possible data generation processes

warns us about the underlying assumptions of individual farmer behavior and the aggregation method used. What do farmers of land of varying sizes actually do, given the large differences in their access to owned or borrowed capital, ability to pay wage workers, and so on, questions totally bypassed in production function analysis underpinned by uniform behavior dictated by the marginal productivity theory of rational choice? Attempts to answer such questions have naturally led – from the 1960s onwards - to issues based on the stark reality of vast inequalities in the agricultural/rural sector and arrangements that leave the actual tillers of land with limited control over disposal of the output. A review of the relevant literature suggests that the estimates of elasticities derived from fitted production functions are of doubtful validity and not at all useful in guiding public policy on several matters vital to rural living conditions. Krishna Bharadwaj, Amiya Bagchi and others have written about this; and I later contributed my bit to the relevant literature.)

My habit of raising questions about the appropriateness or otherwise of certain proposed regressions models did not sit well with some seniors at the IEG, even as it was appreciated by Khusro, KK, Dharam Narain and some others. I must add however that the boldness of a mere research assistant picking holes in a senior's proposed work was never questioned; that was because all colleagues at IEG had some commitment to academic values and democratic functioning in institutions. For example, a senior colleague wanted me to fit a regression to inter-state data on growth rates in agriculture with explanatory variables that included quite appropriately growth rates in irrigation and fertilizer use, but also some dimensionally different variables such as the average area under tenancy (which in a proper specification should be the change in that variable: the decline in tenancy rather than its absolute value in different states). Technically speaking, the growth rate equation on integration over time should yield a sensible production function. In a paper he published later on the subject, he made amends by confining himself to dimensionally similar variables. Perhaps he didn't like my remarks on his specification when they were made, but he later obviously saw the relevance of what I said about his model, and all that in the end left our personal good relationship intact. I want to mention another curiosity in this context. We had a training programme for research scholars at the IEG. Krishnamurty, who was the organizer of the programme, gave me the full

responsibility of teaching some statistics and mathematical economics leading up to econometric work. Imagine the disbelief among some faculty members about this unheard of hierarchical sin of a mere research assistant being asked to teach a course. I must add the students enjoyed my lectures, totally unwise to my lowly status.

I acquired a reputation of sorts as a tough nut but asked nevertheless by VKRV Rao to assist him in the Planning Commission. During the 15 months I was with Rao in the Planning Commission, I wrote two notes for him, both in preparation for a meeting of the National Development Council (the last one that Nehru attended). One of these was about the contribution of irrigation development to agricultural expansion during the first two Plans. I remember to have done a satisfactory piece on the subject. The other brief I wrote for VKRV Rao was on export promotion, with a special reference to the desired direction of exports: towards the Soviet Bloc of countries. This latter note, in retrospect, was all hot air, with little relevance to facts and devoid of sensible analysis. But of course it introduced me to the production of inconsequential paper for official and other agencies. Fortunately, I never again in all my academic life had to produce such junk to satisfy a boss, good or bad.

Despite good reports about my work, and pressure exerted by Khusro, I stagnated at IEG, PNDhar the director making no moves to promote me higher. He was, on the other hand, upset when I decided to move on and told me that big things were in store for me, that it was all a matter of time and for patience on my part. Among those who knew about my work at the IEG was Arjun Sengupta – a fresh recruit to the institute - who introduced me to T.N.Krishnan (TNK), a member of the faculty at Indian Institute of Management, Calcutta (IIMC), then on a visit to Delhi. TNK was at that time engaged in preparing a brief for KTChandy, director of IIMC, who was about to assume charge as the first chairman of the Food Corporation of India (FCI). Learning about my familiarity with the food economy and the relevant statistics, TNK offered me a job at the IIM, initially to help him write a detailed note on a plan of functions and modus operandi for the proposed FCI - covering procurement/buying options, pricing and inventory policies, etc. (A curious fact about that note we wrote after I joined the IIM: Many years later, in 1996, Krishnan and I edited a volume of studies on the public distribution system in India

and while writing the introduction to it we, perhaps unconsciously, used ideas we originally put forward in the Chandy brief for the efficient working of the FCI and other public agencies. We did that just a week before Krishnan's passing away)