

IN CONVERSATION WITH NISHITH PRAKASH



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As someone who has experience in conducting field experiments and surveys, what are the challenges you encountered while conducting these, especially in the context of developing countries like India? And, what advice would you give to students who might be interested in conducting the same?

I think the best way to answer this question would be to take examples from my projects and go over every aspect of that project while highlighting the challenges we faced. This might be more useful than just listing actions. This is a very important question because it is important to understand the various steps involved in field experiments or any projects requiring data collection.

First and foremost, how do you come up with a research question and how do you narrow it down to a hypothesis?

To give you an example, I have been working very closely with the state police in various states such as Bihar, Telangana (Hyderabad) and Madhya Pradesh and have found that the most important thing is building trust and strong relationships, this is not a trivial matter. The building of trust and relationships with organisations or people is crucial for field experiments. I'll tell you a story: when I was visiting Hyderabad in 2013 to obtain a criminal verification certificate for my wife because we were applying for our permanent residency in the United States, I met a very senior IPS officer who was curious about my work. *You should feel very excited, show your enthusiasm to talk about work, and I can tell you that this doesn't come naturally.* I have a student who is in the job market and I have to keep pushing him to smile, make eye contact and be passionate about his research question to entice the listener.

If you are not passionate, the listener loses interest as well. The project I was working on then studied the impact of electing criminally accused politicians on economic growth where we measured growth using night lights. I talked about this and he [the police officer] got excited about the project and asked to understand the process. I had gone just to collect the certificate and spend some time seeing Hyderabad but the IPS officer asked to spend time to understand my project. I went over the slides and explained to him how the data is analysed etc. Once this connection was formed, I kept in touch with him. Since I run an organisation called the Association for Mentoring and Inclusion in Economics I get to interact with many students. I often tell them that there's no shortcut to research, you have to invest time. You can't ask for help when you have no contact with a person, it appears very shallow, you have to make efforts to stay in touch. The next time that I visited Hyderabad I met him again. At that time I was working on a project called "Gender, Crime and Punishment: Evidence from Women Police Stations in India" that talked about the impact of women's police stations in India on crime and labour market outcomes (mobility). The IPS officer informed me that, as the Police Commissioner of Hyderabad, he was working on an endeavour to address sexual harassment in public space called the SHE Team "Meant for Women Safety". He said he would like me to study and evaluate this project. I was already working with my co-author Sofia Amaral from the ifo Institute in Munich. Sofia and I decided that this was a great opportunity to study something that's quite important and novel.

Now comes the challenging aspect of the project: finding resources, data, and a team based on expertise.

Sofia said that she had been working with a newly appointed faculty member at Princeton, Maria Sviatschi (Mica), who was working in Argentina and Peru. We thought we could do the same experiment in Peru to have greater external validity. I had also come across a very fascinating paper on sexual harassment in Delhi by Girija Borker who finished her PhD at Brown, and is now an economist at World bank. As I took the initiative and introduced myself to her over an email. A lot of people are fearful to reach out but I have a rustic take on things. The worst outcome of writing an email is that the person doesn't respond, and that is okay, in fact, most people don't respond. Girija had read my paper on girls education and cycles and was happy to be a part of the team. Through this process of reaching out, we created a team. *As you can see, reaching out to people nicely is never a bad idea.*

We then wrote up a proposal for this project stating that we (the researchers) wanted to push the frontier. SHE Team is a very innovative idea, where the Hyderabad police is running undercover policing to catch harassers in public space. Police officers in plain clothes would be in public places to catch perpetrators in the act. We proposed to add a uniform policing arm to the initiative to help us learn something new that's not yet been tested in crime literature for public street harassment. However, donors or organisations are often not open to ideas which can result in a lot of back and forth. You have to understand their challenges and constraints to make progress. You need lots of patience when dealing with partner organisations (donors, civil society members, bureaucrats, policy makers, etc.) or someone who is extremely busy (politicians, bureaucrats, etc.).

You must consider the bigger purpose, if you are interested in the question, you should have the patience, and be willing to engage respectfully. Generally, people lose patience very quickly but you have to realise that the outcome is not going to come right away. I started a project in 2015 which took five years to finish and we still haven't submitted it to a journal. An ambitious randomised control trial like this will normally end up taking 8-10 years. Another observation I've had is that academics tend to think they are smarter or have the upper hand intellectually when collaborating with partner organisations (donors, civil society members, bureaucrats, policy makers, etc.), which may or may not be true, but this can be detrimental. Showing off your pedigree or educational qualification doesn't go down too well with policymakers. The primary interest of the organisation was the research question and whether we were a good team who they can trust. One must remain humble despite your academic accolades. I can say based on experience that policymakers, bureaucrats and politicians are really smart since they are experts and know the challenges in terms of implementation. Do not underestimate the knowledge of others.

How can you tell if your idea is good? In our case, we presented our idea to top scholars who felt it was quite novel. Another important issue is that of funding. Field experiments are very costly. This experiment has cost us more than \$350,000. There are many ways of getting funding. The most ideal way is to write a creative proposal that you can pitch to funding organisations. Funding in developmental economics tends to have a caste system.

If you are not elite, you don't have access to funds. I don't know how this issue can be addressed. In the theme of elitism in economics, I personally don't take very elite RA's. When I first started hiring RAs I didn't get good resumes because people are not willing to work with unknown researchers. But, now even though I get applications from top places in the US and India, I don't hire people just based on transcripts, I hire individuals who are hard-working and passionate. I have placed RA's very well who might have not had perfect transcripts because the value-added is what matters. Coming back to the money piece, there are some donors and organisations with open calls for proposals where you can submit your proposal. We got rejected from a few places after which we decided to use our own money granted through our universities. With this money, we did a pilot that was a proof of concept and then wrote a proposal. We didn't ask for the full money because people are often more willing to pay marginal sums than the full amount of money when the project has not yet delivered results. We started applying for smaller amounts which helped money roll into the project. We had non-stop funding because the question was innovative and we did everything possible to push the academic frontier. *The trick is raising small money after conducting a pilot, so you have proof of concept that can help investors placing a bet on your project feel relatively confident.*

When you do fieldwork you need a strong team consisting of field managers, research associates and good research assistants. To emphasise again, it's not easy to hire very strong RA's because when you are new people are not willing to work with you. You have to build a reputation. One way in which I

built a reputation was to work towards the intellectual development of my RAs. I talk to my RAs a few times a week as compared to other researchers or PI who might not have time to talk to their RA's even if they want to help them. A good letter of recommendation cannot be written unless you have close interaction with your research assistant. When I write a letter of recommendation they are nearly 4 to 5 pages long because they are really comprehensive. Since I now have a track record in terms of placements, people know that my RAs are well trained.

I have also noticed that students tend to take a shortcut concerning institutional details or background. For example, if someone is working in the area of crime against women and the police, how do you build knowledge and understanding of that institution? There's no one specific answer. You could read books, I personally pay attention to my surroundings. For example, if you are travelling by train, talk to people because it will help you frame your hypothesis. Similarly, if you have an interest in the police, visit a police station to see the functioning and understand challenges. For me, it has always been about paying attention to my surroundings. A lot of people *don't* invest in learning about institutions.

Another very useful tool is soft skills. There's no magic bullet to effective communication or writing emails, you have to build your soft skills. There are few excellent papers that talk about returns to soft skills in economics – a new area of research. People assume you don't need private sector (corporate) skills to succeed in academia which is not true. You can't always be an excellent writer, in fact, most people have average and even below-average writing skills – for academic papers, but

working on these soft skills is essential for successful collaborations in order to do field experiments.

You will encounter tons of challenges while running field experiments. For example, the pandemic started when the endline for our police project approached. We could not go back and collect data for this type of project because you cannot go back to your sample one year later and ask them to recollect if they saw police officers on the street etc. We got lucky because we had been collecting weekly data on crime and sending our team to every hotspot every week to enter crime data based on their observation. In this context we really got lucky. Additional challenges include managing teams. To manage teams sometimes I have to be awake at 2 to 3 am EST to take calls from RAs to resolve panic situations. For example, we had a project in Bihar for training officers on gender-based violence where for two weeks I went to sleep at around 3 am following which my collaborator Sofia, living in Europe, would take over. One of us had to be available to take the calls. Academia is not just about teaching, there are a lot of moving parts and sacrifices. You have to be awake at odd hours and answer several messages. You need to gain technical data skills to prevent being blindsided. You have to maintain relationships with your team—even though I am not physically in Bihar or Madhya Pradesh, my team is there and you have to keep up communication. You have to survive in unknown places. I've had RAs who have said that they don't want to go to Bihar. I had to spend two months in a very difficult place in rural Kenya in Marsabit. It was hard to find food, I didn't know the language and I had to sleep on the top of the land cruiser we had because there was nowhere else to sleep. I learnt the answers to survival questions such as:

how do you get cold coke in a very hot place? You could wrap the coke bottle with a wet cloth so that it cools down as the cloth dries. You need to learn such survival skills. You have to be willing to take up challenges.

I just shared a story from one of my projects and each aspect has its own challenges. There are projects where things just come to you. For example, for my paper—cycling to school, I evaluated the policy of Nitish Kumar's flagship scheme "Mukhyamantri Balika Cycle Yojna" which gave cycles to girls who would enrol in grade 9, using admin data. So, this project had minimal fieldwork, although I spent time meeting school principals, student beneficiaries, and parents to understand how the policy worked at the ground level. I was presenting this paper at the World Bank, where the president of World Bicycle Relief attended my talk and offered us funding to evaluate their project which had similar objectives. We didn't have to spend time raising money, the money just came to us.

On another note, keep the time factor in mind. Field experiments can be risky for PhD students because they can take a long time to complete. For example, we have an experiment on training police for gender-based violence which lost funding due to COVID and we had to reapply. If you were banking on this project for your PhD you would have been in trouble.

The New Education Policy stresses on learning in your mother tongue. While research indicates learning in your mother tongue is conducive to a child's learning, many also criticise the policy maintaining the belief that English education is important, especially for

the job market. You also talk about this in your paper “The Returns to English Language Skills in India”. How do you reconcile this debate?

You guys forced me to re-read the New Education Policy, so thank you for that since I had not gone through every little detail of this policy. I was paying attention when things were kind of floating and people were giving suggestions about the policy but when I read the details of the policy, I came to the conclusion that I feel more excited than not. I won't be talking about reconciling this debate because there is not much to reconcile here but I will talk about my thoughts on the New Education Policy. So, the New Education Policy talks about many new and exciting things. It talks about early childhood development, which was something missing and I've always been puzzled as to why it hasn't been introduced in the past. It also talks about care for children with special needs—again, something that was missing from the education policy space—alongside support for gifted students and bringing in discussions around ethics, empathy and something that they classify as 'doing what is right.' I think all these things are fantastic moves and I applaud the Indian Government for bringing in these changes. We do not know how these changes will translate into outcomes and how investments will be made towards these plans are still unforeseen. So, for example, let's say, the plan is to invest in gifted students. How are they going to do that? Are they going to cut hiring of new teachers and fund this? We don't know that because it's

too early to talk about such plans. So, I think the challenge lies in how they are going to translate these plans into successful outcomes.

Now, coming to the debate on language. My overall read is that the new policy is in sync with the frontiers in terms of languages: we still have the 3 language policy as before, that hasn't been changed. The new policy does give more freedom to states and introduces additional languages like German, Portuguese, Spanish, French and that is totally in line with what I would say anybody should be doing. The point that a lot of people have reservations about emphasises on native and classical languages and frames them as essential tools of national integrity and loyalty. There is no empirical evidence on this idea being true but I don't think it's crazy either. If you think about France, a lot of people don't speak English but rather converse in their native language. You'll find a similar environment in Germany. This is my own observation that people do take more pride in speaking their native languages. For example, if I'm talking to my Bengali friend, they would take much more pride and find comfort in speaking to me in Bengali than any other language. Similarly, French and German people take a lot of pride in speaking their native language. This connection with our native language helps us remember or at least know about our culture and historical books which haven't been translated into English. So, learning in your mother tongue does have its own benefits rather than costs. But as I said,

everything depends on how these things are being funded and I hope it doesn't come at the expense of, let's say, hiring new teachers, building better classrooms or adapting new technologies. I would be interested in knowing about the source of funds for this policy. So, I don't think there is much to reconcile here but let me discuss my language paper, discuss evidence from another language policy in Bengal and then, maybe you can figure out what to reconcile.

The big takeaway from my paper was very simple: if you speak fluent English, there are returns in the labour market, i.e., you earn more. The returns are also quite sizable, they are as high as, say, having a Bachelor's degree. A big piece of the paper—which is very similar to what people have studied in other countries—is about complementarity. If someone is very good at English but they haven't had formal schooling, then the returns are not as high. What complementarity means is that, let's say, once you have a Bachelor's degree and if you speak fluent English, then the returns are very high. I'm forgetting the exact coefficient but it's around 70%, I'll have to go back to the paper and check but it is very high. So, the big takeaway is that you need to think of this in terms of complementarities and I'm not talking about complementarities with English but other skills as well, for example, knowledge of data skills, soft skills, etc.

I've been emphasising on the value of soft skills to students I teach. People lack precise knowledge on the high returns of soft skills, data handling skills and basic computer skills. All of these things highlight the role of complementarities in various senses. In fact, I have another paper with one of my former R A., Raghav

Rakesh who is doing a PhD in Economics at Michigan State University, Abhiroop Mukhopadhyay at ISI and Tarun Jain at IIMA. In this paper, we estimate returns to studying science in India. However, when we started this project we were under the impression that people are making mistakes in terms of making stream choices. So, imagine that someone is really good at Humanities but their parents have forced them to study Science. If you aggregate these things, you think maybe this is bad for the economy because it's a mismatch in terms of resource allocation. So, that was our big idea, but when we went to the field, we realised that parents are doing the right thing because there are returns to studying Science, as simple as that. If you study Science and Maths, there are sizable returns.

When it comes to language, I want you to think about complementarities and not just the returns to speaking English. To elaborate further on my answer, I will give you two examples that discuss the fundamental question that you asked. Before that, think about the global world. We do need English, right? There is no way you can survive in this world without English language skills. Recall the production function in Economics, you can think about capital, labour, human capital technology, land. So, similarly, think about the education production function. Something like a language skill is part of your education production function. Now, hold that thought for later.

Imagine a child in grade 3 who's good at Hindi but very poor in English. Now,

suppose you teach them in English. How will that work? They're not going to understand anything. You have to distinguish between English language as a subject versus medium of instruction. Yes, they are correlated but they are two different things.

There is a paper by someone whom I really admire, Dr. Joydeep Roy. I think this paper never got published but the author did his PhD in Economics from Princeton and his Master's from DSE. In this paper he studies a policy change in West Bengal—they abolished teaching English language in primary schools—and finds that there was a positive and significant effect of the policy on subsequent educational attainment, and that this was larger for children from poorer families. However, there was simultaneously a large increase in expenditure on private tutoring. This suggests that families who could afford to do so were supplementing the skills of their children by private purchases, since in a multilingual country like India, a knowledge of a common language like English has significant benefits later in life, both in the labour market and otherwise. These findings make a lot of sense.

Another researcher, a professor at IIM Calcutta, Tanika Chakraborty and her co-author Shilipi Kapur, studied the same policy but looked at labour market outcomes instead and what she found is that people who were exposed to the policy made less in the labour market. The result of her study is also what you were hinting at with your question. So, yes, it has benefits and it has costs, like anything else, it has a trade off.

It depends who you are really targeting with the policy. So, having English medium instruction will only help if you understand it, have teachers and the right infrastructure. Otherwise, it's going to have its own costs. A more fundamental question is teaching at the right level. That's also quite important. Any mismatch leads to bad outcomes. Amartya Sen uses this example of, let's say, you give a book to somebody who is illiterate, that is not going to work. You have to think about the mismatch too. From a policy standpoint, any customization of education can benefit kids, especially those who are at the lower tail of the distribution. Any customization will help but it is also hard to do. How can we customise? Think about your teachers, do they customise education? That is one question that I want to study as a teacher, do I customise? Say, someone is at the top end of the distribution and someone else is at the bottom end of the distribution. How much do I customise? I try to do it whenever I can. Like when I grade the first midterm, I recalibrate. I ask questions in the class and I always tell my students, Look, there is no wrong or right answer, just speak because you are talking to a professor who failed in his first year in his undergraduate. You cannot be worse than me." I want them to talk to me because that helps me understand if they're paying attention, if they're understanding and then I recalibrate my pace of teaching. For example, I'm teaching principles of microeconomics and I have completely slowed down after the first mid-term. First mid-term, the average was 73, which is a C I think, so after that I had to slow down. It goes back to any of these debates around education policies and customization. Customization is hard

and requires lots of investment in teachers, teaching skills and pedagogy and I think the NEP talks about these things. How it's going to happen, we will see soon, I guess.

Sir, do you think the results of your paper that talk about the returns to studying science in India are liable to change in the upcoming decades? With respect to studying something like engineering, which constitutes a huge part of the science field, ten years back the market was booming, but now it's almost oversaturated. So, do you think in, let's say, 20-30 years or even more than that, when market conditions and requirements are different, the results of your paper are likely to change?

Let me reframe this and connect it with our discussion. Abhiroop and I spent a lot of time thinking about what exactly is science doing here? Is it just pure returns that if you know Maths, Science and coding there are jobs. Is it that? Or, is it something else? I have a hunch that it's something else also. Think about Economics and the idea of opportunity cost. It is a fascinating idea. Economics introduces many concepts that's fascinating - think about spillovers and externalities. These fascinating concepts definitely enhance your critical thinking skills. So, I feel that in addition to the market returns that you are talking about here, science does a bit more to the way of thinking.

I'll talk about another RCT that I'm collaborating on with Agastya Foundation. What they do is that they have these mobile labs—science labs are in a mobile van—and they go to villages with them. So, we are working with Agastya Foundation and the whole idea is to make science accessible to rural

India. Many parts in rural India might not have well-functioning labs, so the mobile lab goes to them and teaches them about science, teaches them experiments. Now, we want to study how it impacts creativity, subsequent stream choices, etc. I think studying science also has non-market returns which we don't know and which could be changing the way we think. I think training around science does more than just the market returns, that is the puzzle that I want to understand. Is it that it makes you more creative? Is it the way you think? Is it how you approach something different than let's say somebody who has been exposed to humanities? So, it's market returns which we study, which is around 17-18% and there are these non-market returns which I don't know of. So, if those non-market returns are driving the growth of science students in the labour market, the answer to your question is it's going to stay because the returns go beyond the market. It's not just the market responding, it gives you these other skills as well.

What are your thoughts on the existence of a distinct branch of study called development economics, when based on IMF data, 85.20% of the world's population still live in 'developing countries'?

I saw a debate on this on twitter also very recently. My thoughts about studying development economics have evolved quite a bit. So, I don't think of issues from the lens of, say, developed, developing, less developed or more developed countries. Of course, there are certain issues that's more prominent in less-developed or developing countries—for e.g., take the example of poverty or enrollment. It's not a concern in developed countries. However, the way I see it is that there

are many questions that are relevant in the low-income setting; and a low-income setting can be found in any country, it's not country specific. For example, think about inequality, is it just that we only find inequality in India? You look at the US data, the income distribution is highly unequal. Let's think about learning gaps. We know there exists learning gaps among school going children in India based on the ASER data collected by PRATHAM. Translate the learning gap to college education in the US, you would start seeing learning gaps there too by race.

Currently, I'm guest editing a special issue in a journal called '*Economics of Education Review*' and the topic is *Education in Low Income Settings*. The reason we do this is because it makes it less country specific and more setting specific. We hope this issue will draw attention to specific challenges as well as advancements in these settings, with an emphasis on issues of access and equity for vulnerable students. If you go back to researchers who started studying Development Economics, they were studying issues like poverty, inequality that would be a bit specific to the poorest countries in the world. Sure, it's true that there are more people living below the poverty line in poor countries but we see this problem in developed countries as well. If you look at food insecurity, homelessness, it's not as if this doesn't exist in developed countries. I can give you a small example, I live in the US next to a town which is extremely poor. My town is not very rich but not poor. We were driving through a grocery store and my 6-year-old son, Aaryav saw a homeless person and he got really curious and started asking me all sorts of questions; "Why is this person

homeless?", "Why doesn't he have food?", "Why is he standing here?". He just went on and on and I thought, "I can actually answer these questions because this is the subject I've been trained in". And, during the process of explaining he asked me, "How did this person become poor in the first place?" which is a very structural intergenerational question. So, the point being these issues are prevalent everywhere in the world. When I talk about homelessness, think about France. It's a big problem in France. So, the insight you get from Development Economics depends on who you're talking to. To me, it's very context specific.

I teach a course on gender inequality called '*Economic Foundations of Gender Inequality*.' So, when I started teaching topics—one is about labour markets and one is about crime against women. I used to feel a little embarrassed when I used to teach crime against women. I used to think, "This is so terrible, it's such a big deal in India." However, when you start looking at the data, the numbers are very similar all around the globe. Not the aggregate number, but the proportion of women who have experienced some sort of violence. The challenges are the same. For example, even in the UK when a woman reports a crime, the challenges are similar to what you will find in developing countries. Even in the US, I have spoken to a couple of police departments, and they have shown little interest in working for women's safety. So, I realised that the fact that I worked in India exposed me to see more data from there. Some of these challenges are very similar in many countries, however, the form of those challenges might change.

In your paper 'The Impact of Employment Quotas on the Economic Lives of Disadvantaged Minorities in India', one of the key findings was that the policy improved the likelihood of finding a salaried job for male SC members in rural India, but not for ST members. What could be the reasons for this difference, and in this context, could a separate employment quota for SC and ST members be more beneficial?

Just to give you a bit of history, this was one of my oldest papers, but it has been published very late. This was my job market paper or the key chapter in my dissertation. I'm glad you read this carefully and brought up this question, it is similar to the question on language debate.

The key point here is about the mismatch. Imagine there are more scheduled castes in rural areas but jobs are in urban areas—so, this won't help them. Similarly if the minimum education requirement to join a job is a Master's degree, now how many scheduled tribes have a Master's degree is going to determine whether this will be effective or not. That's quite important.

Now going back to the very specifics of the paper. The paper provides a very crude measure of employment. I did not have the "perfect" data—a problem I spoke about in the very beginning. The National Sample Survey that I use in this paper uses salaried jobs as one of the variables. Salaried jobs can be private or can be public. It doesn't disaggregate, especially during the period I was looking at it, by the type of sector—which is public versus private jobs, because the quotas apply to public jobs not private jobs. So, any numbers that I am giving you are likely underestimating the impact. However, it

does classify by what is most relevant, that is the class of jobs—class I, II, III, IV. So, when you look at the descriptives you will find that many scheduled castes and tribes are decently well represented in class III and IV and the problem comes in class I and class II jobs. So, not having any access to the "perfect" data doesn't allow me to answer a lot of questions.

What I find is that the employment quota policy benefitted scheduled castes on average and not the scheduled tribes, during the time period that I studied. However, we do find that it benefitted scheduled tribe males residing in rural areas in BIMARU states—these are the less developed states within India, i.e. Bihar, Madhya Pradesh, Odisha, Rajasthan, Uttar Pradesh. And, it benefitted scheduled caste males in urban areas of non-BIMARU states. If you try to take everything together, it is again back to targeting. Suppose there is one job in an urban area, and although people belonging to scheduled tribes don't live in that urban area, there is one person who lives in the urban area—he gets the lottery. A lot of this mismatch explains the strange findings. But as I said, this is not a paper where I have the "perfect" data to give the perfect answer—I don't. If there was such a dataset, one could potentially study this by looking at the class of jobs. I think that's quite relevant here.

It is impossible to make changes in these policies. Think about what you can do. You can't make changes in these policies in the parliament. However, as mentioned, it is important to improve the targeting based on what the gaps are for the two groups, as a matter of fact, for any group that's disadvantaged, it doesn't have to be a scheduled caste or scheduled tribe. By targeting, you asked this question of how you make it better or more beneficial, so I am explaining in terms of targeting. It is a very complex

process, which requires a lot of discretion, which would lead to a lot of bias and prejudice. So there's this risk and maybe that's why policy-makers have a strict constitutional policy and haven't thought about—or maybe they have thought about it, and it's just complex to do specific targeting. However, I highly encourage any policy-makers or the members of parliament to think about a feedback mechanism where you get specific feedback about what's missing and which gets built into the policy to improve it. But, that's almost impossible to happen because you're basically giving individuals discretion, and that's too risky.

Despite the rise in economic growth over two decades and a rise in educational attainment, there has been a trend of falling female labour force participation in India (especially women working in rural areas). This is in contrast to other developing countries which have experienced increased female labour force participation following economic growth. What do you believe is the reason for this trend and what policy nudges can garner greater participation of women in the workforce post-pandemic?

Low female labour force participation is something that has caught the attention of many researchers who work in India. And I don't think people have found it easy to understand, it's quite complex, and very different from what people have observed in other countries. We have evidence that supports that female labour force participation helps with economic growth, is more inclusive, and improves female empowerment. That's why everyone is trying to push for greater female labour force participation. So, this is not a very

straightforward question to answer, it depends on many factors: poor state, rich state, urban, rural, social-norms, safety, what jobs are available, opportunity costs, it's a pretty long list.

Let's think about this in terms of demand and supply-side barriers. Lack of opportunities such as, let's say, there are many women who could get a job in a call centre, but there is no call centre in Bihar. And if there is no call centre then the lack of opportunities is an interesting demand side barrier. You don't have enough jobs which propels people to participate. Now think about a poor household, my best guess is that in a female labour force participation will be very high when you look at the poor household because they are severely credit constrained, so you have to work to survive. Then think of a scenario where you have a skilled female labour force, but jobs are not available. Then imagine safety being an issue, it is quite an important aspect in terms of women's mobility. I am aware of at least 3-4 well done papers that show female mobility responds to safety concerns—law and order and women safety is a good investment. Then come a few additional and important barriers. Norms, suppose you can address everything we have discussed so far, but men don't want the wife or the parents/in-laws don't want their daughters/daughter-in-laws to work—that's a serious barrier and a big concern in many parts of the country.

So let's talk about opportunity cost. I have listed a few issues and am elaborating. Think about it, I have two kids, I am a female, I don't have help at home. I can find a job where I can earn Rs 50,000 per month, but I need to spend Rs 30,000 on having a nanny. I'm still worried about safety, the job is tiring, and kids get sick. Now I have to

decide whether I work or I don't work. I don't think it's a straightforward answer. It's really hard and depends on the joint decision that the husband and wife have to make. Depends on bargaining — what's the bargaining between husband and wife, and overall costs and benefits of taking a job.

So what I am trying to add here is that it's complex and it's hard to get an aggregate answer to these important policy questions. So I feel that identifying these barriers is quite important before you think about any solutions. If the barrier is, let's say, the lack of education or access to school, then construct feel that identifying these barriers is quite important before you think about any solutions. If the barrier is, let's say, the lack of education or access to school, then construct schools. My "Cycling to School" paper on Bihar shows that providing bicycles reduced the gender gap in education by 40%. If the barrier is safety, invest in policing, make the police more proactive and make them more sensitive to these issues. I'm collaborating with the Bihar police and the end goal is to improve actual and perceived safety for women.

Now suppose the key issue is norms. This is the most difficult one and hardest to change. Then you should invest in gender attitude curriculums in schools. There is a paper by Diva Dhar, Tarun Jain and Seema Jayachandran in Haryana. In this study the researchers attempted to change gender attitudes through curriculum change. And what they find is, it works!

Overall, think about what the barriers are—I don't think there is any nationally representative data where attempts have

been made to collect data and document what the barriers are. One knows about the barriers because you might be reading 5 different papers in India, or different papers in Turkey, or something in Africa. But in India, there is no nationally representative data that identifies these barriers, because unless you identify what these barriers are there is no way that you can come up with a solution. Now, another aspect which is very important, at least in developed countries and many major cities in India, is access to child-care centres. This is a big, big debate in the U.S.—it's a big gap that's relevant in most developed countries, especially in the U.S.—as compared to say Sweden, they have figured this out—the U.S. has a long way to go. It's also possible that these barriers are very different for different states. If you talk about rural Uttar Pradesh, the barriers can be very different. Maybe in Delhi the barriers are safety. So if you don't know barriers there is no way that you can think of solutions. There are just too many factors. There's a recently published paper by Rohini Pande and her co-authors which talks about how money goes to the female bank account in MNREGA so they feel empowered and work more. You will find specific papers talking about specific questions in a specific context and finding solutions. External validity is an active area of research in the discipline.

For e.g., India Human Development Survey collected data about whether you need permission from someone to go to the market. I think it is a fine question to ask but you have to distinguish it with a norm. For example, even though my wife is completely independent financially, maybe not right now given that she has started her PhD, but she is independent. Yet she informs me, saying, "Oh, I am

going to the grocery store.” So many of these datasets have attempted to get at these barriers but not in a very sophisticated way. I always worry that, let’s say, if you are telling your parents that you are going to some place, is it the case that you are not empowered or is it the case that it’s just the norm and you are informing. The dataset does not allow you to distinguish that. I would suggest that people or the government or organisations must invest in knowing what these barriers are, and then try to address them.

Several studies have demonstrated that digitization of welfare systems using mechanisms such as Aadhar has excluded vulnerable people owing to issues with verification of records or internet connectivity. At the same time, digitization has been shown to improve the efficiency of programs and create valuable databases. What mechanisms can be employed to overcome these pitfalls caused by the digitization of social security to maximise accessibility?

This is a very controversial question, by the way. One of my professors at the Delhi School of Economics, Jean Dreze, has written very strongly about it, and my co-author Karthik Murlidharan has also written very strongly about it—it is highly debated. So, on one hand it is true that digitisation, or you can say technology, helps improve the last mile problem—I don’t think there’s any doubt about it. You don’t want to go back to the old style PDS, where you are getting bad quality rice and receiving half a kilo instead of one kilo rice, you don’t want to go back to that time period. However, the exclusion of the very vulnerable from accessing benefits from the welfare programmes is

something you have to be very conscious of. Think about when Aadhar came, they were using biometrics, right? A lot of the debate is about biometrics. Now, if someone in a village is using a spade, they won’t have fingerprints. So, yes, although there is technology, I can get excluded if I am really poor and when I don’t get food. In some cases Jean Dreze talks about, people have actually died. So, you don’t want that—there’s absolutely no doubt that you don’t want that.

So, think about what the solutions are. I don’t think the solution is to go back to the old age of delivering welfare benefits, but actually to use technology to address this. During COVID, I used to be under the impression that, “Oh, everybody has a cellphone. It’s not a big deal, you can have Zoom classes”, not realising that—I remember Abhiroop Mukhopadhyay (ISI-Delhi) talked about how students at ISI Delhi struggled because they don’t have necessary internet bandwidth, or many have gone back to very rural parts of Calcutta and don’t have access to stable internet. So it is a real challenge, there’s definitely this big digital divide in India. It is important to acknowledge and address this. So, yes, maybe someone in a rural village has a phone, maybe a smartphone, but that doesn’t mean that you don’t have to worry about this divide. As I said, I used to think that this divide was not big, but the overall coverage of smartphones in India is only around 54-55% and there’s a lot of variation across states, etc.

The issue that was highly debated in this context was the biometric, many poor who work have this fingerprint issue. But I feel how one should be thinking of the way forward, using technology to address it. You can think

about facial recognition, you can think about using iris to identify beneficiaries.

Think about the electronic voting machine. Most of you are very young so must not have known the early '90 phase of booth-capturing. There are many famous and horrific incidents about booth-capturing in elections. Do we want to go back to that, or do we want to make sure there is a robust EVM? Obviously, there's debate about EVMs but I think it is as robust as it can be.

Yes, you have to make sure this exclusion does not happen. I would say the local administration, the Panchayats, should be thinking about this more carefully than somebody sitting in Delhi, because they can think about this big picture but at the end of the day this big picture has to be implemented more locally. But, the solution is to not go back to the old age but think about using technology to address it, and I do feel that technology can address the problem of exclusion.