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WEBINAR

AN INCLUSIVE FUTURE? TECHNOLOGICAL CHANGE AND PUBLIC POLICY

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P R O C E E D I N G S

MR. COULIBALY: Good morning. Good afternoon, everyone. I am Brahima Coulibaly, the vice president of the Global Economy and Development program at Brookings. I'm very pleased to welcome you all to this report launch event on the opportunities and challenges of emerging technologies.

Technological change led by digital technologies and artificial intelligence is a defining future of our time. Transformative new technologies are reshaping markets, business models and the nature or work. But as they create new opportunities, they also pose new challenges not least at which is rising economic inequality particularly in the advanced economies.

Rising inequality has been stoking social discontent and political firmament. And it has emerged as an important topic of political debate and a major public policy concern. There are important questions that must be addressed.

In what ways are the new technologies altering growth, employment and the distribution of dynamics? How are they affecting inequality within the economies and prospects for economic convergence between economies? How can the promise of digital transformation be transmitted into better, more inclusive outcomes for economic growth and development? Or what are the implications for public policy?

And importantly, what new thinking and adaptions are needed to make institutions and policies better fit the digital era at the national and global levels?

The report we're launching today entitled, "An Inclusive Future? Technology, New Dynamics and Policy Challenges Addressing These Questions." It's available on the Brookings website and it is part of a larger and ongoing Brookings' global forum on democracy and technology project, which seeks to promote ideas and policies to manage technological change, to build inclusive prosperity and democratic societies.

Harnessing technological change to promote inclusive growth and development is a key part of our research agenda within the Global Economy and Development program here at Brookings.

An important message of the report is that large and persistent increases in inequality within the economies are not inevitable consequence of technological change. Much depends on public policy response. A related message is that in capturing the full promise of today's technological

transformation economic growth and inclusion are not competing but complementary objectives.

Public policy must enable a broader participation of firms and workers including smaller firms and wider segments of the workforce in the opportunities created by new technologies. In emerging economies, technological change would disrupt traditional pathways to growth and development, but it also offers new opportunities for economies that successfully will recalibrate their growth model to the new technology paradigm.

We are very fortunate to have with us today the report authors to discuss these issues. I would like to thank David Autor, Kaushik Basu and Dani Rodrik who contributed important papers in the report and for participating in the large event. They are all lead thinkers in their fields.

David and Dani who are joining us live, welcome. And Kaushik unfortunately could not join us live because of an unavoidable last-minute conflict, but he has sent us a prerecorded presentation.

I am also delighted to welcome Laura Tyson, another distinguished economist and leading thinker and public policy figure as they discuss the report. Finally, I would like to thank my Brookings colleague, Zia Qureshi, who coauthored and edited the report. And I'm sure we're in for a stimulating conversation.

I will now turn it over to Zia to moderate the discussion. Zia, over to you.

MR. QURESHI: Thank you for your welcome and for your thoughtful opening remarks that provide the context and the frame of our discussion very well.

Rapid technological change lead by digital technologies and the now unfolding innovations in artificial intelligence is indeed a big story of our time. The technologies hold great promise to boost economic prosperity, but as they transform business and work, they have also highlighted and can deepen economic and social fault lines across advanced and developing economies.

One important fault line is economic inequality which has risen in many countries including (inaudible) here in the United States. A key element of the forward public policy agenda in countries today is to better harness the potential of technological transformation to boost productivity and growth, create good jobs and produce broad based improvements in economic prosperity.

The title of the report we are presenting and discussing today poses a question. This is the report. And the question is, can an inclusive future be envisioned in the digital era? The answer to

that question is a yes, but a conditional yes. Public policy must play its part to put technology to work for broader groups of firms and workers and better meet the needs of and interests of economies and societies.

Public policy has been behind the curve in responding to the profound to technology driven shifts that are taking place in the functioning of markets and economies. In important areas of policy, the new economic dynamics of the digital era gone for (inaudible) and a revamp of existing policies.

As Coulibaly mentioned combating inequality as technology drives change is not only a distributional issue. It is also a growth issue to promote more inclusive growth. The paths to achieving stronger economic growth and more inclusive economic growth from the new technologies are closely interlinked.

So to discuss these issues, we are privileged to have an excellent group of speakers. All of whom are well recognized for their work. So I can be brief with their introductions. First the three authors who contributed papers to the report. David Autor is a Ford professor of economics at the Massachusetts Institute of Technology. He also codirects the Labor Studies program at the National Bureau of Economic Research.

Kaushik Basu is professor of economics and Carl Marks professor of international studies at Cornell University and a former chief economist and a senior vice president of the World Bank and a former economic advisor to the government of India.

Dani Rodrik is the Ford Foundation professor of international political economy that the John F. Kennedy School of Government at Harvard University. He's also the current president of the International Economic Association.

Our esteemed discussant Laura Tyson is distinguished professor at the graduate School and professor emeritus at the Haas School of Business at the University of California, Berkeley. She's a former chair of the U.S. President's Council of Economic Advisors and director of the National Economic Council. The event page at the Brookings website provides links to the very impressive resumes of our speakers.

I would like to thank also all those who are tuning in to this discussion. If you wish to

submit questions during the discussion, you can do so via email to events@brookings.edu or via Twitter using #InclusiveFuture. And thank you to those who have already submitted questions beforehand.

So we will proceed as follows. We will first have presentations about 10 minutes each by the authors of the report, David, Kaushik and Dani on the main points and policy messages of their papers. This will be followed by discussant comments from Laura. Again, for about 10 minutes. The authors that is Dani and David who are with us live will then have the opportunity briefly to respond to discussant comments. And we will have an interactive discussion including take up questions from our viewers.

So let's start with David Autor. David's paper focuses on the labor market. A key transmission mechanism for how a technology backs growth, employment and distributional dynamics. David, over to you.

MR. AUTOR: Thank you very much. I assume you can hear me okay. I'm going to share my screen. Okay. Great. It's a pleasure to be part of this panel and our report where we were able to share our thoughts.

And I'm going to speak today about the labor market's impacts, technological change and how the economists have gone from kind of unbridled enthusiasm to qualified optimism to what I would call vast uncertainty and where that leave us.

So important to start off by noticing that citizens and experts are pessimistic about the societal impacts of digital technology even academic economists, according to the Chicago market's poll. So for example, here's a key research from 2018 and asking if robots and computers are able to do much of the work currently being done humans what would happen?

Most citizens think the inequality between rich and poor will be much worse than it is today, three-quarters of Americans. Less than half in most countries think that the economic will be more efficient including only 43 percent of Americans. And only a quarter of people think that there would be new, better paying jobs. So it's important to notice that U.S. which is usually thought of as a beacon of technological optimism is rather on the pessimistic side here as well.

So what is the role of technology in determining wages and shaping wage and equality? And why the growing pessimism or contingent in what I would -- Shoshana Zuboff would call

inevitabalism. The view that our fate will befall us. It's only a matter of accepting it.

So there are really four recent ways of understanding them. I'm going to quickly walk through. One is the education race model in which technology raises all those. Although, some more than others. The second is the task polarization model where some boats are rising, others are submerging. The third is what I'll call the automation reinstatement race that all boats could sink although not necessarily. And then the fourth is the AI intelligence uncertainty which is do we even need boats anymore which leave so many open questions.

So let me just walk through those and try to highlight I think how this intellectual journey that scholars have been on and hopefully why it leads to where it does. So the competitive wage settings, this sort of intellectual foundation for all of these models. Wages depend primarily on value workers reaching their labor that is their productivity. Their productivity depends on their capabilities, the tasks they can accomplish through their skills and their scarcity. If fewer workers are able to perform a needed task, they'll earn higher wages, if there are fewer available.

Technological change affects wages by changing the scarcity of skills. It may complement labor in certain tasks raising wages. It may substitute for labor in given tasks, lowering wages. It may directly automate meaning replace labor with capital or it may create demand for novel task and expertise reinstating.

So to begin this optimistic side of the talk. The education race model has kind of framed a lot of academic understanding of technological progress over the last 50 years. He starts with a short informal article by the Dutch economist and Nobel winner, Jan Tinbergen, who makes this analogue of an education race that says, modern economies face an ongoing race where technological change is forever propelling the demand for skill outward and education must just push the supply curve outward to keep pace. If it doesn't keep pace inequality rises. If it does keep pace inequality holds constant. If it accelerates then equality falls.

So you can think of this as a red queen model. It takes all the running you can do just to keep in the same place. Countries must constantly raise educational obtainment. There is no finite quantity of skill, you just have to keep educating people more and more as generations past. And it is formalized and empirically verified in some very well-known papers and books. And just to show you how

successful this model is, this shows you the college/high school wage in the United States for 103 years of data.

And the dash line is what we actually see. This is the proportional difference between college and noncollege wages which fluctuates between 60 percent and 30 percent and up to 70 percent. And the solid line is what's predicted by this very simple model. And except for a period around the second World War, referred to as the Great Compression, it really fits the data remarkably well.

So it explains a lot but with little you can organize a century of data with this and it reveals an important driver in inequalities usually not discussed which is it's not necessarily the demand for skills has accelerated, but the supply growth has decelerated. That after the 1970s in most industrial countries the growth rate of college educated workers slowed down especially associated with the Vietnam War.

It has some limitations. Taken too literally, it implies that technological progress is an autonomist force that intrinsically makes highly educated workers more productive. It doesn't explain why that's true or whether that's always true. It sort of assumes that's true. And as conventionally applied, it implies that technology only augments the productivity of skilled workers. It may raise inequality, but never lowers anybody's wages.

And that's why I'm going to be very optimistic in that framework, right? Because that's all good unless you're worried about inequality per se. If all boats are rising, you should be happy about that. However, the data shows us that not all boats are rising. A key contributor to the rising college/high school wage differential is the falling of real wages of noncollege workers. That's a really important and puzzling fact.

Now, this can be interpreted within the education race model, but you have to change the model a lot to do it. Not in the way that Jan Tinbergen thought about it. So it's important to kind delve deeper, which I will do next into why technology – if technology is involved might cause wages of some skill groups to fall.

But let me just summarize this model. The education work model for higher educated workers, we see strong complementary wage will rise. There's no needed educated workers in this model so we'll leave them out. Low educated workers are only weakly complemented so their wages rise

but only a little bit. So in general, this model says that all those equal, technology advances cause an inequality to rise unless supply grows with it.

So now, we ask, dig a little deeper. Why does computerization particularly appear to complement highly educated workers? Where is that coming from? So a series of some work that I've done starts by conceptualizing the process of accomplishing the job as performing a series of tasks and then ask, well, which task will be carried out by machines? And which by workers? And finally consider how computerization or digitalization might change this picture.

So the key observation in this kind of way of thinking about is what has come to be known as Polanyi's paradox after the philosopher. Like Polanyi, he says we know more than we can tell. Many of the things that we do without much effort are really actually hard to automat because we don't know the rules for doing them.

So I can tell you how to, you know, calculate, file, you know, perform a repetitive actions and organize information. But I can't tell you how to make a persuasive argument. How to lead a group of people nor can I tell you, actually how to vacuum a room because that requires all kinds of sightedness and dexterity and so on.

And so, this explains why some tasks are readily computerized because the ones that follow well under certain rules and procedures can often be turned into computer code and executed by machines. And we see that phenomenon occurring across the industrialized world. This is just for the U.S. and sort of shows this barbell of what's called occupational polarization.

On the one hand, we have growth of high skill, high waged analytic technical and managerial tasks. These things are complemented by computers. In the middle we see a lot of production in office administrative and sales work being automated away. These follow well understood rules and procedures. They are what people call routine codifiable tasks. And they can be codified, done by machines.

And then what hangs around is a lot of services that require dexterity and flexibility. Health and personal services, protective services, operative and labor jobs. So yet, it's kind of barred up. And this barbell is found throughout the industrialized world. Not in developing worlds, let me just emphasize. But in industrialized countries.

Now, what are the wage implications? Well, essentially, it's kind of complicated because when people are pushed out of the middle, they tend to move downward, not upward. And so, the implications for inequality are very different from the barbell shape. But some recent progress has been made on this on a paper by Acemogu-Restrepo. And they argue that workers who were accomplishing routine tasks, you know, decades ago, are now have been pushed downward. And so, we see these falling wages of workers who formerly worked in industries that have automated and automated their routine in terms of activities.

So to just summarize, this model gives you strong complementary with high skilled work, direct substitution in middle skill work. No immediate impact on the lower skill work, but we see employer polarization and rising wage and inequality. I'm going to actually close my window because I think you can hear the lawnmower is going on in my street. Hopefully, that helped a bit, okay.

So let me add a third wrinkle to this, which is I talked about automation. But there's another force as well. What about new work? In its basic form, these models just basically have a finite set of activities. And some of them are automated and some are still done by people. No tasks are added or subtracted. Only the, you know, who does what?

But you kind of need some notion of new tasks, new things being added. Why? Well, one kind of casual empiricism. You know, we know that work evolves. That there is demand for new skills and expertise previously unimagined, drone pilots, artificial intelligence programmers. Pediatric vascular surgeons, vegan chefs, executive coaches. The other, if the task domain were really static automation would inextricably crowd people into a shrinking set of activities, but that's not our perception, right?

The world has actually gotten more complicated and creative not narrow and narrower, right? At least that's my perception. So Jeff Linn in a 2011 paper shows you how we can find representative evidence on the appearance of new work. He offers a methodology for systematically capturing new work hiding in plain sight using census bureaus, historical documents and recent work, which coauthors and I have expanded on this.

And then Acemogu-Restrepo, another paper adds this notion back into the task model. And they say, well, you can think of automation as the process of when machines take over labor task

and reinstatement is the process when new labor using tasks are invented, they have to be done by people initially.

So in recent work with Caroline Chin, Ana Solmaz and Bryan Seegmiller, we tried to implement this over a long period of time. And we show that about 60 percent of all work today or in 2018 is in tasks that had not yet been invented in 1940. So a lot of new work, a lot of current work is new work. New in the last 80 years, new in the last century.

And you say, well, what do you mean by new work. Give me an example. Well, glad you asked. So here's some examples added over various decades. So for example, 1940, an automated welding machine operator or a textile chemist or control over remotely piloted vehicles, an AI specialist, a pediatric vascular surgeon. Those are one set of jobs named OIC. So new work is about people who used new technology or sell it or fix it or, you know, install it, design it, et cetera.

However, many new jobs are actually services that don't have an obvious technological element but more reflect changing tastes, changing wealth, changing demographics like a beautician, a mental health counselor, a conference planner, a chatroom monitor, a drama therapist, a Sommelier. And you might say, okay. Well, Sommeliers have been around for a long time, but there weren't enough of them in the United States to sort of be captured by the census. So only in 2010, the Sommeliers have really hit the big time here.

So why does this occur? Why is new work created? So in this work with Chin and Solmaz and Seegmiller, we distinguish between automation innovations, things that are route employment and what we call augmentation innovations. Things that enhance the value of services created by people and often demand new expertise and knowledge. And those have countervailing effects on employment.

We show on the left side that things that are augmented tend to grow. These are occupations. Things that are automated tend to shrink and these often occur in the same place. Some occupations are subject to both simultaneously. So both of these forces are present. Both automation and what we might call reinstatement.

It's also important to emphasize that it's not just technology. Plain old demand shifts create new work. When demand grows, you have new expertise being formed. New work is different

from more work. If you make a big investment, for example, in electrification of the grid. You're not just going to get more workers, you're going to get workers with new specialties like, for example, solar electricians or solar plumbers. Those are people who just do those tasks on solar installations sites. Those are new titles captured by the census bureau.

Okay. So let me skip the table in the interest of time. So let me know get to the fourth and final section, the era of AI uncertainty. So when it comes to AI does the task framework still fit or should it just quit?

Well, it has two conceptual pieces. The first is the notion of tasks as units of work to be accomplished by workers or machines. This is still I think a useful idea. The second is a theory of which task can be readily computerized? Again, based on Polanyi's paradox. These things that follow well understood rules and procedures.

AI blows that away, right? It overcomes the constraint that computers can accomplish only explicitly understood pat routine tasks because of course AI infers taskic relationships using statistical associations, supervised learning and supervised learning. So computers can figure things out without explicit rules using AI.

So that raises a really – these are wide open questions. Well, what will AI do? What will people do? What is the area of comparative advantage of these machines and people in this new era? And I don't think we know the answer. We're only beginning to get evidence on this. I will say one thing I'm very confident of is AI will perform a lot more expert managerial and professional decision-making tasks that we used to think of as, you know, highly skilled.

So this is already occurring in finance, investing, inventory management, credit issuance, fraud detection and design. Some expert in semi expert tasks will become technologically equivalent to "routine tasks." They'll be cheaper and faster and more reliably done by machines even though we think of them as having to require this kind of knowledge, judgment, intuition and so on.

Now, there's a counterargument that says, well, look. AI is context blind. It can't reason holistically. It can't do these things. This argument might be convincing if people were actually consistent, analytical and reliable at doing these types of tasks, but in fact they're not. People are highly inconsistent. They can't even follow their own rules. So the notion that a machine that's also somewhat

inconsistent or opaque can't do it is not that compelling to me.

Simultaneously, I want to emphasize, human capacities are underrated. People do extraordinary things all the time effortlessly. They apply common sense to piece apart and intractable problems. They generalize inferences from small data. Generalizing from small data is actually harder than generalizing from big data. They use deductive reasoning to form implausible interpretations from a spare set of observations.

So in many ways, we don't even fully appreciate how much taskic knowledge we possess. So people continue to have a comparative advantage in creativity, in judgment, hypothesis formation, contextual thinking, causal analysis, communication, emotional intelligence. There's going to be a lot of work to do, but it's going to be different. It's going to be different.

Let me actually point out an irony. I can't resist. What I call the AI irony. Artificial intelligence is opaque to humans. It's layers of fiscal associations or encoded in countless notes. There's no human interpretable window into decision making process that most AI engages and this is a big problem known to AI researchers.

Due to this opacity applying Polanyi's paradox with a twist. Prior to AI, people struggled to give computers taskist knowledge, needed to perform a nonroutine task. In the AI era, computers can actually readily acquire taskic knowledge but they cannot in almost all cases communicate that knowledge explicitly to people. So I call this Polanyi's revenge. Computers now know more than they can tell us.

Okay. So let me conclude with policies and possibilities. So I'm going to give the policies a short trip. I hope we'll have time to talk about them in the discussion.

So really in a recent book with Elizabeth Reynolds and David Mandel that we wrote for the MIT taskforce and worker of the future, we talked about three bodies of policy to deal with these challenges and take advantage of them. One is of course education and training. That's a given, it's never green but it's wholly insufficient.

A second is to revitalize the governmental and nongovernmental private sector institutions that shape job quality. Job quality should not just be left to the market. I know that is a point that Dani has been made in many context, and I found her influential. Labor standards, (inaudible) and

wages, improve the unemployment insurance system and removing health insurance and directly decide what types of jobs we want to create.

The third, of course, is shaping innovation to speed productivity growth and competent the skills labor force. Innovation is not an autonomist force. It's something that we invest in, that we shape through incentives and we can put public dollars into it.

So let me just conclude with possibilities. One, uncertainty, one certainty and one admonition. And this relates back to this negativism, this pessimism or inevitabalism that we see. I think the uncertainty is that AI has vastly extended the frontier of technological possibilities. Our clarity about the future should be less, less, smaller than it was 10 years ago not greater.

I think we knew the path 10 years ago where technology was going. Now, we really don't. The certainty is that this technology will expand the set of desirable possibilities, they're within reach to deal with. You know, the provision of healthcare, with education, with global warming. There are things we will be able to do using technology that would be otherwise much harder.

But we can easily blow it, right? It doesn't mean we will use it for that. It just means we could. We could also use it for surveillance. We could use it for hacking, right? We could use it for, you know, filtering all the contents of the world information to make sure only what the government or advertisers want us to see is what we see.

The admonition is that the future really isn't a fate to be divined. It's something we're actively creating as we go. So we should ask not what we want AI – I'm sorry. Not ask what AI will accomplish, but what we want it to accomplish. And we should invest and shape to make sure that's what is used for. Okay. Let me stop there. Thank you very much.

MR. QURESHI: Thank you, David.

MR. AUTOR: Yes. I apologize that I – yeah, I'm going to stop sharing in just as soon as I figure out how to do that.

MR. QURESHI: Thank you, David for that excellent exposition of technology's impact on labor market dynamics jobs and wages. We next turn to Kaushik Basu who recorded his presentation as he could not be with us today live.

Kaushik's paper has a broad sweep covering important structural shifts that are taking

place including in product markets that are seeing a shift towards monopolistic structures dominated by tech giants.

And the paper makes the case for a more radical overhaul of policies and points to new challenges for the discipline of economies. So can we show Kaushik's recorded presentation, please?

MR. BASU: Good morning, good evening, everybody. It is a pleasure to participate in this conference. I should begin by thanking Zia Qureshi for the original invitation to me to contribute a paper to this important and urgent collection. I'm also grateful for the comments I received later from Zia himself, Janina Broker, Brookings Institution and several others while I was working on this paper.

The paper is technological advance and globalization. The pitfalls and the opportunities. I have to say I'm optimistic that out of this very dangerous time good things will come. Or maybe to put it more currently, I tried to be optimistic that out of this dangerous moment, good things will come. But it is a very, very dangerous time for the world.

Let me explain a little bit. There are other papers by David Autor, by Dani Rodrik which touch on different aspects of it. I will, of course, encroach on some common topics, but also try to stay aways from what I know they are contributing in a big way.

A part of the problem is coming from the rise of digital technology, technological advance. This has been the case throughout history. Episodes which are very occasional episodes when there is rapid change in technology. That at one level is a blessing because it expands our production and possibly the frontier.

What is possible is now begot because you've got new technology. But by virtue of the new technology opens up new challenges. Rich, if you don't manage to take those challenges on right. We could actually have a devastating effect on our economy. This could be the dinosaur moment for the human economy.

On the other hand, if we march to take on the challenge, we come out of it better off. The challenge is deep and I would explain that in a moment. But let me go back to a little bit of history where something similar happened. This is the industrial revolution roughly from 1750 to 1850, 1860, roughly 100 years we saw the most rapid advance in technology.

There was labor saving technology coming. The demand for laborers falling and also

much more basic skills could be put to use. Children could use their labor to produce things because of new technology. This period which now in retrospect was a period that helped humanity. We have data from medicine that the world growth up to 1820. From 1500 to 1820 world growth was roughly 0.32 percent per annum.

After the end of the industrial revolution from 1870 onwards, if you look at another 100, 150 years. Growth rate has gone up. Average growth from 0.32 to 2.12. Seven times faster the growth rate. So we came out of it fine, in fact. I think I'm out of the current situation, fine. The current growth rate of three percent per annum roughly for the world could become 21 percent per annum, which will be another form of transformed work.

What happened during the industrial revolution was important for us too. Remind ourselves there was radical policy change. There were policies coming in which was not treating what we were doing early, but many, many different kinds. For instance, restrictions on labor. Supporting workers in different ways which was not known until then.

Starting from Sir Robert Fields Act of 1802, there were all kinds of labor supporting legislation that was being brought in. Child was being stopped. Initially, there were restrictions placed on child labor and eventually stopped, which was then considered a shocking intervention. Income tax which is normal for us today was brought in 1842, which was a shocking innovation and radical policy at that time. So policy changes were quite dramatic.

Along with that we have to remember economics, politic economy progressed in leaps and bounds and in fundamental ways. From over roughly the same 100 years, 1776 is Adam Smith's seminal work. Say 1874 is Leon Walras' seminal work in between. We have Augustine Cornell. We have David Ricardo. We have Karl Marx. We have John Stuart Mill transforming the way we view and understand the economy. So it's policies and intellectual innovation which saved the world and we came out of it better off. Come to today's time.

The technological advance this time is of a different kind and that is what is creating a challenge because we can't go back to the old lessons we had learned. Of the different kind of changes that are taking place, I'm going over it a bit hurriedly because I know time is restricted and my paper is there. You can read it and engage later on.

Important change that is happening this time. One of them is technology has always been there. Advances usually have come in labor saving technology. And we are seeing the demand for labor falling. David Autor has done important work on that. Several other people have done work. You can see the demand for labor falling.

Along with that there is something else happening which is new this time. Labor linking technology, which thanks for the advance of digital technology. What we can do today is not just save on labor by switching over the machines, but save on labor in a rich country by linking up to digital routes with labor in a faraway country. Sitting in Bangalore or Munnar or Cape Town and working for New York or London or Berlin. Workers in different places getting linked. And all this is causing strain, political strain which is a big part of it.

There is another change that is taking place which is quite dramatic and asks us analysts to get back to the drafting board and do some deep fundamental research. Normal economies are important like normal science, but we have to take time away a little bit to look at the fundamental assumptions beneath our subject. So tucked away in the woodwork that many of the economist forget that these assumptions are there.

Look at one example I will give you. Look at the early work from Adam Smith to Walras. The market maker, the agent that brings the buyers and the sellers together is usually an invisible hand. It's the invisible hand of the market. Lots of people want to sell, lots of people want to buy. For Adam Smith, it's to the invisible hand. Not quite an agent that people are managing to transact. For Walras, it is an auctioneer. And imaginary auctioneer that brings the buyers and the sellers together.

But look at what's happened with our new technology today. The invisible hand has suddenly become a very visible player. The imaginary auctioneer is today a very, very visible character. The digital platform is the invisible hand in a very visible form. Or the imaginary auctioneer in a very visible form.

So suddenly this imaginary character has become a real element of the market. And there's another thing that this player, the digital platform is not only come into existence. It's a profit-making body. We have never imagined that the invisible hand would itself become a profit making massive mega almost a monopolistic agent bringing different players together. That is what is happening

to Amazon, through Uber, through ANAMB these digital platforms are doing that. Transforming the way we do economics because we have to think of the buyers and the sellers as profit makers and we have to think of the digital platform as a profit maker creating a new market structure.

Not surprisingly, first of all, there is a big political agenda open over here and I don't even know because it is sufficiently big that we have to put our minds together and we will discover new ways of structuring, analyzing, setting up the axiomatics description of our economy and doing it. But this is also pushing us in policy directions which are quite novel.

First of all, I have (inaudible) with the whole class of writers that labor in the end, the demand for labor could go down and there is nothing much you can do about it. For instance, if there is a robotic invention whereby the robot begins to do everything that manual labor does. And it can also create new forms of labor and new robots. Then at one level, anything which is work, which is painful work, we don't have to do anymore. Robots have taken over.

We can sit back. Go the opera, listen to music. Create art. Write philosophy. Whatever we enjoy doing, we can spend our time on that. To me, that in itself is not a bad thing at all. But it would be a bad thing under the current legal regulatory structure where the income of the workers will vanish and it will all go into the pockets of the people who own the robots and the machines and the patents and the intellectual property.

If we had a better distribution of things. The fact that we all sit back and do pleasure activities and these robots are running around and doing our work, it would not be a tragedy at all. It would be, in fact, a kind of utopia that many early thinkers like Thomas Moore and others have written about and thought about. So what do we do?

Policy, yes, we have to use some of the standard policies. Well, there are people who are writing that we are not using our antitrust policy correctly. These ones are mega players sucking in the profit and you need to do something. I'm grateful that there's a slew of recent writers stressing that our antitrust policy especially in the United States starting from the Sherman Act in 1890 has been over focused on the consumer and concern about the consumer.

Whereas, we need to be concerned about the laborers who are being exploited. About small retail firms who are being exploited by these platforms. So the shift – there has to be a shift in the

focus of antitrust. But still you will not be able to solve it by that route simply because there are such big economies of scale that you can't cut up these platforms into a closing platform and the whole advantage is gone.

So what do you do? And I have two – again, I should say very, very early hesitating suggestions but which I feel we have to put on the table and begin to think. One is mega profits by these platforms or big corporations in itself will not be a problem. If this mega profit was going into millions and billions of pockets. One way to do that is to have disbursed shareholding laws that these big corporations that these digital platforms cannot be owned privately by 20 people.

A hundred people, a thousand people. They will have to be disbursed shareholding so that the big profits going to a big number of pockets in which case it would not worry us so much. Shared profit sharing as a rule, something that Marty Wiseman wrote about a long time ago is something that we are to turn to because profit motive is important. I'm not for a moment saying that you stop the profit motive. The profit motive has to be there. But it has to be a disbursed holding so that the profit is going into many pockets.

One more suggestion which sounds radical at this point of time but we have to think about. Certain kinds of businesses, we realized a long time ago cannot be left to the private sector. The best example of this is the Central Bank. The Bank of England set up in 1694 was owned by shareholders. I forget the 1,200 or a certain number of shareholders making profits. The Indian Reserve Bank of India was a private entity making profits. At some point of time, it is realized that when a business is a business, which is virtually an intricate. The money creating authority is basically giving an intricate for all agents that if you want to survive in the modern economy, you have to buy my product, namely money.

It was realized that such a big gatekeeper cannot be a private player. Then it's one individual or a small group that controls the whole economy. And the central banks were one after another turned away from making a profit-making body to a nonprofit. Different kinds of structures they take, but it's nonprofit. The Bank of England is nonprofit. Reserve Bank of India is nonprofit. Virtually all central banks are nonprofit. You can't make profits through them.

I feel we have reached a time where for some of the biggest platforms which are virtually

an intricate for a buyer or a seller to survive in the modern economy, you have to think of eventually of one or two of these to be turned into nonprofits. Maybe controlled by similar rules as we do for the central bank. You don't want the state to take full control of that, but there has to be a certain autonomy with a nonprofit structure.

These are, I know, thinking outside of the box, but I'm not saying that this is the specific thing you have to think about. But we are at a juncture in society where we have to open up these questions. That we look away from normal times because this is a make it or break it moment for humanity. Thank you very much for giving me the opportunity to speak all of you. Best wishes. Thank you.

MR. QURESHI: Thank you, Kaushik. There are some provocative insights and ideas here that we will come back to in our discussion.

Next, Dani Rodrik's paper addresses the implications of the technological change for global economic convergence. While inequality within countries has been rising in recent decades. Inequality between countries has been falling thanks to the rise of faster growing developing economies that have been narrowing the income gap with advanced economies.

But as Dani analyses in his paper, technological change is posing new challenges for global economic convergence. Dani?

MR. RODRIK: Thank you, Zia. And thanks to Brookings for putting this panel together and the individual contributions. I've learned a lot from reading David's and Kaushik's pieces. I will – let me see if I can get my presentation up. I hope you can see my presentation.

I want to basically just to give away my punchline at the outset. I have two main conclusions that I want to develop. One is that the present technological trends have essentially made it very difficult for repeating the kind of growth miracles exercises that we've seen most noticeably in East Asia, South Korea type, and China. Very rapid economic growth and convergence. Very rapid poverty reduction.

I think the possibilities of export-oriented industrialization that enabled such growth miracles have had really weaned and I think the main conclusion. Number one, is that it is going to be very difficult to sustain very rapid growth of the type that we've seen before.

Conclusion number two is that even if we set our targets on reasonable moderate rates of growth that will achieve a steady if rather slower convergence with incomes in the rich world achieving that is going to require a significantly different economic strategy in lower- and middle-income countries. And that is sort of that policy implications are the ones that I want to end with. I'll return to that at the end and say a little bit more about that.

But to start with, we are coming out of the period when in fact there was a significant global convergence in incomes. Prior to the pandemic for a period of two or three decades, in fact, lower income countries were experiencing faster growth than rich countries because they were relatively rare thing for the world economy. Us, it is the great divergence that started following the industrial revolution.

And this period of convergence was actually quite widespread including very low-income countries. It wasn't just a low any station phenomenon. But we sort of all – the expectations are now that after the pandemic, we're going back to a divergence period. There was a lot of different reasons for that. A lot of problems having to do with, you know, just some of the human capital front, on the public debt front.

But I think even if you look at the trends before the pandemic, it was quite clear that there was something quite unstainable in the economic growth experience of the developing countries in the last two or three decades. And that those special circumstances were already disappearing.

The one key thing that I want to draw your attention to in that period of recent convergence was that it really was not for most countries, it was not based on what has been the most reliable and most potent form of economic convergence the world has ever seen, which is industrialization. And I think it's important to understand why industrialization has been such an important force for deriving rapid economic growth.

And I think there are three reasons why manufacturing historically has been special. One is that manufacturing is an area where, in fact, it has been relatively easy for lagging countries to absorb new technologies. So in the language of growth economies, manufacturing is the one sector of the economy where we have observed unconditional convergence or as far as back as – you know, we can create datasets to look at. So there is a technological dynamism which is relatively easy to absorb. That's number one.

The second aspect is on the supply side in that manufacturing is typically required, a relatively low skilled labor, which of course poor countries have plenty of. So on the supply side, expanding manufacturing typically has not run into supply side constraints. You can simply bring more people from the farm.

And on the demand side because manufacturing is mostly tradeable, you can actually export manufacturing. So there are not demand side constraints to scaling up and expanding manufacturing either. So historically, the countries that have grown very rapidly have done so by specializing in a sequence of increasingly more sophisticated manufacturing sectors without relying on domestic demand, but relying on global demand. And therefore, so this feasibility of scaling up.

So the absence of constraints on the demand side, the absence of constraints on the supply side and this technological dynamism is really what makes this particularly manufacturing has been historically special.

Now, of course, of those three conditions, the one that is really no longer operative is really the fact that technology, the technological change has made manufacturing much less low educated, low skill and bound them to a sector in the economy. And I think we've already been seeing this. And there has been a trend of premature deindustrialization happening in the developing world that low-income countries are not reaching levels of manufacturing employment that was characteristic of countries that have industrialized before them.

And these peaks in manufacturing are taking place at much lower levels of income. There are to virtually no developing countries that have managed to exceed or even come close to 20 percent of employment in manufacturing. And even if we look at sort of relative successes. They are very blemished cases.

In low-income Africa, Ethiopia is the only country that has actually experienced significant industrialization. But you look closer at what's been happening there, it's highly informal. Ninety percent of the employment and the growing part of employment is in the informal part which does not share this technological dynamism. I'll show you a picture in a second. Bangladesh, of course, has been even more successful than Ethiopia but remains highly narrowed and specialized in readymade garments with very few backed with linkages that informalization of manufacturing a big problem there too.

Now, when you look at sort of the kinds of remedies that are offered for cases of these, you know, manufacturing industrialization even in those successful cases that are hitting these bottlenecks, the policy remedy is, well, you need to move up the quality chain. You need to move up sort of invest in skills and digitalization.

But of course, the whole issue is that what historically has manufacturing has contributed to these low-income countries is precisely the ability to absorb a lot of low skilled labor, which these countries have abundantly of. And just telling these countries that they just need to move up the value chain is good, but it's actually – you know, it is telling them something that is not going to be very helpful giving their factor (inaudible).

And so, what that does is essentially hits the developing countries with a kind of I would have called it a triple whammy, which is that one is that there is a significant decline in their comparative advantage of manufacturing. As manufacturing becomes less in low skill, labor intensive.

Second, for any level of industrialization precisely because of this lower labor intensity of manufacturing, less labor is being absorbed into manufacturing. And third because manufacturing is not increasingly more complementary to capital and skills the buoyance of manufacturing that is this ability to respond to positive profitability shocks is much lower. So that manufacturing is not the kind of dynamic sector over time as it has been typically.

Now, you can see sort of what is happening in sort of within manufacturing if you look across countries and divide up sort of the share of labor and low-skilled and intermediate-skills and high-skilled labor in global manufacturing. What's really striking is that all of the decline in the labor content of manufacturing globally has overtime has taken place in the low skill category. And that, of course, is important because that's the category in which the developing countries have competitive advantage in.

You see a very similar kind of a picture if you look at global value chains specifically. The use of different types of labor within global value chains. And global value chains are important because that's the mechanism to which technology is transmitted towards developing countries.

So participating in these global value chains means that you have to use those technologies that they require. And you can see again very clearly a decline in the use of low educate workers within those global value chains.

So what is happening is that basically this traditional model of development, this traditional structural change model that we had which was that we would start up by all the economies labor in this informal agricultural traditional sectors and then the process of industrialization would move them to the formal organized manufacturing and then ultimately to the tertiary sectors.

What is really happening today is something that's very, very different. It's not that workers are not leaving agriculture, they are. They're still coming into urban areas, but effectively they're coming into informal petty services within the urban areas. And the formal part of manufacturing is becoming really, really, very, very thin layers of the economy. Almost sort of analogous to the kinds of, you know, mining or resource enclaves in these countries.

So just, you know, a couple of examples of what it used to look like. So these are two Eastern and Southeast Asian examples of the traditional model of industrialization where most the growth in employment took place in the context of formal employment. But if you look at today in African cases like Ethiopia or Tunisia what you're seeing is that most of the growth even when there is growth in employment such as Ethiopia as I said has been actually not insignificant. Most of the employment is actually happening in the informal parts.

So the basic story here is that the firms that can successfully compete in global markets, successfully integrate with global value chains are those that have to adopt these skill and capital intensive technologies which are participation in the global value chains are required because of having to meet their quality requirements and so forth. But those are precisely the ones are the least suited in terms of employment absorption.

And therefore, you have this dichotomist development within these countries where the most productive parts and those that are doing well in terms of productivity and exports are actually not growing employment wise. They're not absorbing any employment whatsoever. Whereas to the extent that manufacturing as a whole is growing. All of the increased labor is going into the least productive and least productively dynamic parts. So that's that utilization of manufacturing itself.

The conundrum, and I think this is sort of where we move into questions about policy is the conundrum, the question is where will labor go? Clearly, there's a lot of possibilities in agriculture and nontraditional agriculture. But it's hard to see that agriculture will turn itself into the labor absorbing part

of the economy. So, you know, while we need to for productivity in agriculture that's not where labor is going to go.

Services? Well, I think services are, of course, are a big mix of different kinds of things. The most productive services that are also tradable and share some of the technological dynamic aspects that manufacturing historically has are also fairly skill intensive. So I think here, for example, you know, the developing countries face the additional disadvantage that even though as David mentioned that many of these technologies that creating new types of job classifications and services most of them are actually nontraded.

And so, they are not going to be necessarily linked up. I think Kaushik's optimism notwithstanding with workers in the developing world. It's very difficult to envision informal receptive workers or farmers being absorbed in these internationally tradable services. And that at least it's been barely looked at.

So I think to close up with. There was really, you know, three strategies that are available. And this really exhausts all the possibilities as a logical matter. One is, of course, you know, the traditional remedy of simply increasing the skill of the labor force. Increase and invest in education. Well, that is always the remedy for the future, but doesn't solve the problem in the short run or the medium run. So that has to be complemented with other measures.

Second, you know, we can reduce the skill intensity of existing production within developing countries. But this is really, you know, very difficult in light of existing technological realities. And so, many of these production techniques I've said globally and the kind of, you know, sort of flexibility to adjust the factory intensive, the production technique in response to relative factor prices as well to be limited.

And I think sort of the third possibility is – and I think this is the one that really to me seems to be the only one that provides a way where we can have a significant impact is to stimulate the production of the more labor-intensive sectors. And I think this would require a fundamentally different strategy from the traditional industrialization-oriented strategies because if that's not where the jobs are going to come from then we are going to have to focus on the relatively non-tradable parts, the small-scale SMEs.

And this would require a kind of a strategy for helping firms that are not necessarily the most productive, but the ones that are sort of in the middle of the productivity spectrum, mostly services and SMEs. So it's really going to require an industrial policy that looks very, very different.

But if we don't engage in this strategy, I just don't see how we're going to be able to create jobs particularly in low-income countries in sub-Sahara and Africa that are facing still significant amount of young job seekers who are in the urban areas and that need to be employed more productively than they currently are. So with that let me just stop here.

MR. QURESHI: Thank you very much, Dani, for this incisive analysis of the new dynamics facing developing economies and global economic convergences and technology's role in that.

So now, Laura has the easy task of being the discussant of all of this work, and to do so in 10 minutes. Thank you, Laura, for valiantly taking on this challenge. Over to you. Laura, you need to unmute yourself.

MS. TYSON: I said thank you. I said these are terrific papers and I encourage everyone listening to read them carefully. They are very well researched. They are very well written and they're great. And a very important topic.

I will just comment on a few things. Mainly things that the authors didn't say that I found interesting. And then I'm going to relate it a little bit to some work I've been doing on – particularly on AI and the uncertain future of AI.

So for David's paper. First of all, David implicit in his paper but never laid out – and I think important for all of this discussion is that technological change has a displacement effect, has a productivity effect and has a reinstatement effect. And I don't think that – I'm pretty sure that David does not think we're entering a world where humans become dinosaurs.

I think we're going to have full employment. I think -- depending upon demand policies – we're going to have full employment. And the composition of employment is going to look different. It's going to change over time. Workers are going to be displaced from certain jobs and certain tasks. They're going to see their productivity enhanced in certain jobs and certain tasks. And they are going to be entirely new jobs and new tasks, and I think that's important.

But I also think it's important to note that for the political issues that we are behind the

scenes dealing with the pace of those things does not occur – it does not occur at the same pace. So the disruption or displacement usually occurs pretty fast and pretty dramatically. And maybe localized in certain places.

So if we take this notion of David's work on the China shock with linked technology that made the whole supply chain world possible that shock was very focused in certain communities. The displacement was real and dramatic. And those workers didn't find other jobs. There were not productivity enhancing opportunities for them and they were not reinstatement effects possibilities for them.

David mentions, and I really want to emphasize, that in his continuing work on polarization which shows up in all of the developed countries very clear. A decline in the share of middle skill and middle-wage jobs, an increase in the share of lower skill, lower-wage jobs but a much bigger increase in the higher wage, higher skilled jobs. So we've got to think about reskilling. Upskilling exists and reskilling to get those workers who are displaced from the middle to go up, not down. Like David, one of his charts shows very disturbingly, and I think this was (inaudible) Darren Kosovo's(phonetic) chart, is we have a world in which the reinstatement into higher skilled jobs is occurring at a much slower pace than the disruption that's occurring.

So technological change is actually driving people from the middle to the bottom more than – with the opportunities to reinstate at the top just occurring at a slower pace. I think those are really important points in David's analysis.

Related to that all of the work in equality and technological change is really about inequality, not about what happens to the bottom. Why are the bottom wages falling? Why isn't the productivity and the technology raising wages for everybody? But the gap is getting bigger, okay? And I think there you have a lot of policy issues to address. There are a lot of things that the advanced industrial countries can do to try to prop up wages at the bottom and I'll get to that in a minute.

The final point I'll make on David's paper is AI. Because I had gone out on a limb perhaps and characterized AI as what I call routine-based technological change on steroids, on steroids. And the reason I say that is because the AI makes the robots more intelligent so there's going to be more robot taking over of human jobs. And AI also substitutes more and more for cognitive skills. So it's more

as David points out. We already see displacement occurring in relatively high wage, relatively high skilled routine cognitive jobs. So if I take that that this is going to be routine by technological change on steroids, I'm afraid I predict the same consequences of previous rounds of automation.

I predict that there will be wage inequality. I predict that there will be a decline in labor share of national income. I predict that there will be a continued gap between productivity growth and labor compensation growth. Therefore, I am not – I'm cautiously pessimistic about AI and future effects on labor markets. And I know the effects are uncertain. I agree with David on that, but I do think the characterization of robotic technological change routines by its technological change on steroids is a good characterization.

All right. Let me go on to Kaushik because there's a natural link here. Kaushik really focuses on how the technologies -- on essentially who owns the technologies. Okay, the technologies themselves are going to have these effects, but where are the profits going to go? Who owns the profits? Who owns the robots? Who owns the platforms?

So while I don't agree with him on it's a dinosaur moment for humans. I think that automation does substitute for certain kinds of labor with a lag and in different places, it reinstates (inaudible). So I don't think we're like horses and we're going to be undone by technology. However, I do think that – and this is relevant to Dani's paper – that how the technologies are deployed is being driven increasingly by super firms, super large firms, platforms.

So the super firm, super normal profits issue which is not really addressed in David's paper, I think is important to highlight. Because, for example, the – if you look at the productivity effects of technology what you see is the firms at the frontier, the large digital giants, in stem and in platforms, their productivity is doing just fine.

So they are actually growing productively and they are also paying higher wages to their workers. So you do have interfirm wage and equality at increasingly important role in overall wage inequality. And then you have the super normal profits that Kaushik was talking about. So I do think there are a whole host of policy implications for that that we can discuss.

As he mentioned traditional competition policy is not going to work here. These firms have power because of economies of scale and network effects. And those are beneficial. So how are

we going to deal with the things that we don't like if we want the economies of scale and network effects? Competition policy won't work.

He mentions profit sharing. I'm a big proponent of profit sharing. I was a Marty Wiseman student at MIT. I went into economies partly because I was interested in profit sharing. I studied Yugoslavia which was at the time the preeminent profit-sharing model in the world and considered to be a socialist model that was successful. I do not – organized labor around the world doesn't like profit sharing and regulators don't like profit sharing. So I'm afraid I don't really see that as a possibility.

I think that Jean Tirole has written many, many interesting papers on how if you're worried about a platform or you're worried about privacy, for example, on Google or you're worried about interoperative ability between Google or Facebook, you've got to regulate those things directly. You can't break them up. You've got to regulate the things directly. I think that's very important.

One other point that Kaushik makes that is I think made in all the papers is tax incentives. So he talks about who owns the robots. But let's talk about instead about who owns the profits of the robots. And we have a global system right now. There's a possibility we might get a global tax agreement. I hope we do because a lot of these big companies we're talking about at the frontier of technology paying, earning super normal profits are stateless right now from the point of view of where they pay taxes.

They're paying no taxes. They're paying no taxes. And we're close, I think to a tax agreement on this. I think that's much more likely than the global social contract that Kaushik talks about in his paper. I don't see any move in that direction. Possibly a global agreement on taxes. And as all the papers recognize the incentives to assure automation right now. Think about it. We're talking about automation. All the decisions about automation are being driven by business investment decisions, business investment decisions.

And what do they look at? They look at taxes and they look at labor costs. Those are the things they look at. Those are the two things that a CFO has. They're the biggest claim on revenues, labor and taxes. So right now, we have a system which taxes labor relative to capital. It makes the return on capital less subject to tax and the cost of labor higher because of tax. So taxation is an important policy issue.

Let me end with a few comments on Dani's paper. Yes, I agree completely on premature industrialization. However, I will say to both you and to Kaushik and to the group. The industrialization revolution, what the world experienced after – from the industrial revolution today is not sustainable in the future. We have used up earth's climate to do that. It's not possible. It's not possible. So we need to think about development strategies which take into account the cost to our environment of continuing to industrialize. It's not sustainable.

So it maybe that it's premature but it's not sustainable to industrialize. That model that the advanced industrial countries use and the Chinese, not possible anymore it seems to me.

Dani didn't mention and find his use of this really important and helpful to the audience to see. He has a very important matrix where he talks about thinking about policies at the preproduction phase, that would be like education training and things like that. The production phase like what do we do to help small and medium sized enterprises get to the technological frontier. And the post-production, it would essentially be redistribution, okay? At the end of the day, we may have to redistribute some tech.

It's a very good matrix and helps me think about the policy recommendations. All the papers (inaudible). One is that everybody agrees on the importance of education and training, but different kinds of education and training for the advanced industrial countries – I have done a lot of work on Germany.

The apprenticeship system has been a big help. But on the other hand, I'm going to pose this, I guess for David. One of the things that has happened in Germany is that as the middle-income jobs of manufacturing have reduced, people have gone into services. But there's a lot of licensing requirements in services. There's a lot of training. To be a hair dresser in Germany is to have an income level and a training level which is a living wage level. It's a professional level. So economist don't like licensing, but on the other hand, apprenticeships and licensing maybe a pretty good thing.

I want to mention worker's voice and unions just because in the advanced industrial countries certainly the erosion of union power particularly in a country like the United States where these effects – the negative effects on labor have been most dramatic. If the erosion of union power is very, very important. Again, Germany kind of shows in many ways the importance of collective bargaining.

Let me just say support for small and medium sized enterprises. Again, my work on

Germany. The strength of Germany, one of the strengths is the middle stop, the medium and small enterprises. They're very connected to their communities. They are also more financed by debt than equity. That means those two things together mean they have a much longer term perspective. And if they are going to reduce their labor in some uses in the firm, they actually look for ways to maintain the overall labor force. Perhaps over time reducing employment, but certainly not in the kind of dramatic disruptive way that would occur in the United States.

And then I'm just going to end with the importance of demand policy. There are many other policies to talk about, but demand policy.

MR. QURESHI: You're out of time. You'll have a couple of minutes.

MS. TYSON: Okay. Just the competition – David has already made this point. But let's think about it for a minute.

The demographics and healthcare in the advanced industrial countries. That is where a lot of jobs are going to occur. And then the question for policy is going to be what are the benefits around the jobs? What are the labor protections around the jobs? Are there minimum wages around the jobs? There's a whole host of policies in the development of the service equity. So why don't I stop there?

Great papers. It was hard to summarize. There's so many things.

MR. QURESHI: You did very well, Laura. Thank you very much for your thoughtful comments.

So we have really gone over a few minutes. If you would please stay with us. We have about 20 minutes for some follow up questions. I would also work into those some questions that we have received from our viewers.

And please keep your answers to two to three minutes at most for a question so we can get three or four or five questions in the time that we have left.

Let me go back to David and Laura also touched on AI. This is a key question of interest to many including some of our viewers. How AI, which is the sort of next phase of the digital revolution will affect labor market dynamics. David, you touched on this in your paper and presentation. And you know, the great answer associated with how AI capabilities and applications may evolve in the future.

The question, Laura touched on that also, that many have is this. Could AI accentuate

the trends of increasing job polarization and wage inequality that we have seen with the advance of digital technologies in recent decades and compound our big policy challenges in promoting good job creation for all and mitigating the rising inequality? Could you say a few more words on that, David?

MR. AUTOR: Sure. So let me again underscore the uncertainty. I think, you know, as I wrote in my paper. It's a lot easier to say at this point what AI can do than what it can't do or won't be able to do. And so, this, you know, kind of creates a lot of, you know, the compensatibles on everything you're expanding, you know, you become less confident.

You know, Laura characterized the effects of the AI as kind of routine, you know, displacing technological change on steroids. But I think what's sort of built into that is the definition of what's routine is expanding, right? So we used to think like driving a car was not a routine task because it required all of this, you know, kind of context, awareness and sightedness. And now, it kind of it's done by AI.

So many things that we used to not think of as following well understood rules and procedures will now be accomplished by software. You can call that routine, but it will be a lot of decision making passed. A lot of managerial and judgment tasks. And those were things we used to think you needed a kind of a lot of, you know, many inputs and a kind of fuzzy decision rule. So it wasn't good for computers. But, of course, as I stress, people aren't that good at that either. So computers don't have to be that great to displace people.

So, yeah, I think it has the potential to hallow out the middle more. I don't think it's going to eliminate the highest professions. I don't think it's going to eliminate the low skilled jobs, but I think it could be to more hallowing out, more polarization. But it could also, in fact, do – it could actually reduce the value of a college degree if a lot of college educated workers are middle managers, right? You know, they may succumb to the same middle skilled displacing process that, you know, administrative workers and production workers have seen.

So I think there's a lot of things that could happen. But I think we should also think constructively about how do we use it to augment people? Rather than just what might it take away, right? So, for example, you know, Laura talked a lot about moving people from the middle to the top. I think that's great. I think we want to improve the quality of jobs for people who don't have college

degrees just like Germany does and as Laura emphasized as Dani's matrix, famous matrix, also emphasizes.

There's a way to improve jobs quality. And so, we have to think how do we augment noncollege workers if they're doing repair? Can we give them things like Google class to give them information and make them more effective? Can we augment, you know, medical service workers who are not doctors to do more care and do it more efficiently?

So this is, you know, my admonition that we should not ask what AI will do, but what we want it to do. I think, you know, I'll end on that. I think it's really valuable for us to take that constructive point of view. Thanks for the question.

MR. QURESHI: Thank you, David. That's a good segue to the next question to Dani. Dani, in your paper you say that we need to revive the idea of appropriate technology. And that governments should take a more active role in steering innovation in a more labor friendly and development friendly direction.

Some – including some of our viewers ask the question whether there are risks associated with governments picking winners and whether a heavy hand of government in the innovation regime may not muzzle innovation? Now, governments of course have an important role here unquestionably. But I think it would be helpful if you would say a bit more on the sort of tools governments may use to shape innovation in the desired direction. Dani?

MR. RODRIK: Yeah. Actually, at this point, I mean I think this links very directly with the last point that David made and I actually agree with him from his own presentation that we – I mean just the broadening from AI to technology more generally. That, you know, we don't – I mean our standard narrative is that, you know, we should, you know, our labor markets and our skills and our society should adjust to technology.

And I think this is, you know, this is weird. I mean technology should adjust to society. You know, at least meet it halfway. You know, it's – and it's remarkable how we just take for granted that there is just this, you know, train that's moving along in its speed and its own direction.

And then when we talk about, okay, so, you know, redirecting technological change or moving AI in a direction that's going to be more directly useful for society and for labor markets. Then

sort of people say, oh, but, you know, can the government pick winners? But, you know, the government is already in this, you know, up to its neck as Laura mentioned.

I mean I think there are, you know, everything about our tax policies is already, you know, sort of incentivizing firms to invest in automation. And then, you know, I think other reasons why we, you know, the decisions that innovators and firms make are not necessarily in line with, you know, the social evaluation and cost of different technologies.

And so, we have understood that there are a lot of areas where, you know, public policy ought to play a role in directing technology. I mean, you know, for the longest time obviously, you know, the public sector has been an investor in military technologies and defense technologies. We take it for granted that there's a role for the public sector to direct technology in the direction of military or military related technologies.

Now, it's perfectly taken for granted that given the climate challenge that we should invest in green technologies. That we should have the right kinds of incentives there. Well, I mean why not also sort of broaden the agenda to thinking about how we can envisage directing technology in a more labor friendly direction as well?

And I think we do have the institutional frameworks for that. Everything from, you know, DARPA style agencies with sort of, you know, that sort of take on these tough challenges of how do you think about this problem? To, you know, sort of our small-scale industrial technology extension programs. Everything from the small business administration to local economic development initiatives and so forth that are intimately linked with what's happening with this.

And again, Laura knows well. I mean like in countries like Germany or many other places actually in Europe because labor is much more directly involved in the governance of firms that the type of technologies that are adopted, the consequences for firms, you know, play out very differently when you change the nature of the decision makers or where you give labor a voice, for example, in the adaptation.

Now, all of that is fine. But again, from the standpoint of the hat that I was wearing in this panel, which is what do we do for developing countries? Here is yet another reason why developing countries are at a disadvantage. Because all the decision makers in this domain are going to be in the

advanced countries. Whether it is the innovators or the public sectors of the advanced countries. And nobody is really looking out for the interest of the developing countries here.

There are some large middle-income countries, the Brazils of this world, the Indias of this world that have some innovation programs where they could actually make these appropriate technologies for their purposes and a much more central objective. And they do that in areas of climate change and sustainability. But again, it's in other areas of the labor markets is something that I think they need to collect and they could get more into.

MR. QURESHI: Thank you, Dani. We have time for one more question, and I would ask Laura. You briefly touched on some of the points that Kaushik has made. You mentioned one important area where you're thinking and policy innovation is needed is antitrust and competition policy as technology shifts markets.

In particular the regulation of tech giants and digital platforms rather known as gatekeepers in the digital economy and exhibit features of national or quasi-national monopolies. We know that the current chair of Federal Trade Commission also has been arguing that the U.S. antitrust framework maybe ill equipped to address the competition policy challenges of the digital era.

And so far viewers are also asking whether competition policy and institutional framework needs a major overhaul? And there was this related question of the point that Kaushik makes that if machines – about broadening the ownership of capital. That if machines replace workers and wages become profits. Bottle this can flow back to workers if they own a share of capital and associated profits.

So if there are ways to broaden ownership of capital that can be considered. There's a lot in there which needs further thought and fresh thinking, but you touched on that and any additional thoughts that you may wish to offer on those points? Laura?

MS. TYSON: Well, I won't speak for Kaushik. I do know that in general the economics profession has been moving in this direction for quite some time to the view that the technological giants have too much market power.

They have market power vis-à-vis the consumer. They have market power vis-à-vis businesses because, for example, to list your business on an Amazon platform. Over time, Amazon can adjust your contract to take more of a profit share. They can actually develop a competitor for you. So

the (inaudible) auctioneer actually becomes a producer of things that they also allow other small firms to list on.

So there are, I would say, real issues in terms of these firms. Kaushik focused a lot on platform companies. But the market power of these firms vis-à-vis businesses. It's not the customers. It's not the price point. It's vis-à-vis businesses. And also, monotonicity power vis-à-vis the labor. I think that's the other one that's really important here.

You're beginning to see in the United States, and I think it will move forward, but slowly efforts to unionize at Amazon just as an example. The firm has – it may be right now the biggest employer in the United States. In many parts of the country, it certainly is the biggest employer.

That has added exercises tremendous monotonicity power. So I think that is very important. I'm not an antitrust lawyer and so I cannot determine whether there are ways to adjust the antitrust law itself. As I said, I tend to think at the end of the day the solution is not going to be breaking these firms up because of the network externalities. Because they are large because there are benefits in the economies of scale and networks.

On the other hand, we can insist, for example, or public policy could insist that there be more inoperability. So that actually you have – if you're working on one platform, you have the ability to also work on another platform. That seems to me to be completely sensible. So again, I would go back to the notion of what Jean Tirole has been saying was there are lots of things that we can do to regulate these giants.

But let's think about exactly what we want to regulate and then write the regulation for that behavior. And if the issue is they're just earning super normal profits then actually that becomes a taxation issue. That becomes – as I said, these are stateless corporations right now in terms of where they pay taxes. We can get at some of their super normal profits by taxing.

MR. QURESHI: Well, thank you, Laura. So this has been a very stimulating, thought provoking discussion. Unfortunately, we are almost out of time.

So I would like to thank our speakers for their excellent presentations and comments. They have given us important insights and ideas to reflect on. I would also like to thank all those who joined us online and shared their questions and comments.

Just a couple of brief remarks at the end. One, across getting theme of our discussion today and of the report underpinning it is that we are living at a time of significant change. Technology is changing markets, business models and the nature of work in major ways.

It is altering growth, employment and distributional dynamics. These shifts pose new challenges for public policy to harness technological change to build greater and more inclusive prosperity. And it is clear from our discussion today that we are at a junction where we need fresh thinking and innovations in many areas of public policies. Several of which our speakers touched on today.

And one other comment, if I may. And that is that the political discourse on public policy to reduce inequality often forces focuses narrowly on redistribution that is taxes and transfers. That is indeed an important element.

But as the presentations and our discussion revealed, there is a big and crucial agenda of pre-distribution to make the growth process itself more inclusive by improving opportunities for and capabilities of smaller firms and less skilled workers as technology transforms product and labor markets. This includes, of course, competition policy, worker training, active labor market policies and more.

And in a similar vein, Dani in his paper underscores the reform of policies that pertain to the production stage of the economy. At Brookings, we have a continuing program of research on how technology is reshaping the economies and public policy agendas. And we look forward to more discussions of the kind that we had today.

We will be posting a recording of this discussion on our website and it will also be available on YouTube. So with that thank you all again. We close this event. Thank you and good bye.

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I, Carleton J. Anderson, III do hereby certify that the forgoing electronic file when originally transmitted was reduced to text at my direction; that said transcript is a true record of the proceedings therein referenced; that I am neither counsel for, related to, nor employed by any of the parties to the action in which these proceedings were taken; and, furthermore, that I am neither a relative or employee of any attorney or counsel employed by the parties hereto, nor financially or otherwise interested in the outcome of this action.

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