

India Studies in Business and Economics

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Sureshbabu Syamasundar Velagapudi *Editors*

Practical Economic Analysis and Computation

A Festschrift in Honor of Professor Kirit
Parikh

 Springer

India Studies in Business and Economics

India is one of the fastest growing economies of the world, with the country being an important G20 member. It is a significant player in the global market with a notable demographic advantage, and an important geo-political and geo-trade position. Additionally, due to its position of being not only the most populous country in the world, but also the world's largest youth population, India has a pivotal role to play in meeting global SDG goals. This makes research from the country to be of immense interest to the global community.

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ISSN 2198-0012 ISSN 2198-0020 (electronic)
India Studies in Business and Economics
ISBN 978-981-97-6752-6 ISBN 978-981-97-6753-3 (eBook)
<https://doi.org/10.1007/978-981-97-6753-3>

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Preface

This book is a compilation of scholarly work in honour of Prof. Kirit S. Parikh. On August 1, 2020 when the whole world was grappling with COVID-19 outbreak and everyone was isolated in their houses, Prof. Kirit Parikh turned 85 and his friends, well-wishers and colleagues from IRADe decided to celebrate his birthday by meeting with him online. This was also followed by a yearlong online conference to celebrate his 85th birthday with scholarly presentations in fortnightly sessions on various thematic areas. The session themes were selected based on topics on which Prof. Parikh has worked extensively—Optimisation, Macroeconomics and Growth, Agriculture, Food and Nutrition, Health and Energy policy. This book is a compilation of these scholarly research papers presented in the conference.

Our efforts in bringing out this volume would not have been possible without efforts of the authors of all the contributions to this volume and we thank them for taking time out of their busy schedules and providing us with technically sound, informative and intellectually enlightening research papers.

We are also thankful to Prof. Alakh Sharma, Dr. V. P. Ojha, Dr. Chetan Ghate, Dr. Priyantha Wijeytunga, Dr. Parkash Chander, Dr. Samar Singh, Dr. Sajal Lahiri, and Dr. Devnath Tirupati for their efforts in refereeing many of the research papers that are part of the volume.

We thank the administration of Integrated Research and Action for Development (IRADe) for their support in organising the KP@85 Festschrift Conference sessions online and also during various stages of production of this volume. We also thank Ms. Sharmishtha Ghosh, Ms. Arushi Bajaj and Ms. Neha Shukla for their editorial help and support during the compilation of this volume.

Finally, we thank Ms. Nupoor Singh and Mr. Naresh Kumar Mani from Springer Nature for their support and cooperation in bringing out this volume. We hope that the readers gain useful insights from the interesting and interrelated topics covered in this volume.

New Delhi, India
Noida, India
Union City, USA

Probal Pratap Ghosh
Rajbans Talwar
Sureshbabu Syamasundar Velagapudi

Speech by Dr. Suman Bery, Vice Chairperson, NITI Aayog at the 20th Anniversary Celebration of IRADe

I am here as someone who enormously admires what Jyoti and Kirit have built in the last 20 years. With Kirit, my life is intertwined with his in all kinds of ways. I came to NCAER in 2001, and IRADe if it's now celebrating 20 years, was founded in 2003. So, I have been a keen observer of this latest journey.

While I was at NCAER, Kirit was doing his landmark work on a low-carbon growth strategy. I see Montek is here; engaging with Kirit, and the Planning Commission of that time was influential in my decision to accept the offer from Shell to be their Global Chief Economist. I well remember the formulation that we have an energy problem, and only after that do we have a climate problem. And that remains the case. It may well be the case that people who are pressuring us from the global North believe that our priorities are in the area of mitigation. But we know that there are lots of other issues, and energy access is important among them.

But I have also come in a personal capacity out of admiration and affection for Jyoti and Kirit. I want to reinforce what Deepak has had to say, which is that it takes stamina, perseverance, leadership and, also networking and knowing how the system works to be effective. And we have in IRADe an institution that has been extremely effective.

While you have heard a lot about energy, I would say that as a policy economist, leading NITI, I do sometimes worry whether we are bringing economics enough into the energy discussion. I remember that when NCAER was commissioned by Jairam Ramesh pre-Copenhagen he said look, we have to do the modelling because otherwise, we are working off other people's models; so that was, in some ways where the emphasis on modelling began.

At that time, we had the McKinsey low-cost abatement curve as one of the foundations of how we thought about the agenda for energy. I do think it's important as we go for technology-based solutions, be it electric vehicles, green hydrogen, or small modular reactors always testing them to ask is this the least cost approach? That is, I think, an agenda for NITI Aayog, but also an agenda for knowledgeable think tanks like IRADe.

Let me make a few additional points. One is the time horizon over which one should look at models and how models, in a sense should incorporate uncertainty.

And here I draw on my education at Shell, which taught me that while straight line projections are bound to be wrong, models do provide a discipline; there are consistency checks. But I think that a question of how you anticipate what's going to happen, particularly with respect to relative costs and technology is a challenge. Having got to Shell in 2012 and looking back, I don't think we actually saw the decline in unit costs that was going to happen, certainly not on solar PV and also not on wind. So, there is a set of assumptions that go into those models. But then I think there is geopolitical uncertainty as well. What does that imply for vulnerability? Supply chains? Choosing the time frame for your modelling becomes quite important.

But let me get to the personal dimension. I know that Jyoti had organised a set of events around Kirit's birthday and there's a publication that's either out or due. But I want to indicate why I was pleased to be invited tonight and why it's so important for me to be here as an act of homage to Kirit.

Kirit, you would be amused to discover that in the online World Bank archives there is a record of how we first met in 1978 because Hollis Chenery had organised a review of World Bank research. It was Robert McNamara who brought Chenery to the World Bank. Sir Arthur Lewis, who was a professor at Princeton, (where I did my graduate work) was asked to head an apex panel called the General Research Advisory Panel. Under that were various sub-panels, I was looking for Kirit in an energy panel, but he was actually a member of the sub-panel on Industry and Trade, if my memory is right. So Kirit and I go back to the late seventies.

I then interacted with him when he was invited to set up the Indira Gandhi Institute of Development Research, I was in Bombay at that time at the Reserve Bank of India. Fast forward to when I was a member of Dr. Manmohan Singh's Economic Advisory Council. I see that Dr. Mohanty is here and Kirit was called upon to prepare a report on oil and gas pricing. And the point Kirit made tonight about the impact on inflation being short-run rather than long-run was also in the report we did together.

Another set of links is with ISI and NITI. Apart from being at the ISI when it was in Yojana Bhavan, Kirit was also responsible for the construction of the ISI campus, in which I set up the Delhi office of the International Growth Centre, after leaving NCAER. That is why it is such a privilege and such an honour for me to be here to celebrate this latest contribution to systematic, objective, granular and wise thinking about some of the knottiest problems that we face.

Jyoti and Kirit between them have referred to the many areas in which they have been active. But for me, I think it's not only the macro picture, it's the point he made about Odisha. Knowing the reality at the state level in a way that I would aspire to and saying that look, each of these states is more than a European country, so please think of their individual strategies.

Returning to energy, we are facing two transitions. The energy system now was largely public sector-dominated when I got here in 2001, to one where the renewable transformation is essentially on the backs of the private sector. This poses enormous challenges for regulation, contract enforcement, etc.

Secondly, there is going to be a shift in energy comparative advantage from the east of the country, which has a lot of the coal resources, to the west of the country, which has the solar resources and also the kind of financial infrastructure that's

going to be needed. So, the kind of research that IRADe has pioneered is going to be extremely important over the next 15–20 years.

My final point would be a response to what Deepak had to say about the lack of connect between think tanks and policy. Deepak, as somebody who really is a think tanker, more than a government official, my reading of the literature, on think tanks is that think tanks are there to look ahead, and debate possible solutions, but it is unreasonable to think that analysis alone drives policy.

The way I like to think of it is that when the policymaker feels the need or finds the political moment to act, think tanks are there to, constrain the area of action so that sensible things, not outright crazy or venal things, get done. So, from that point of view, it is India's endowment of the think tanks which is important and the fact that they engage with each other. Political moments for change do arise, and then you have to be ready.

And it is, of course, because of the long innings that Kirit and Jyoti have played in public life that they have a well-developed sense of timing. So, thank you for this honour and let me not delay drinks and dinner any longer.

Walk Down the Memory Lane: My Association with Dr. Kirit Parikh

P. G. Babu¹

Indira Gandhi Institute of Development Research Mumbai India

The founder Director of IGIDR, Dr. Kirit Parikh is a unique personality. Even now, none of us can match his enthusiasm, energy, and drive. On an occasion such as this, one is flooded with many memories. Let me pick and choose among them those that best illustrate various facets of his persona and more importantly, what we have learnt from him.

Library classification: IGIDR library those days arranged books by accession number, without any subject classification. Dr. Parikh always believed, and am sure still believes, that it is great to be able to see all sorts of subject books sitting next to each other, without a “subject caste” system. We were all too beholden to the Dewey decimal classification system for books. And we kept bugging and badgering him to accept the Dewey decimal classification; and finally he agreed with a resigned look, but even today in his heart of hearts, he does not believe in subject classification and can give very convincing arguments for accession system ordering. But, again, despite his own strong alternative belief, he did not veto the majority opinion.

Blank cheque: He has his own unique ways of checking people out. However, once he is convinced about your motives and commitment, he would never ever ask a question. It took us some time to win his trust with regard to IGIDR library, but one fine day we won it when he told us “I give you a blank cheque with regard to library” and after that never said “NO” to anything that we dreamed with regard to the library, be it budget, extension, or new annexure building.

Institutional Culture: We all learnt some of the most important lessons on academic management from him. To give a few examples: he taught us the importance of practicing “no free lunch” principle; subsidies were never ever 100%, be it the canteen coupons or book grants—at least 40% the user has to bear. He ingrained in our minds the futility of having rules and more rules. His refrain always was “you younger guys should never fall into this trap of rules”. One could blame him for not codifying rules,

¹ This is based on a quarter century of academic and personal life at IGIDR.

and most of us did those days; but with hindsight, I can only say how right he was. I should emphasize that we always had strong social norms. Looking back, we now understand better what it takes to ensure the continuity of those norms, which used to be recurrent theme of my conversations with him—I always used to tell him that he is assuming that all people share the same social norms and that it is unlikely to be true. As is the norm with him, he always thought the best of human behavior. We now also understand what it means to build and maintain “institutional cultures”. To give a specific example, say, you want to stop people from visiting unmentionable internet sites. KP would say “Forget it. The cost of wasting your brains and time on trying to stop people from misusing internet is way too high”. At the same time, he was very aware of the need for checks and balances—that fine balance between rights and responsibilities. That is one lesson of his that I constantly remember: “Just because there is no plague today does not mean you will not have plague control mechanisms in place”.

Walk-in to offices and computer center: Those of us who had the habit of breaking occasionally into a game of “Solitaire” would dread the scenario where KP would be standing behind, and often he did—quietly standing behind and catching them literally with the fingers on the keyboard. People often fondly remember his informal style of walking into faculty offices for a chat. His usual opening sentence always was: What is up. There was a deeper purpose behind such visits; while making us all feel at ease with his charm and informality, he was also implicitly goading us in our own, as well as Institute’s work. His own office door was always open to all. His secretaries would cry that no one follows the appointment route. Blame it on KP: that is the reason why most of us at IGIDR react so violently to the not-so-uncommon “meet by appointment” culture. From what I have heard, he followed that culture in the Planning Commission too. Don’t know how those hierarchy and protocol conscious Delhi wallas reacted!

Bias: In a country like ours, which is full of stories on nepotism, regionalism, and all sorts of chauvinism, IGIDR was one of those rare places free of any of these diseases. I am sure the entire world searched hard to see if at all there is some chink in KP’s armor, but could not find any. However, I did find one, his soft corner for fellow Leos. At one stage, there were at least eleven of us Leos on IGIDR faculty. And we had several fights with our dear friend and former colleague Veena Mishra which always used to end with: “God... You all Leos...the bane of this earth”. Alas...we are in a minority now. But, you know, even that is not really a chink in his armor. To give an example, like most parents in India, mine too wanted to put me in school as early as possible and increased my age by four months. So, my official date of birth is in April. Hence, you can’t blame KP for showing soft corner for a fellow Leo. Hmm... Maybe you can still blame him for showing soft corner for Aries perhaps. No prizes for guessing...Mrs. Parikh is Aries of course. Jokes apart, that unbiasedness of KP has become the hallmark of this Institute, viz., IGIDR.

Campus Life: He was one of those few people on campus without cable connection those days. So, it was not uncommon for him to go to one or other faculty home to catch up on some cricket or football. We almost always saw the world cup football finals in Seminar Room 1. And towards the end of his career, we started to get lot of

dance-crazy students, and many a moon-lit Saturday night, KP and JP have joined them in: “Saturday night, and the moon is out, I wanna head on over to the twist and shout, find a two-step partner and a Cajun beat, when it lifts me up I am gonna find my feet, out in the middle of a big dance floor”. And that big dance floor was our red square. So, it should not be a surprise that he and Mrs. Parikh often won the best dancers award in our annual Garbha.

He made it a point to attend all seminars whenever he was on campus. It was not uncommon in the later years to see him doze off a bit in the seminars, but when everyone thought he was asleep, he asked the sharpest question that more than once put the speaker off balance. He also made it a point to ask the simplest possible query, to encourage students that it is alright to ask even the simplest of the doubts, as long as you don’t know it. It never mattered how others would judge you for asking that question. You ask because you can’t follow it. Simplest principle—but in our self-conscious world, almost no one follows it.

And he was always there in the cafeteria for lunch and would choose the table randomly. He was a strict follower of a principle that my grandmother had already ingrained in me—no wastage of food. So, I would get this additional utility whenever I happened to be on the same table, when he would gently remind a student who is about to waste food, “It is self service system after all and you got it. So, you should not waste it”, and would sit there till the poor student gulps the food down the throat.

His way of solving students’ problems: Till date none of us know how he solved some of the trickiest student problems. Before the problem blows out of proportions, as often happens in small academic campuses such as ours, KP has already solved it. There was this famous case where an anonymous student destroyed all the data files of another. All we know is that the destroyer had gone to KP for a confessional. Till date we don’t know who it was, how he solved it, or what punishment he meted out.

JP and KP: It is a cliché to say “behind every man...”. However, I think I can give you some hard evidence of their life long complementarities. Having worked with both of them, and having had the advantage to observe their methods of guiding students, I can tell you that JP is the most successful supervisor and even more successful Co-supervisor. KP was always full of big pictures. He could never be satisfied with small picture dissertations. The research agendas he outlined for his students were more like 40-year programs. If you wanted to be a successful KP student, you needed to know how to get him to agree to your micky mouse four-year agenda. If you didn’t have those tricks of the trade, at least you ought to be smart and get JP on your committee. The pragmatic JP often stepped in, and bailed on many hapless students by defining time bound goals. I bet my life that even now KP would be telling Satya, who is one of our all-time great Ph.D. students, how he wishes that Satya had done that one more model run or included one more sector...

The following two episodes from IGIDR history of 1990s capture his personality.

One of our promising Ph.D. students failed in Ph.D. qualifier examinations and had to leave with M.Phil. In the ensuing qualifier examination committee’s discussion, some of us thought she should be in but others thought otherwise. Final decision was that she had to leave. KP and myself were in the minority side. And it was a sad

evening for some of us. That day, KP was walking back to his bungalow quite crestfallen. I met him near the children's park and at some point, I told him "Dr. Parikh, you suffer from soft heart problem" and he looked at me for a moment and said with a twinkle in his eyes "Do you know who has softer heart than me?" and walked up the hill to his house. This episode underlines his style as the Director. He could have perhaps vetoed the decision, which obviously he thought was a wrong one, but he didn't. And at the same time, his heart was for the student whom he thought was Ph.D. material and spent the entire evening thinking about it.

KP was completely convinced that one of our own Ph.D. students had everything to become a colleague at IGIDR soon after his graduation, and was quite keen to recruit him. However, all of us faculty those days used to cherish the ideal of "no inbreeding" and in a "Cool-off period of at least three years" for our own students. Despite his conviction, he deferred to our wishes and did not overrule us. For decades, and perhaps even now, except for one exception, IGIDR is perhaps the only institute in the country which has not recruited any of its own students.

As a mature adult, you learn that life is not black or white. And in the same way, in one's relationship with another, it is never going to be a rose garden; nor is it going to be only a field of thorns. It would be a mix, as we learn from an individual rose plant. The same is true with our relationship with Dr. Parikh as well. I am sure we all have had our share of fights with him. Also, it is not as if KP never made any mistakes. In fact, therein lays KP's greatest virtue: he is one of those rarest of rare people who always admitted their mistakes and made course corrections if you could convince them that their logic was wrong. And the next greatest trait of KP relates to this first: to convince them, they ought to be willing to listen to you—and KP always listened to you—and with that ALL important qualifier, "with an open mind". To sum up, KP for me is synonymous with those three qualities: willingness to rethink if proven wrong, patience to listen to opposite views, and an open mind to weigh differing and conflicting views. Thank you, Dr. Parikh, for bequeathing those great qualities to us, and we can only hope to make proper use of them.

Professor Kirit S. Parikh—A Teacher, Mentor and a Policymaker

Probal Pratap Ghosh

I had the privilege of interacting with Prof. Kirit Parikh as a consultant in perspective planning division of the planning commission of India from 2006 to 2008 when he was the member of planning commission. After I joined IRADe of which he is the chairman and where I have been working since 2008, I got the opportunity to closely work with him on various research projects where he mentored and guided many young researchers like me. Though the last 17 years were my formal acquaintance with him, I had known Prof. Kirit Parikh through my Ph.D. guide Prof. N. S. S. Narayana who in turn is his first Ph.D. student. I can say that whatever impression I had gathered about Prof. Parikh from Prof. N. S. S. Narayana was strengthened during last 17 years. Some of his personal and professional qualities that impressed me are discussed below. Professor Parikh is intellectual, knowledgeable and even at this age is updated with latest developments in not only his subject of professional interest but other subjects too. His views and his opinions on any subject or topic or issue—economic, social, political or technical, are always balanced, well thought and wisely worded.

One of the best qualities that I have come to appreciate about Prof. Parikh is that he is a very good listener. Irrespective of whether he is talking to a young researcher, a senior researcher, policymaker, government official or administration official, he gives them a patient hearing and provides his views firmly and reasonably without imposing his opinions on them. His liberal attitude makes it easy for anyone, even young students and researchers, irrespective of their economic, social and political positions to approach him and have a free discussion.

While articulation and ability to listen to others are qualities that endear him to so many people, I would credit his success in public life to his other remarkable quality of being a very good and effective communicator. Professor Parikh is an expert in optimisation-based modelling and has used it for policy analysis all through his career. Any other expert in his place if asked to explain optimisation models and their outputs to a non-technical person would end up providing a very technical response with lot of jargons. This is not the case with him. He can communicate subject knowledge and understanding to a very non-technical person in a very simple way. Most modellers present their models using large number of scenarios obtained by

changing each parameter in the model. Professor Parikh believes that modellers should have an understanding of the nuances of their model and should be able to present the policy inferences from model in a few simple but meaningful scenarios. This made technical model results easily comprehensible as well as acceptable to non-technical but important policymakers like government officials and civil society. This quality of him contributed to his success as a policymaker. I got to experience this first hand at IRADe where I worked on number of important projects under Prof. Parikh for informing government policy. I would mention the case of four projects on the following themes (1) *Diesel subsidy removal* (2) *Diesel price rationalisation* (3) *Low carbon strategy for inclusive growth* (4) *Cross border electricity trade (CBET) between Nepal-India and Bangladesh-India*. In all the four projects he guided us on constructing meaningful scenarios which highlighted the *cost to the economy of government inaction* on part of the government. The Government of India (GOI) was worried that due to unprecedented increase in international oil prices around the period 2012, the subsidy due to diesel was leading to increase in fiscal deficits and causing inflation in the economy but on the other hand the GOI was equally worried that removing the subsidy would adversely affect the poor and middle class who were vulnerable. The diesel subsidy removal project scenarios showed that compared to continuing with policy to subsidies diesel, if GOI reduced subsidies in a slow and phased manner, there would be inflation in short term only but in long term inflation would be lower and GDP higher for India's economy. This gave lot of confidence to policymakers in GOI that the economy would not be hurt by diesel subsidy removal. Similarly when IRADe begun to work on CBET in South Asia region in 2014, there were considerable doubts and pessimism among the countries for engaging in electricity trade. This was largely due to the political difference among the countries and lack of trust in each other for standing by electricity trade commitments in the face of political differences. Model-based scenarios suggested by Prof. Parikh showed the economic gains in terms of GDP, household consumption and industrialisation and technological gains in terms of efficiency of grid operation, lower fossil fuel use, lower cost of renewable absorption and overall lower power system cost to Nepal, Bangladesh and India for participating in CBET. This convinced the governments of each of the country of the gains at stake due to inaction on their part and helped them to overcome their misgivings and today CBET in South Asia is a reality. Similar strategies were also used in the case of diesel price rationalisation and low carbon strategy for inclusive growth which resulted in the government realising the need and gains for adopting the policies. The modelling scenarios were effective in showing to the government what was at stake for the economy and it spurred the government to act. An important learning for me from working with him has been the art of simple, smart and effective scenario making.

Despite his towering achievements in the field of academics and policymaking, he remains grounded in his approach to people especially young researchers with whom he still enjoys having conversations. At IRADe and while at planning commission he would wish and greet one and all irrespective of their position and seniority on occasions. He is always encouraging young researchers and enthused to listen to their presentations and talk. He is very fond of sweet dishes and has a particular liking for

Bengali sweets and loves mangoes among fruits. He loves watching sports in general and follows cricket matches very closely on TV and internet with lot of interests. Like most Indians, he also loves watching Bollywood and Hollywood movies. One of his favourite movies is the 2005 movie “The Greatest Game Ever Played” which is also among my favourites. He loves to travel and has visited various countries and places during his academic career as well as later for his interest in knowing various cultures, food and customs. His reading list includes both fiction and non-fiction books. This includes spy thrillers, novels, philosophical and subject books on economics, technology, society and politics. The other important like he has is about music especially classical music—both Indian and Western. This is an interest he shares with Dr. Jyoti Parikh, his partner in life and academics. Me and many of my colleagues at IRADe have been fortunate to have been able to witness both of them play or participate together in small evening functions on classical music with friends and well-wishers at their home in Khelgaon, Asian Games Village, New Delhi. While Dr. Jyoti Parikh would provide vocal renditions, Prof. Kirit Parikh would help in organising and joining in with all the guests.

Kirit: Our Friendship Since 1976

Michiel Keyzer

I guess that I first met Kirit in summer of 1975 at a seminar in Alpbach, a mountain village in Austrian Tyrol, but it may have been two months later in Baden, near Vienna. I had come to Alpbach, where it was raining all day long, as part of a Dutch research team. This team consisted of staff at Free University in Amsterdam and Agricultural University in Wageningen, led by Hans Linneman and Jan Tinbergen that had been asked in 1972 by the then famous Club of Rome, to conduct a study on the doubling of world population which was at the time expected to occur within 30 years. The study was to build on the message of the Limits to Growth Report by Dennis and Dana Meadows and their colleagues published earlier that year. It started with an equally broad scope but eventually came to focus on the question how to address world hunger in the face of this fast-rising world population.

At the Alpbach seminar, our team presented its main findings, based on a multi-country world model named MOIRA (Model of International Relations in Agriculture) meaning “fate” in ancient Greek. The model combined information from soil scientists and crop scientists to estimate the agricultural production potential of all countries, with statistical data on supply, demand, import and export and income distribution, to develop a two-good (food/non-food) equilibrium model with supply-demand equilibrium and statistically estimate or calibrate these relationships as best we could. The main finding was poverty rather than lack of or degraded production potential was the main cause of hunger. Development and income redistribution seemed more effective than Malthusian policies of birth control.

The Club of Rome board was not amused, because this went against the pessimistic posture they had adopted at the time. Ferenc Rabar from Hungary was also present, however. He had just been sent to IIASA (International Institute for Applied Systems Analysis) in Laxenburg, Austria, to look around for collaborative opportunities to start a new program on Food and Agriculture (FAP). Soon after but independently from this Alpbach Seminar, our team was invited by Tjalling Koopmans, to present the MOIRA results at an upcoming IIASA Global Modeling Conference to be held a few months later in Baden, in a Kurhotel Badener Hof, not far from Laxenburg. Other Club of Rome projects would present their finding as well. Koopmans had been a colleague of Jan Tinbergen in Rotterdam (and also happened to have been

thesis supervisor of T. N. Srinivasan at the Cowles Foundation). The conference took place in the fall of 1975. I am not sure whether Kirit attended this one or the Alpbach Seminar, but he was at one of both for sure. Anyway, for me the upshot of the conference was that Ferenc Rabar invited me to join the FAP team and help develop the MOIRA model into a more general tool that would represent the institutional specificities of various countries, in the developed, centrally planned and developing world.

As I had to complete various activities in Amsterdam, my wife Andrea, our three-month old daughter Heleen and I moved to Austria in February 1976. Soon after Kirit joined the FAP team and came to share with me what I had until then considered my office, in the Park Wing of the “Schloss”. Schloss Laxenburg was the former summer palace of the Habsburg emperors, where Empress Maria Theresia raised her 16 children under far from spacious circumstances, and where Emperor Franz Joseph signed in 1914 the ultimatum to Serbia that led Austria and Germany into World War I.

Kirit had been recruited from the Indian Statistical Institute (ISI) with the task to build a model of the Indian food and agriculture system, as a critically important component of the FAP-world model. We had intense discussions on that subject, but also on about everything else under the sun. Kirit often expressed at the time his concerns about the increasingly autocratic stance of Prime Minister Indira Gandhi. Once he got more or less settled in Vienna, Jyoti came over with little Fantu (= Maulik), soon to join Wolf Häfele’s energy team at IIASA. I remember that Fantu was so fond of a “Mighty Elephant” he used to play with, and of colored toy elephants in general. It was, therefore, quite amusing to observe that Maulik Parikh, now a well-respected professor in theoretical physics, was still toying with little colored elephants in his TEDx lecture of 2016 on “How to escape from black holes”.

Next to our task in research, our FAP team also had to engage in public relations. I remember us traveling to Bonn in 1976 for presentations at a seminar to IIASA’s West German National Member Organization (NMO). We had prepared our sheets and talk in English, of course. However, after the first sentence by our first speaker spoke, the NMO chair interrupted and demanded on a characteristically German uncompromising tone that we all conduct our presentations and discussions in German. Our delegation was apparently too intimidated, and IIASA too dependent on West German support, to refuse, but the seminar went terribly bad in terms of substance, and I still regret that we didn’t resist.

In the years 1976–1978 Kirit and I collaborated most closely on the India model, especially on how to include the Indian system of ration shops and agricultural procurement. The task was wide, however, and after a while, Kirit secured the help of N. S. S. Narayana to speed up the process.

IIASA in those days made all efforts to offer a hospitable setting to its pluriform staff. There were outings to Salzburg, to Budapest, the collective farm in Balbolna which offered rich food and drinks. In winter, we also went out to the snow, where the Parikh family much enjoyed skiing (we didn’t).

Most appointments at IIASA were short-term, however. In my case, I was only there as guest scholar, on secondment from the Free University. After two years I had

to return to Amsterdam to help Wouter Tims setting up our Centre for World Food Studies, the MOIRA-project's successor. By that time, the FAP-work had advanced but it was far from finished. Upon my return, our Centre in the early 1980s, also collaborated with Jyoti on biogas energy technology in Bangladesh.

In 1980, FAP-project leader Ferenc Rabar had to return to Budapest, for similar reasons. Fortunately, Kirit accepted to take over the FAP leadership from him. During the period 1978–1986, I frequently returned to Laxenburg on short stays, initially to help with the model simulations and later to participate in the writing process. I noticed that working in this leadership position definitely sharpened Kirit's diplomatic skills, particularly in dealing with researchers and council members from Central and Eastern Europe.

I also remember that we once had lunch with a representative from the Vatican Academy, who came to talk about fertilizer use in developing countries. Kirit was not very much interested in what that academy had to say on the subject. He rather chose to play the innocent unworldly Indian, and inquired about the difference between Soviet communism and the Catholic Church. Taken by surprise, the Vatican representative could do no more than utter some mumbling followed by a long silence,..., which Kirit was only too happy to break with a big smile: "O, I know, Catholics believe that the pope lives in Rome and communists think it is Moscow!"

In 1986, Kirit and Jyoti returned to India, with Fantu and Anokhi, upon invitation by the Reserve Bank of India to set up the Indira Gandhi Institute for Development Research (IGIDR) in Mumbai. With a Ph.D. in civil engineering, Kirit was well-placed to guide the construction process, and I remember him sharing his ideas on the subject. Wouter Tims and I also attended the formal opening of the institute and the dedication ceremony of the Director's home with colorful flower garlands and incense.

As regards flowers, I remember Jyoti and Kirit in those years visiting flower park Keukenhof in April, with rain and sunshine, under the motto: "If you do not like the weather, just wait a minute!"

In the late 1990s, Fantu spent some time completing his Ph.D. in Utrecht, under the guidance of Eric Verlinde, and we met him quite regularly, and clearly, we saw more of Jyoti and Kirit in those days.

I also remember taking Kirit on a cycling tour in the polders near Amsterdam. After a while he spoke less, and eventually kept on peddling in silence. Years later, he started reminding me time and again about how exhausted he had been.

In 1997, I met with Kirit in New York, where he served as advisor of UNDP. I remember us paying a visit to his sister's family in some high-rise with a nice view on Central Park.

When Kirit was Member of the Planning Commission, we communicated several times on draft documents he was intending to issue, for the 11th Five Year Plan 2007–2012 and otherwise.

In 2007, I also went to the Hannover Fair to meet him, and I remember how he was as Member of the Planning Commission given red carpet treatment, and being lobbied by German companies, Siemens in particular.

More recently, Kirit visited us twice at our house in Normandy, in 2014 by himself, and the second time in 2017 with Jyoti, when we also toured Paris together.

Lastly, in December 2019 we most enjoyably spent a few days together in Valencia, when Kirit and Jyoti were participating in the COP 25 Conference in Madrid, just in time before the COVID confinement. After that, we only had contact by mail, and by sending messages for their celebrations. Kirit and Jyoti make fewer stopovers in Europe, and we also travel less, because of our retirement, but also of shame of flying, and a tenuous atmosphere internationally.

Taking stock of this 48-year-long period, I note that our common interests have extended from concerns about poverty and hunger, international migration (rent of the fence), economic growth, reducing inefficiencies of state intervention by enhanced planning methods and market orientation, and fair sharing of natural resources, to including addressing climate change and sharing the burden of it.

As regards the latter, we were for a long time expecting that exhaustion of deposits would by itself limit pollution by fossil fuels in due time. Many had high expectations of nuclear power, with transition to new technology like Thorium reactors, until the Chernobyl disaster of 1986 changed the global energy perspective, and promoted further reliance on fossil fuels and investment into prospection. Greenhouse gas emissions hardly played a role at the time, and it would take until 1997 for the Kyoto Protocol to be signed.

During those years, while I stayed on the methodological side and was primarily engaged in research and international research collaboration, Kirit and Jyoti climbed the stairs of policy influence, in India but internationally as well. Our short stay in Valencia in 2019 proved, nonetheless, that this in no way impeded our common understanding. Kirit's tolerance, joyfulness, brightness, mental flexibility and concern about the most vulnerable are in our long friendship presumably the traits I appreciate most.

Our Professional Lives: Together, Yet Independent

Jyoti Parikh

Kirit and I got married with no expectations of collaborating professionally, as our respective subject areas viz economics and theoretical physics were quite apart. In 1968, I was working at Tata Institute of Fundamental Research (TIFR), Mumbai and he was a Professor of Economics at Indian Statistical Institute (ISI), Delhi. He used to come to TIFR to use the best computer facility that TIFR had. Around then, we took a decision and got married in 1969. Much before that, we knew of each other as his sister was my best friend and I knew the whole Parikh family as I spent a lot of time with her from 1955 onwards. He was then mostly at IIT-Kharagpur and then went to MIT Boston from 1957 onwards. Thus, I had heard of him and also met him, but he was one family member I did not know too well. In 1961, I went to the University of California Berkeley and our paths hardly crossed till we both returned. After I got married, Dr. Vikram Sarabhai brought him to Mumbai to start a new group of economic analysis of nuclear power and applications. So we spent two to three years at Mumbai and I continued my work in Physics. However, after Vikram's tragic death, we moved back to Delhi. I began to take interest in science at-large while at the Department of Science and Technology dealing with environment and renewable energy. In the mid-seventies, energy and environment started to be central to dialogues on technology as well as development economics, nationally and globally. I wrote a few articles on the environment then. Soon, we had the opportunity to work at the International Institute for Applied Systems Analysis (IIASA). Where the area of systems analysis seemed to be a meeting ground for both the disciplines viz. science and economics, in the area of energy modelling in particular. He provided much support to me to make a transition and I first began my career in energy with two jointly authored articles with him. While the subject and methods were a bit familiar, one is always apprehensive on how other disciplines work in practice. Kirit's support was essential for this huge transition, and it was helpful for me to make that transition smoothly and confidently. We wrote two papers together. One on the community biogas plants—a technology assessment paper that resulted in another paper on technology assessment of solar irrigation pumps. (With this beginning with him, later in my life I did several technology assessment exercises). Second track I got started with Kirit was in energy modelling viz. model that simulated

macro-economic (SIMA) scenarios with energy sector. It was used for a global modelling project at IIASA. Another model he supported behind the scenes was rural energy model highlighting choices of using biomass for fuel-fodder-fertilizers. Projecting till 2020 seemed like a bewildering prospect to a physicist- where much more precision is expected- but his confidence was amazing! That put me on the course of many optimisation models; spanning areas like climate change, power system, transport sector, regional connectivity, etc., encompassing technological, scientific, environmental, societal, and institutional issues; a mix required for good policy analysis. We returned to Mumbai again as we were to start a new research Institute-Indira Gandhi Institute of Development Research, IGIDR- at the request of Dr. Manmohan Singh, Dr. Rangarajan and Dr. I. G. Patel and Reserve Bank of India.

I am glad that much about that period at IGIDR and ISI is written by others in this book. The time at IGIDR was a great period of creativity for both of us. However, Kirit was busy building the new institute and was at the helm of affairs, so I focused on working with other team members of IGIDR, especially guiding students. But two joint works we did were pioneering—One was “Consumption patterns—Driving Force of Environmental Stress”, a commissioned paper by UNCED written for Rio Conference on Climate Change in 1990–1991. Strangely, the people then thought climate change is happening because of population growth! We showed item by item of consumption, viz; all fossil fuels, cars, appliances, steel, fertilizers, etc., that 70% were consumed by the developed countries with 20% population. Kirit’s contribution there and in Natural Resource Accounting brought much needed clarity. Even when we are not co-authors, we consulted each other, and it is so even today. We may not always agree but we connect on many levels. Both of us enjoyed interacting with Ph.D. students the most and that is what kept us going.

Sometime around 1997, he reached retirement age, which was then extended till he reaches 65, because by then he was a Vice Chancellor of IGIDR. I felt he should not take it and we should start the new institution sooner. However, he decided to continue and so IRADe was delayed by three years! As it happened, I was involved in the EERC project as national Project Director, which was one of the most satisfying projects to build capacity for environmental economics.

Soon after we finished at IGIDR and came to Delhi, Kirit was asked by Dr. Manmohan Singh to join the Planning Commission, the job where he spent some of his most productive years as he completed Integrated Energy Policy, which was a landmark and of interest to all and anyone concerned with energy. I had to be careful not to get any benefit from his position for IRADe or myself and kept distance and minimized his involvement with IRADe also. However, a chance of introducing a chapter on “rural energy including gender”, which no other earlier energy policy documents had, was too tempting and IRADe did get involved there. Even after his term was over in 2009, he kept engaged with the Planning Commission, writing Low Carbon Strategy for Inclusive Growth (LCSIG) which is another work that he is most satisfied with and for which IRADe, particularly Dr. Probal Pratap Ghosh provided support. He has had more time for IRADe after that.

On the personal front, we are too much involved in many activities to bother about gender roles. We do not limit ourselves to conventions and deny each other the

pleasures and privileges of both the roles. Neither do we have energy to keep denying that they exist and let all take its natural course. Yes, on work and public front, in terms of social change, we do work towards reducing extreme adherence to it. Our son and daughter are perhaps the biggest assets we have and more important than anything or any achievements we have made together. We have enjoyed travelling singly, together and most of all with the whole family including our grandson. At my 60th birthday celebrations, he said, she has walked behind me, together with me and ahead of me at various times. I say the same to him, more so, ahead of me!

Therefore, this article on state-level climate mitigation is a tribute to him because policy analysis demands a multi-faceted perspective that I developed during our collaboration. It was also a matter of concern to him when he was working in the Planning Commission.

Admiring Kirit Parikh

Sureshbabu Syamasundar Velagapudi

Introduction

Kirit Parikh was most fun among all the faculty at Indian Statistical Institute, Delhi in the first half of seventies. They used to have corridor conversations with us mere graduate students. I learnt a lot from their casual remarks about life in general. I told my IITM Aero classmate T. R. Sankaranarayanan the following as a way to enthuse TRS to participate in the KP@85 conference.

Once I remarked to Kirit Parikh that Muhammad Ali staging a comeback to win Boxing Championship was remarkable because of the age. They asked me immediately whether I thought it would be easy for individuals in intellectual professions to stage a comeback. I had to gather my thoughts and hedge my answer replying in probabilistic terms. They advised me to keep the mind active so that staging an intellectual comeback would be possible without much pain.

It is heartening to see Kirit Parikh intellectually active late into their Eighties. Nowadays I call them GurKir to characterize their sweet nature and intoxicating conversational abilities. It just means jaggery (Gur) mixed with a (Kir), a cocktail. This is a recent coinage of mine. Take it or leave it.

My original impression of GurKir was that of a FORTRAN Fellow Traveler and a card-carrying coder who coauthored with Richard Eckaus [2] a book on “Planning for Growth”. FORTRAN programmers are fond of writing program variables in uppercase letters and starting from I for integer variables. Typically used are II, IJ, IK and IL. What do those stand for in the present context?

Four Notable Qualities

I admire (not with equal intensity) the following four of their traits (Not an exhaustive list and no properties of consistency and completeness claimed for this list.) I guess the reason I admire the following qualities in them is because I could not definitely sustain any of those qualities to the extent GurKir manages to do even to this day at the age of 89. I am 13 years younger and always look to them as a role model worth emulating. I confess I am not as good as GurKir in maintaining any of the following qualities.

- (1) Intellectual Integrity (II)
- (2) Impish Jokes (IJ)
- (3) Innate kindness (IK)
- (4) Intimidating love (IL).

Stories to Share

Well, these are personal stories defining a relationship. You may have different stories to tell. I should also make it clear upfront that I look at intimidating love with some trepidation and try not to indulge in it or become a target of it.

Intellectual Integrity in Dealing with Clients They were involved with A–Z of Indian Economy from the early sixties. A–Z can stand for Atomic Energy to Zoo Maintenance.¹ At Department of Atomic Energy, they headed the Program Analysis Group directly reporting to Vikram Sarabhai from whom GurKir claims they learnt listening and conversing skills in dealing with people of different educational backgrounds. I recall the day GurKir revealed that to me in the early seventies and my resolution to be more humane and less bothersome in my dealings with other humans with different understanding of the world. Implementation of that particular resolution has been tough ongoing process with little success.

GurKir once had an interesting problem they casually mentioned to me. Abstracting from the details, they said that department A believes in X and department B believes in Not X. Both departments want intellectual support from GurKir. What should they do? I casually offered a solution. Tell A they are right by “Ceteris Paribus” reasoning and tell B they are right by “Mutatis Mutandis” reasoning² and

¹ I am actually not aware of any zoo Management advice they offered. They could easily have done that given the fact that they could manage graduate students’ zoo at ISI Delhi.

² All students of economics are taught these Latin phrases. “Ceteris Paribus” meaning “other things being same” and “Mutatis Mutandis” meaning “other things changing suitably”. In the Advanced Education Program for practicing engineers I used to introduce these concepts with the following well received story.

One aged doctor had two Economist patients. The first one was lean and underweight. Doctor’s advice was “Eat a Banana”. The second one was overweight and interested in losing weight. According to the eavesdropping apprentice, the doctor’s advice was “Eat a

collect the consultancy fee from both departments. Ashok Rudra who happened to be in the same room began laughing. GurKir was not amused at all and told me straight that intellectual integrity is the most important quality even for consultants. A trait I admire but find difficult to follow because of the temptation to throw in high sounding Latin and/or Samskritam phrases in conversation if that results in an ego trip if not some slight petty material gain. One of my favorites is “De Gustibus non est disputandum” translated loosely as “no point in quarreling about taste”. I like the saying in Samskritam even better. “Loko Bhinna Ruchi” meaning “People have different tastes”.

Impish Jokes to Reduce the Heavy Burden of Understanding Quantitative Economics Once their typist typed ‘closure’ instead of ‘closer’. GurKir joked that the air at ISI Delhi is full of Advanced Mathematical Economics that even typists instinctively type ‘closure’. They had respect for economic theory but thought that too much of it is just a comic show of Laurel and Hardy type. I do not think that joke was well received by the local theoretical economists befriending the local mathematical statisticians to get recognition for India as a leading nation in the research on Mathematical Economics. Similarly when they indulged in a self-deprecating joke in 1974 that they would stand for the slogan “planning or growth” instead of “planning for growth” [2], I could manage a laugh, but a close friend of mine was enraged and decided not to pursue study of planning models (A very wise decision no doubt!).

Raju Talwar and I recently recalled the heydays of discussion of Indian government project about people’s car. GurKir’s suggestion was disarmingly simple. “*Invest not in people’s car Maruti, but in people’s bus Hanuman*”. We, the graduate students always welcomed the corridor conversations with GurKir just for those impish jokes. Another one I recall is their tongue-in-cheek comment about objectivity vs subjectivity. They said “get a few subjects together and let them brainstorm and objectivity emerges”. Another one is about attacks on Logical Positivism. “How can any one be so silly as to attack what is logical and also positive”?

In one of the many seminars I gave at ISI, I was explaining the econometric techniques used in an electricity demand study done in USA [7] and I used the term ‘white goods’. Some one wanted to know what that meant. Kirit Parikh was quick to answer “Goods used by white people”. Everyone laughed and they (Kirit Parikh and audience) succeeded in spreading light instead of gloomy econometrics.³

Banana”. Apprentice cornered the doctor about the inconsistency. Doctor said the advice was followed by a whisper (so that the apprentice cannot hear) “Ceteris Paribus” to first and “Mutatis Mutandis” to the second. Because they were economists, they knew what the doctor meant. The first one decided to eat a banana with a meal and the second one decided to skip a meal and eat a banana instead.

³ Incidentally in that much acclaimed study [7] white goods just meant large electrical goods used domestically such as refrigerators and washing machines, typically white in color. No racial connotation is intended.

A standing joke in our conversations was about the qualitative Versus quantitative economics. Qualitative, I suppose is a euphemism for prose loving economists without any knowledge or interest in using algebra and calculus. There is no quality check on them. They are by definition ‘Quality’. On the other hand, we the quantitative economics students try to absorb a lot of mathematical and statistical analysis to make sense of the economic world but face ridicule by those powerful literary economists as “irrelevant number crunchers” or worse “FORTRAN foot soldiers” of the economics profession. GurKir weathered it all at an early age and succeeded in winning the admiration from all brands of economists.⁴ I guess that has something to do with their Innate Kindness and cultivated communication abilities.

Innate Kindness I mentioned earlier Vikram Sarabhai’s advice to them. I think it is their innate kindness that made them internalize that advice. I heard they never lashed out at any student even when they were teaching a class for a whole semester. Our batch had a few guest lectures by them on planning models. I recall the mistake I made in one class when they presented a model and asked the question about what would constrain the growth of that toy economy. I immediately replied foolishly that it would be technology. They corrected me gently without calling me stupid (An epithet I deserved.). They said it would be the capacity constraints.⁵ Later I read their review [6] and realized how deep their knowledge of economics of planning⁶ was. I could never forget the last sentence of that review.

One comes to the sad conclusion that though “Economic Analysis in Input Output Framework” has lots of very useful input output tables, it has very little economic analysis in it.

And I hoped that some day later in my life I would write a review of that quality. Ironically I ended up writing one recently [4] criticizing their second student’s doctoral dissertation in which the significance of capacity constraints was not at all understood by that student. I wonder whether that particular student was intimidated by the Crown⁷ of economics of planning to have had a frank one-on-one discussion about the differing economic meanings of the models in the dissertation.

⁴ For us budding Quants, to be published by North-Holland in their series on contributions to Economic Analysis was very prestigious. The founding editors of that series proudly declared that “Their methods tend to be ‘practical’ in the sense of not being too far remote from application to actual economic conditions. In addition they are quantitative rather than qualitative.” Quant pride did not remain at that level forever. When GurKir published in that series along with their mentor T N Srinivasan and mentee NSS Narayana in 1991 [1], “rather than qualitative” was quietly dropped. I infer Quants now respect *Quality*.

⁵ I ended up cursing myself silently for not being able to get rid of the image of lathe machines of IIT Madras Workshop. As B.Tech students, we used Technology as an umbrella term including capacity constraints. And that was wrong.

⁶ Those days “economics of planning” was my favorite journal. Nowadays I understand it morphed into “Economic Change and Restructuring”. I have not read any issue yet.

⁷ The meaning of Kirit is Crown. The first Festschrift got it wrong where it was translated as ‘famous’. I suspect the naming authorities in 1935 must have felt that the crown is more important because fame usually follows the crown.

Intimidating Love They loved their direct graduate students. I was out of that charmed circle. I maintained mutually respectable computing comradeship and considered GurKir as part of our tribe as Samar Singh [3] put it in this volume.

In those days, both were “card carrying members” of the “computing fraternity” (because we carried boxes of punched cards to and from Computer Centers!).

I suppose their love always came with a slight dose of intimidation. Once they, together with NSS Narayana, came to me to ask point-blank whether I can explain “higher education as a filter” [5] by Arrow to them. I sheepishly⁸ explained it to them and also added it is all interesting theory⁹ but not verified in any way. They thanked me before leaving. Later in the evening, NSS Narayana told me their argument about the value of doctoral degree. GurKir took Arrow’s position that Ph.D. is just a signal to potential employer but not any real value to them. NSS differed vehemently but GurKir insisted that Narayana had to read Arrow’s paper. GurKir wanted to find any other research student who read that paper. I was the sucker who read it and was a little ashamed that I read it. NSS Narayana praised me for reading it and not getting influenced by the concept of “filter”.¹⁰

I was thrilled to find the same Kirit Parikh I knew half a century ago, back in action now. The last session in the KP@85 conference was about econometric techniques to study middle age diseases. GurKir quipped by defining middle age as current age plus five years. The speaker did not get it. Audience had a hearty laugh.

Such liveliness is what makes me an admirer of GurKir. I will continue to look for it in GurKir for a long time even after their “*middle age*”.

Acknowledgments Thanks to my coconspirators Probal Pratap Ghosh and Raju Talwar. My instigation of Festschrift for KP@85 succeeded only because of their involvement. They are not responsible for any of my utterances. I own all my errors. My use of genderblind language is also compatible with the hallowed Indian tradition of respecting the Guru with the plural. On the rare occasions, when their first direct graduate student NSS Narayana and I spoke in Telugu about GurKir, we referred to “Varu Mana Guru” meaning “They are our Guru”. When English was used, I vaguely recall that politeness was missing and American vulgarities dominated.

⁸ Sheepishly because my guide Guru Thiru (Thirukodikaval N. Srinivasan) warned me about my wayward behavior of reading academic papers unconnected with my thesis topic.

⁹ I wonder what GurKir saw in that paper. In my opinion, it would qualify more as a Laurel and Hardy comic show type of theory than the theory practical economists can use. I still hold the same opinion.

¹⁰ Regrettably, NSS Naryana renounced the intellectual world. I thank them for encouragement they gave in the initial stages of planning for this Festschrift.

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