AI and Services-led Growth: Evidence from Indian Job Adverts Podcast Transcript

Ashley Pople:

Welcome to the CSAE Research Podcasts, a series of conversations about projects taking place at the Centre for the Study of African Economies at the University of Oxford. I'm Ashley Pople, an affiliate member of the CSAE and an economist in the World Bank. Today we will be discussing one of our new projects, AI and Services-led Growth: Evidence from India Job Adverts.

Rapid advances in machine learning have spurred an intense debate about the labour market consequences of A.I. Online job adverts show that the demand for A.I. related skills has grown almost exponentially and concurrently in several countries around the world since 2015. Yet detailed empirical evidence on the extent of AI deployments and its distributional impacts remain scarce, particularly beyond a handful of advanced economies. For low and middle income countries, the use cases and impacts of AI would not be the same as for advanced economies. This project examines the demand for AI skills in India's service sector, using a new dataset of online job adverts from its largest jobs website.

Joining us today to discuss this project, we have Alex Copestake, an economist at the International Monetary Fund, Max Marczinek, a DPhil student in the Department of Economics at the University of Oxford, and Katherine Stapleton, an economist at the World Bank. Welcome.

Alex Copestake, Max Marczinek, and Katherine Stapleton:

Hi Ashley

Ashley Pople:

The origin of this paper started back in December 2019, when Alex, Katherine and myself travelled to India with a big question on our minds 'To what extent is India adopting emerging technologies like artificial intelligence and how are these technologies affecting the services sector?' India was of particular interest to us because in the recent past the country has showcased the potential for a services-led growth model. We had plenty of fascinating discussions during our two weeks there. Katherine, Could I please invite you to share something that really struck you during our trip?

Katherine Stapleton:

Yes. So one thing that really struck me was when visiting a firm in Bangalore called Teleradsol that did medical outsourcing for organisations like the National Health Service in the UK, was that they previously had a group of doctors that would look at CT scans and conduct diagnosis, but more recently, they had hired a team of data scientists and machine learning engineers who are

conducting image recognition. And how this would work was essentially that they would run a screening process as the first stage, which would then be handed over to the doctors, which would essentially lower their workload, but also increase the efficiency of the number of scans they could deal with. And so what was really interesting is this was a combination of offshoring, but also the use of AI. And they had both a groups of data scientists and machine learning engineers, working to make the jobs of the medical experts easier and more efficient. And the combined impact of this was to increase the productivity and profitability of this firm and actually allow it to increase its offshoring. So that was one really interesting example that stuck in my mind for a long time afterwards.

Ashley Pople:

Thanks, Katherine. So inspired by some of these examples that we were seeing, we were beginning to wonder what would be the future labour market impacts of these types of technologies. So we went off to meet the largest job postings platform in India, and this is where the story starts. Let me pass on to Alex to tell us how the paper unfolded thereafter.

Alex Copestake:

So, yeah, so even before we went, we'd already started looking in an exploratory session at some of the labour force surveys. But the real issue that is very hard to measure adoption, because all you have is an industry wide measure often developed in an advanced economy that you then need to plug in and apply to the Indian firm or Indian district. So it's pretty hard to see at a granular level if there was any AI adoption. Once our data partner came on board, we could use their job postings to actually see at the firm level who was trying to hire people with particular AI skills so we could look into the text of the job descriptions that were being posted and see if certain phrases and terms which were technical and specific to AI were being mentioned. Once we once we did that, we found a pretty striking result, which was this huge take off in AI hiring, just like in the UK and the US, during the 2010s. So particularly in IT and finance in call centres but also more broadly. So that really got us thinking. It was interesting to find that these new technologies were spreading very quickly to the most productive and innovative firms all around the world. And the patterns that we're finding in India looked very similar to those in the UK and in the US. So those initial descriptive results raised the obvious question, what's the impact of that adoption? So we started thinking about how hiring and also about how the wage offers associated with those jobs would be changing after those firms started to hire people with AI skills.

Now, obviously, firms hiring AI engineers versus other firms are likely to be a bit different in other ways. They might be more productive, they might have better managers. So we had to come up with ways to account for those effects. So in the paper we detailed the various econometrics that we used to try and get at those effects. Essentially, our main method is using the fact that the occupational composition of some firms prior to the key machine learning technological breakthroughs made them more or less exposed to some technologies. But then we also have various other controls and matching techniques and so on.

Ashley Pople:

Great. Thanks, Alex. And just to clarify, when we mean demand for AI skills, what we're really looking at is the demand for machine learning skills, which is kind of been defined by a set of verbs. And we know that hiring through job postings is actually quite a good proxy for ultimate employment of these types of skill sets, which is something we motivate as well in the paper.

Alex Copestake:

Yeah, I'd add on that. That's a very good point in that some firms might look to outsource some of those functions. But what we've seen in survey evidence and anecdotally is that even if you are going to contractor a firm to perform your machine learning functions, you still end up wanting to hire people with those skills in-house as well so that they can construct a contract, they can work out what sort of jobs are amenable to that kind of technique. So even in the situation where you might be doing some of those functions with labour located outside your firm, you would still have an element of hiring internal to your firm. That's what we can trace back

Ashley Pople:

So now to the cheesy bits. Max, what are some of your main takeaways from our paper?

Max Marczinek:

Thanks, Ashley. What I think is really striking about our results is that the establishments that adopt AI, so that hire workers that are going to be employed in machine learning tasks, these establishments actually grow less than comparable establishments. This is to say that the number of jobs that they post a couple of years further down the line is lower than comparable firms. And the highest effects that we find often is higher skilled occupations. So it's really professionals and managers and we vary the data so we can dig in quite deep. We can see its corporate managers in a certain kind of professional occupations that really take a hit once AI is deployed in these establishments.

Looking at wages and the wages that are offered to these prospective employees, we also find a negative effect there, which is to say that AI hiring leads establishments to reduce the wages that they offer to hires. We can also ask how these two things go together by essentially asking how much of the wage effect is really explained by job offers being increasingly at the lower end of the distribution. And we find that this largely explains our wage results, but at the very top for the top 1% of salaries we also see that within these occupations AI deployment at the establishment level reduces wages.

Katherine Stapleton:

I think what's really interesting about these results is also how this compares to the literature on technological change over the past 20 years, and particularly computers, because what we're finding here is this negative impact on high skilled workers, but to some degree some positive impacts on lower skilled workers, and particularly this negative impact on non-routine. Typically the literature on robots and computers had always found that technological progress was routine biased in that it was automating away routine jobs. But we're finding the opposite, suggesting this could lead to even a reversal of the trends of increasing inequality and job polarisation over the past few decades, which is really striking and also kind of consistent with what's been found in the US. That that's really been a result that stuck with me.

Ashley Pople:

And how would you relate some of our findings to the other work that's been done on the impacts of AI in, say, high income countries? What is implied by this paper for the future of AI in countries like India?

Katherine Stapleton:

Yeah. I think what's really interesting is how similar the results are in India to countries like the US. So particularly these negative impacts within firms, and particularly for high skilled workers and analytical tasks, really resonate with what's been found in the US by papers such as that by Dona Somoglu and colleagues, and Michael Webb, and Grennan and Michaely. And what's also interesting is that we find that growth in AI has actually been even more rapid in India than high income countries, suggesting that it might actually matter even more in somewhere like India. But then, of course, the big question for development is this negative impact on high skilled workers. Because the literature papers wondering about the impacts for development have typically feared the impact for lower skilled workers, which is generally seen as a more interesting element for development where there's such a need to absorb labour into jobs for people with lower and middle skills. So of course, whether this negative impact on high skilled workers really matters for development remains this big open question. And in this paper we find these negative impacts within firms that are using AI, so in the finance industry and professional services industries. But then there's also this big increase in demand for AI skills that's been happening in the tech and education sectors. And so that has potential positive impacts on development. But the extent to which those positive spill-overs from these high skilled AI jobs matter for the economy more broadly is a really key question to get to. So for development in the future, really understanding what this means for the whole distribution of workers will be key, and understanding the extent to which these different industries are affected in different cities and what that means for spill-overs to other types of jobs will be a key area for future work.

Ashley Pople:

Thanks, Katherine. This project has sparked many interesting conversations for us and some unanswered questions as well. Alex, what has been on your mind lately as we advance through this paper?

Alex Copestake:

So, so many things. To start on the things closest to our paper, obviously the nature of our data means that we're focussed on impacts within the firm. But there are lots of other impacts that these new technologies might have as they diffuse throughout the economy. So you might see more start-ups being created as a result of having access to new technologies. People might come out with new types of products, consumers might start behaving differently and so on and so on. So as we move on to other things, I'm thinking a lot about trying to get a handle on those general equilibrium effects. So that's one of them. A big part of that is likely to be the impact of trade. So Max and I will talk more about that potential work on trying to understand the cross-country impacts of the technologies. Then I think that one of the key things that's changed since we started this project is, this started back towards the end of 2019, and in the last year generative AI has emerged onto the scene, which is somewhat different to some of the technologies that we're looking at. So thinking a bit about what might remain the same from these results in that context, but a specific subset of machine learning that is generative and what might be different. The last thing I'm thinking about is the impact of these technologies on finance. So over the same year that we're looking at, India's method of payment has moved from being predominantly cash based to, in some areas almost entirely, contactless to the unified payments interface. So that's almost 10 billion transactions a month. So I'm looking at the potential interaction between these technologies and new payments mechanisms, I think that's interesting.

Ashley Pople:

Thanks, Alex. Totally agree. Max. So what's next for our project and some of your work in this field?

Max Marczinek:

So as always, there's more work needed, more robustness checks to our paper so it will be fully polished at some point. Something that we're looking forward to next year is that I'm going to India to actually disseminate our findings with partners, so some of the people that the team were talking to years ago that inspired our work on this project. So that is going to be done next year, which I think is going to be very exciting. Another angle that Alex was really touching on was the trade question. So the very striking example that Katherine brought up was NHS data being analysed in India, that's an example of services trade, which is the backbone services led growth model that India has been pursuing. And the question that we're currently not asking in this paper is, what are the implications for trade? What is going to be different about how much firms in India trade services? You could see very different things depending on what kind of companies we're looking at. And this is something we're all really curious about.

Ashley Pople:

Great. Thanks, Max. So there are plenty of questions that we haven't been able to answer here yet. So if you're interested in more detail, please check out our working paper on the CSAE webpage. Thank you, Alex, Max and Katherine for joining us for this interesting conversation.

Alex Copestake, Max Marczinek, and Katherine Stapleton:

Thank you.

Ashley Pople:

And thanks to you all for listening to this CSAE Research podcast. We hope you'll join us again next time. To listen to more episodes from the series, go to the CSAE website. Until then.