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ECONOMIC GEOGRAPHY BITES BACK
INDIA'S CITIES, EUROPE'S IMMIGRATION ABOUT-FACE, AND CHINA'S BELT & ROAD

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P R O C E E D I N G S

MR. KHARAS: Good morning, everybody. Welcome to today's discussion. My name is Homi Kharas, I'm the director of the Global Economy and Development program here at Brookings.

We have I think a really exciting program this morning. The genesis is that ten years ago at the World Bank Indermit Gill, who is here today, and a number of his colleagues wrote a report called "Reshaping Geography". It was one of the first efforts to really bring geography into the mainstream of development economics at the World Bank. At the World Bank mostly the discussion had been in terms of themes, you know, human capital, infrastructure, things like that, but much less in terms of where were these kinds of interventions to be actually done. I would say that that report at the time had quite an impact. What we thought we would do today is to see ten years later in retrospect what has changed. Do those lessons still hold up? And to some extent, why has it been so very difficult, because I think it has been, to actually make progress on this agenda?

The run of the show is going to be as follows: I'm going to ask Indermit to make a short presentation about what's changed since that World Development Report because I think the world is actually quite different, and then I'll introduce the panel -- we've got a very distinguished panel -- and we'll have a bit of a discussion about what some of these findings mean for particular regions of the world, and then we'll open it up to Q & A. I'll try to end around 11:30 a.m.

Just let me take one second before inviting Indermit up to the podium here to say that out of the report I was thinking what do I remember out of the report ten years later, because ten years is quite a long time. There are essentially two facts and a framework that I remember and that I thought I would share with you.

So, the first fact is that of all of the various things that affect people's opportunities -- and we talk about education, we talk about early nutrition, we talk about parental income, and social class, and all kinds of things -- of all of those factors the single greatest determinate of somebody's income and opportunities is where they were born. I think that remains true today, but it really is quite telling in terms of the importance of this notion of geography.

The second fact that I think is really worth bearing in mind is that economic activity tends to be very highly concentrated. While we talk about inclusive growth and balanced growth we're not talking about balanced geographic growth, we're still talking about highly concentrated geographic growth. But what the report showed is that at the same time as production can be very heavily concentrated, and usually this is in large urban centers which are quite dense, that have agglomeration economies, that have specialization, can engage in trade, there is no reason for individual social welfare to be as concentrated and divided. So you can have both the benefits of agglomeration and the benefits of a relatively equal distribution of income if you get things right.

So how do you get things right? That's the framework that the report presented, and that that framework essentially revolved around three things. Three D's, that's why I can remember it, and Indermit was very clever in crafting it this way, it's not an accident. The first is density. It's very difficult to have real development in places without a minimum level of high density. The second is distance. Distance is some concept of being able to access markets, usually in the first instance domestic markets. And the third is division. Division is about being able to actually take advantage of globalization and access international markets. As we all know, the barriers that people set up at borders, even in so-called free trade arrangements, tend to be very substantial. So these three factors really dictate the opportunities available to anyone.

So with that I'm going to hand it over to Indermit. He's going to tell us what's changed in the last ten years, how you think about this report, Indermit, and then we'll move on to the panel discussion. Thank you.

MR. GILL: Homi, thank you very, very much for this. I'm going to try to stick to notes because I know that you will cut me off at 20 minutes. So thank you very much. I shouldn't have said that. (Laughter)

First, I would like to thank Homi very much for that introduction. I want to thank Meryl and David for organizing this discussion. I want to thank Caroline and Martin and Rachel for being here, especially Rachel for coming all the way for London. I especially want to thank DFID for making this event possible because we couldn't have made this event possible without money. Finally, I want to thank all of you for coming today.

My coauthor is here. His name is Somik Lall. I do want to say that while Somik is one of the coauthors of this presentation he is not responsible for its contents because he works at the World Bank, okay. (Laughter) So, Duke and the World Bank are not responsible for what I'm going to say and nor is Somik Lall. In fact, I may not be responsible either. (Laughter)

I'm going to take about 20 minutes to tell you about why economic geography matters even more today than it did ten years back when we did the World Development Report. That was also the year that Paul Krugman won the Nobel Prize, and I think Barak Obama also won the Nobel Prize the same year.

Now, for the World Bank and the World Development report team the main purpose of the discussion is to begin a reflection on what that report got right, what it got wrong, and what it missed. We will be having a more detailed discussion of that at the World Bank this afternoon, and we have experts from universities like Princeton and UPENN here. Steve Reading, (inaudible) is here, as well as Seth Morgan from Duke, and we have lots of people from the World Bank who'll be working on this paper like Chellar, and Sam, and Mathilde, and others.

So, I'm going to show you some slides about what has happened in India, what has happened in Europe, what has happened in the U.S., and China during the last ten years. I don't need to convince anybody over here that it's been a crazy, crazy decade, right? So, we could not have anticipated, for example, that Donald Trump would be president and that the UK might be the first to leave the EU, that India would become the most polluted place on earth, and that China would become Africa and Asia's biggest development partner. So, all of these things have happened in the last decade. If you read the World Development Report right off, you go back and read the World Development Report right you'll actually see that all of these things make sense. The way that I would summarize what has happened over the last -- in the U.S., Europe, Asia, and so on is that it's not the economy is stupid, it's economic geography is the smart one.

I'm going to start with a slide that actually summarizes what we did in the World Development Report and what's been happening around the world. So, what we did in the World Development Report, like in all good reports the World Development Report had three parts; it had a facts part which is Chapters 1 through 3, it had a framework part which is Chapters 4, 5, and 6, and then it had three policy related debates and those were Chapters 7, 8, and 9 there. I'm going to talk mainly about things related to Chapters 4, 5, 6, 7, 8, and 9, and I'll single out three developments.

The first is that urbanization, especially in India and Africa, seems to be going wrong for many of the reasons that we anticipated in the World Development Report. These reasons had to do with not pricing land and water and other factors of production right and not building infrastructure in time.

The second is that regional disparities in income and welfare was supposed to decrease in the more developed economies of the world, not to increase. The main mechanism by which this should have happened was from migration. We got some of this right but we did not anticipate what actually happened in the U.S. and the UK, and I'll show you some charts on that.

The third was that we did not anticipate that what we'd be talking more about in terms of what China is doing is what China is doing in southeast Asia and in central Asia and in places like Africa and so on, we thought that we'd still be talking about what is happening within China. So, back in 2009 we expected that we'd still be focused much more on China's own organization and regional development problems; we don’t talk much about that anymore.

Putting it in somewhat different terms, essentially we didn't anticipate in 2009 that 22 of the world's most polluted 30 cities would be in India, we thought they'd still be in China and that's why we were talking about China much more. The second thing we did not anticipate was that 9 of northern Europe's most poor 10 areas would be in the UK. That's true. Then the third thing that we didn't anticipate was that 4 of the world's biggest banks would be in China. If you add up the amount of loans that those 4 big banks have made that's actually almost as large or slightly greater than what the next 6 big banks have done in the world.

So, now, these events have changed the course of development in India, in Europe, in the U.S., in China, and anything that changes the things in these countries which essentially add up to half the world's population and more than two-thirds of the world's GDP naturally affects everything on the planet.

I’m not going to show you stuff first on India, especially to sort of look to see how urbanization appears to be going awry in India. I want to start with this chart. I think that you would recognize this. This is a 24-story tower in Bombay, Mumbai, which is the residence of the billionaire Mukesh Ambani. It's priced at more than $1 billion and might be actually $2 billion, and has a staff of 600.

It looks like a monstrosity usually. I took the nicest picture of it. Right nearby you can see pictures or scenes that the Mumbai city government cannot provide even the most basic amenities to its people. This is one of the contradictions of urbanization in India.

So, this is what traffic looks like Bangalore, which is a city in the south of India that is now one of the largest five cities in the country. If you think this looks bad you have to look at a picture of what traffic looks like in India's north. This is a picture of the city of Benares in India.

So, what is happening in India is actually not surprising. It appears that urban shares are actually greater than what are measured by the government statistics, but it also appears that the speed of urbanization is slower than what India needs in order to sustain growth rates of 6, 7, 8 percent that it wants to do to start to look like China.

But what has not been surprising is that economic activity has actually started to shift to the south. GDP growth rates of states in the south have been greater, and southern states have done better in empowering women and in educating girls so that population growth rates are lower too. So per capita income growth rates in the south are much higher and this trend is likely to accelerate and that's what this map shows, that it's likely to accelerate during the next decade.

Now, this will actually create tensions in India because for the longest time poverty, population, as well as economic production was actually concentrated in the north and so was political power. What's happening now is that production is moving southwards while population is actually moving northwards in a sense and that's going to create problems.

Instead of production what seems to be concentrating in the north is actually pollution. So the first chart there shows air quality in 2005 around the time that we were writing the World Development Report. If you notice over there that the darkest spots are those in China and India doesn't look that bad. So then if you fast forward two, three years back you see that now actually China actually starts to look better, especially around Chongqing and so on, but India, especially northern India, looks terrible. This is what it looks like in Delhi and pretty much every northern city looks essentially like this or worse.

Now, these charts have been put out by Green Peace and the way that the Indian government has reacted is to try to kick Green Peace out of India. Just so you know, the only reason why Green Peace hasn't been kicked out is because it filed a court case I think it was in Chennai or Bangalore, because Green Peace is actually headquartered in the south of India. They are smart people.

But the main reason is that India actually subsidizes coal-fired electricity and petroleum and diesel and kerosene. We don't know of a fossil fuel that we didn't like. The problem is that fossil fuels obviously don't like us. But it's really a question about pricing things like electricity in its own right to start with.

That's the first one. I do know I'm going to run out of time so I'm going to speed up a little bit. The next big development in global economic geography is what has given Europe Brexit and the world Mr. Donald Trump, and it's because of what's been happening in the British midlands and the American Midwest. So here is a picture of Polish workers in the UK, and these guys are expressing concern about the Brexit vote because they want to continue to work in the UK, I guess.

As you know, the Brexit vote was essentially a very narrow one, to leave the EU, and basically it was driven largely by what was happening in the British midlands, in the part that you look at red, where more than two out of three people voted to leave the EU. The part that looks the most pro-stay in the EU is that spot over there which is greater London essentially.

Then if you look at these two charts you'll actually see why people voted the way that they did. The first chart shows what was happening between 1966 and 1996, and what you see is that London, the southeast, and the north, which is up there, were doing better than the rest of the country but many regions were actually catching up. The exception was Wales and the east and west midlands, and both of those actually lost ground. They were losing ground between 1966 and 1996. But then what you see after 2000 is that -- this is what happened in the two decades leading up to the vote -- and what you see is that London actually starts to pull ahead by a lot, that's London up there. And the southeast maintains an edge, over there. But everybody else actually loses ground compared to those two places as well as to the average in the UK, and especially the eastern midlands. If you look at that they've actually done down by a lot there.

So, it was actually a vote against the status quo. It wasn't really a vote against the EU, I guess, in a sense. Then after looking at these numbers I was actually surprised that the vote was that close. It surprised me because -- this chart surprised me. It surprised me that the UK has greater regional inequality than does Italy. I mean, we think of Italy we think about the south versus the north, big regional inequality and so on. You have to look at these numbers a little carefully because the level of aggregation matters a lot, but I was surprised by this too.

Now, it turns out that the scapegoats in this election were actually migrants. They were young migrant workers from central Europe, the Poles, the Hungarians, and the Romanians. They had benefitted from the EU in the rise of London but the British workers from the midlands obviously didn't nearly as much as these migrants. You could say that it was their fault that they didn't move but it's difficult to move when you're older. So I've been trying to move from D.C. to Durham for the last three years and I'm having a hard time. I keep coming back here. (Laughter)

You'd have a hard time explaining why Polish workers in the UK can make a case that they should be allowed to stay in the UK at the same time that Polish workers in Warsaw are making a case that migrants should not be allowed to come and work in Poland. This is a picture of Polish people saying that they don't want migrants. Of course they want to be migrants they just don't want migrants.

Now, the story in the U.S. is pretty much the same. The thing that I realized as I was preparing these slides is that the democrats are now the party -- or have been the party of social equality, but the republicans under Trump have become the party of spatial equality. Because it's not economics but it economic geography that matters the republicans won and they'll probably win again.

So in theory the people and Hillary Clinton ought to have won; in practice places and Donald Trump win. And here's the reason why. Take a look at what happened in the U.S. over the last 90 years or so. This is a chart that was actually put together by researchers at Brookings here. Take a look at what happened in the Great Lakes region, which is the green thing over there. You sort of see that the Great Lakes used to do better than the U.S. overall and over time they've just lost out big. Everybody else seems to have converged to the average but in the case of the Great Lakes they actually started from the top and now they're actually at the bottom and headed the wrong way. This naturally includes Michigan and Wisconsin.

Here are some of the maps from that report. It's an excellent report, by the way, and you should look at it. The researchers actually looked at measures of county-specific economic vitality. What you see over here is income poverty, unemployment, labor force (inaudible), life expectancy, and so on. This is what these maps look like in 1980 and this is what the maps look like in 2016, just before Trump gets to be president. The researchers obviously were democrats because blue is good and orange is bad, okay? (Laughter)

Then if you sort of look at this chart over here which is the change in the vitality index between 1980 and 2016 you see that there's a lot of orange around the Great Lakes. Then the chart over here is quite stark. Essentially what you see is that things get better since 1980 in San Francisco, in New York, in Austin, in Washington, D.C., and things get a lot worse in Detroit, in Flint, and Cleveland. If you had seen these numbers you would probably not have been surprised like most pollsters that in Wisconsin and Michigan and Pennsylvania being blue states which was just before that they actually turned red.

But as in Europe, the people who have been scapegoated have been migrants, people like me. But unlike Europe what you see in the U.S. is that popular opinion is still strongly pro-immigration. As I said thought, the republicans have become the party of spatial equality, and the way the political process works in the U.S. expect them to win again and again unless you change the political process. As I said, again, it's not the economy is stupid, it's economic geography, and we should have got this right in the WDR but we didn't because we didn't pay enough attention to politics.

Now, the third big change is the rise of China. When we were doing the WDR we actually paid a lot of attention to what was going on in China. We had half of a regional report that was dedicated just to what was happening to China's cities and regions. But we should have paid a little bit more attention to the third leg of the World Development Report which was international integration and how China would start to affect the pattern of international integration, not just in its neighborhood but around the world.

Here is a map from (inaudible) data. It just came out, I think. These are Chinese overseas projects. As you see, Chinese money is everywhere. Actually, the thing that surprised me the most in all of this was Chinese money is even in India and we don't like Chinese money at all but it's hard to resist. (Laughter)

This is creating all kinds of contradictions. It's creating contradictions in China mostly because Chinese banks have a lot of loans, they have a lot of assets, and these are roughly $35 trillion worth. Since these banks are actually controlled by the Chinese government this makes the Chinese Communist Party the biggest capitalist on the planet. Maybe the only thing more dangerous than crony capitalism is communist capitalism.

The reason why it's dangerous is not because it's bad but because it's wasteful. Essentially what you sort of see is that -- two researchers in China have actually estimated that ineffective investment has caused China $10.8 trillion since 1997. $10.8 trillion. Almost two-thirds of this was done after we wrote the WDR starting in 2009 when China went on an investment binge to stimulate the economy. So as a result of this what you would find is that Chinese banks are now holding a lot of bad debt. You should expect to see that Chinese banks will go looking for returns not in China, because you would have parts of China that have been overbuilt in a sense at least for now, but what you'll find is that Chinese banks are going to look for returns abroad. So you should expect to see the kind of things that you've seen with the Belt and Road. You should expect to see pictures like this where Chinese workers are helping Pakistan build roads and so on, but you should also expect to see pictures like this where China has actually built -- China has helped the Sri Lankans build an airport. And the thing that you should sort of be struck by this picture is that you see a lot of things over here, you see a very nice sort of place and you see all these people but you don't see passengers. If you looked outside you actually won't see any planes either.

But both these things are going to happen. Good things as well as things like this because Chinese banks are going to be looking for rates of return abroad.

Homi, I'll stop here. These are the kinds of things that we're thinking about as we're looking forward to the next decade, essentially about technology, about politics, and the environment but I won't bore you with that. I'll leave you here. (Applause)

MR. KHARAS: Thank you, Indermit. Please take a seat there and let me ask the panel to come up, and as they're coming up I'll introduce them.

Rachel Glennerster is first off the block. She is now the chief economist at the UK's DFID, their aid agency. Before that she was the executive director of the Abdul Latif Jameel Poverty Action Lab at MIT. That, as you know, introduced probably one of the most important strands in development economics today. So, Rachel, welcome and thank you so much for being here.

Next to her is Martin Rama. Martin was the chief economist for the southeast Asia region of the World Bank. He was based in Delhi, and I'm sure he'll have quite a bit to say about the pictures that we just saw. Delighted to see you still breathing healthfully and happily, Martin. (Laughter) He also was the director of a following world development report 2013 on jobs.

Caroline Freund, sitting next to him, is the Director of Trade, Regional Integration, and Investment Climate at the World Bank so a very pertinent and relevant topic for her today. Before that she was at the Peterson Institute. I think that while she was there she wrote a wonderful book called Rich People, Poor Countries: The Rise of Emerging Market Tycoons and Their Megafirms, and I think came here to actually do a book presentation or at least a conversation around that. She's also worked at the Federal Reserve Board over here.

Then, finally, I actually woefully forgot to formally introduce Indermit Gill who is now at Duke University, was the author of the 2009 World Development Report that you've just heard, and most importantly is coeditor with me on a blog series that we call Future Developments. If you want to follow Indermit's various ramblings about economic development that's where you can find more of him.

So, that's the --

MR. GILL: I think the word he was looking for was writings. (Laughter)

MR. KHARAS: Isn't that what I said?

So that's the order of the day. Rachel, I wanted to start with you on this because actually what was quite striking was that in that whole presentation I think Africa wasn't mentioned at all. We talked about China, and India, and Europe, and the United States, all of these places, but it's probably Africa where this issue of how should we think about geography has some of the biggest problems. If you want to think about Indermit's original framework it lacks the density to really achieve things. People are far away from the coast and major cities so distances and logistics in Africa have always been very difficult. And, of course, it's not connected with the rest of the world through trade agreements in exactly the same way as many other countries so this notion of division remains there.

So, just given this array of difficulties what do you actually say when you go to Africa and African governments and they say, look, we're concerned about all of this, what do you advise us to do?

MS. GLENNERSTER: That's a really big question. Given that we didn’t talk much about Africa I want to step back and talk a little bit about what's different on some of these issues in Africa because I know that's really important to then think about the next step of what do we do about it.

So, first of all though Africa is a good example of the fact that over time economic development has -- traditionally there's a much bigger body of evidence on rural poverty in economic development and as we've just been hearing agglomeration and distance and geography are really important for economic transition and growth, and yet we have much more limited knowledge about that. So DFID has brought a lot of funding and energy into trying to get researchers to spend more time working on these issues of economic geography and some of this work is part of that. There's also work from the IGC that I encourage you to look at in the World Bank more generally that we've funded, and I think it's starting to answer some of the questions that you've raised but I think we're a long way from --

MR. KHARAS: (off mic)

MS. GLENNERSTER: Sorry, the International Growth Center run out of the LOC and Oxford, although a network of researchers more broadly.

But coming back to your question about Africa, so population density as you say is much lower and that has implications in rural areas and cities. The weird thing is though is that in some ways density is surprisingly high in Africa, so you both get low density in the rural areas but you get more urbanization, much more urbanization in Africa than you would expect for its level of GDP. The weird thing about Africa is that you've got urbanization almost at the rate of that in Asia but without the economic transformation. That is leading to a kind of really unusual structure of cities in Africa which sort of makes a lot of the problems we've just heard about a lot worse.

So we talk about density and just looking at African cities one of the problems is that there's density in numbers of people per square foot but there's also a density in terms of relationships. So there's much lower density of economic relationships and capital in African cities than in other continents. And because of bad transport and poor planning and infrastructure the distances within cities -- the transport is so bad that even if people are the same distance in miles, in terms of distance in time they are much further apart. So an important thing for agglomeration to work is that you want a lot of people who are within, say, half-an-hour of a job and jobs want a lot of people, potential applicants, within half-an-hour of the job. But you just don't get that in African cities because they're functioning much more poorly than even -- you know, you saw Asia held up as sort of terrible traffic and all these problems, but in some ways African cities would love to be in the situation of Asian cities.

So, that's this kind of weird duality of density in Africa, sort of very low density in the rural areas. A lot more people crammed into cities but kind of dysfunctional cities mean that the time density is not there to get to the agglomerations.

I mean, all the things that we heard about that cause these problems in poor functioning cities like lack of land tenure and poor infrastructure investment and poor planning tend to just be worse in African cities. In particular you get kind of very uncoordinated planning. So what you want is big roads and pathways that you could then put sewers and utilities and have good transport links but without that planning you get these sort of mismatched and, you know, no ability to build a straight road through the middle. You need sort of a fire, you know, a big fire of London or the riots in Paris or something, kind of cleared space to allow those big transport links to happen in some western cities and you don't have that.

I think what I've also been struck by in the literature is how the lack of planning means that the private sector can't coalesce around hubs. So they don't know what the plans are going to be and therefore they all invest in different places and you don't get that agglomeration. So you get much more fragmented cities.

I realize I've kind of given you more of a list of problems than solutions and I think that's part of the issue of where we are in the literature which is we know understand a lot more about the problems of cities and geography and agglomeration. There's a much more limited number of studies on kind of how to solve there. You know, these obvious things like improve land tenure and improve infrastructure investment and do better planning are great, but as I say when I go to different country offices and you tell that to them they're like, yeah, but how do we do that?

So I think economists have got to get much smarter about the political economy issues of how do you make these things work and we try and tie political governance people with economists working on cities together. And then the other thing is you just have to really move in very heavily when you see an opportunity to change things. You have a reformist mayor or there is a disaster and so you've got to rebuild. I think we've got to bring our knowledge into those opportunities and invest very heavily there when there is a chance to kind of fix some of these underlying problems.

The other area that we've seen some progress on is improving tax revenues. That's another area within cities to be able to make the investments to make this kind of thing work.

MR. KHARAS: Well, thank you. That's really interesting because, actually let me just push you a bit on this, I mean, almost all of the apparatus that we've set up for international development cooperation takes place at national government levels. There are very few, for example, very few loans to cities, there's not a great deal of assistance in terms of technical capacity building for urban planning and things like that. Do you think that that all has to change in a major way, especially in Africa where as you said the rate of expansion of cities is so rapid and the sprawl that's happening is so large?

MS. GLENNERSTER: So, I agree that bank loans, for example, are made to sovereign governments and there's often a big issue with then trying to work with lower levels of government. Actually, at DFID because we mainly provide grant financing it's a little bit easier so we often do work with lower levels of government and that's definitely one of the ways that we're moving. So, part of my job is I sign off all business cases over 40 million in DFID and I see a lot of city proposals coming through my desk. In India we're doing a lot of work at the city level.

So, should other donors do the same, and how do we make that happen? That's a really good question. But certainly the IFC and other bits of the World Bank can -- and the British CDC is also working with cities at a much lower level. I think there's also really important political economy reasons to think about devolution and not just work at the center. So, I've been encouraging people a lot to -- because you can get that competition going. You can say I'm going to work with the best 10 cities in India and we'll talk to 20 but the ones with the best responses will get more money from us. And politically competition too within the country of come to us, we've got better services. I think stimulating that competition is really important.

MR. KHARAS: Thank you. Martin, let me turn to you. And maybe we'll just stay with this theme of cities because I'm sure faced with all of those pictures you'll have some things to say about Indian cities and whether they are actually one level. India is growing at the most rapid pace ever, so is it so bad? Is it so dysfunctional? Or is this just a transitory process and like China they'll sort out the management of cities over time and if we come back in another ten years there will be a picture showing that all of the pollution has gone from Indian cities and is now sitting somewhere in east Africa?

MR. RAMA: Thank you, Homi. Let me really go to your point by first starting by saying that looking back ten years I think Indermit's WDR was spot on because if in my time as a (inaudible) for south Asia I think using a spatial lens to understand what's going on gave us many more insights than we had before. I think as economists we are better trained to come from a sectoral perspective to look at regulations of the doing business sort and really the management of space is very centered.

I think also the WDR was spot on in its emphasis on governance as the way for cities to function. I would say that a lot of what we see in these sorts of dysfunctional pictures has to do with a dysfunctional governance. South Asian cities are typically cities where you don't know who is in charge. You will be hard-pressed to tell who is the mayor because what you have is a lot of different departments from line ministries that more or less overlap on initiative jurisdictions that do not necessarily match the shape of the city. So you have enormous coordination problems that happen. So this idea that governance is the main area is very important.

But at the same time Indermit said something that to me sounds very true.

He said we didn't pay enough attention to politics. And I think that's where I see the biggest challenge when it comes to urbanization in south Asia, is that we know what needs to be done more or less. In fact, like you said, Homi, I think we have had a lot of work with cities. Typically work with the most dysfunctional cities like Dhaka, 11 million people and the worst livability. There are all sorts of good plans that we, JIKA, ADB, the Asian Development Bank, have financed that some planning institute somewhere put into place and the plans are great. It's just that they overlap, they conflict depending on who made them, and then they are not implemented anyway.

So, I think we have been going around governance through fixing at the borders of the governance issue where the real governance issue is you don't have an empowered authority who has a vested interest in making the city work because that's politically important. And there are very important obstacles because to get that change, to get that to be changed, you need to change the constitution typically. You need to involve chief ministers who don't want the political competition of a mayor in the territory. So you don't have the coalitions for change.

Same thing with the debate between fixing cities that are dysfunctional and trying to work at the edge of the cities. A lot of what I'm saying here is work that I've done with my colleague (inaudible), who is in the audience. One of the studies we did was about Dhaka. Dhaka was developed around an embankment that was built because of a terrible flooding at some point, and then there was no follow up. The embankment allowed people to build because they were not flooded but there was no follow up on building roads and building infrastructure. So basically infrastructure increased by like 5 percent, the population increased by 50 percent, traffic increased by 100 percent; there is no way to accommodate it. Walking distance from the most expensive part of the town you have empty land. But there is no coalition, there is no political coalition to say let's build there.

So we have a lot of governance problems that are much deeper than just helping them with the planning, getting a nice competition on smart city projects. We do all of that. I don't think it's changing enough.

The other aspect of this relatively poor governance is that because of this vacuum you start having very big private players who do what governments do elsewhere. You have examples like Gurgaon in Delhi which is basically a bit private area within a city of 17 million people that had metro before being declared administratively urban. We help with the planning, we help with these nice things that you should have in place, but for instance we don’t know how to interact with these players who are very good at land grabbing and then consolidation, who are also very good at influencing public decisions and playing games where in the end the government needs to step in to provide the services that they are not providing. So there are all sorts of games that, again, are governance games for which we are not prepared.

All this said, I think cities in India and in south Asia are extremely vibrant and a lot is happening. I will not underplay how much of agglomeration will present Indian and south Asian cities as consumer cities. There are a lot of activities going on. It's quite impressive when you take a city like Delhi which is formerly around 17 million people. In fact, the (inaudible) is gigantic. There are about 18 million people who more or less are benefiting from the dynamics of Delhi.

If you look at night light data imagery you see that by now Delhi-Lahore is probably the biggest city in the world, even if there is a border in the middle there is like building a wall. So a lot is happening there. A lot is happening that is very spontaneous and therefore probably a very suboptimal way. If we don't have the tools to fix the governance, if we cannot go and say let's change the constitutions, a sovereign thing, the question is what is our second best.

MR. KHARAS: So, Rachel was saying that one of the ways in which one can address cities is to take advantage of the opportunities for competition and to design programs that sort of try to reward better managed cities. So, I think in India they did try that to some extent. Tell us a little bit about that experience.

MR. RAMA: So, competition is fine if you are empowered to do something to compete. So if you tell me about competition between cities in China or Vietnam I could really see what it does.

India tried different things given that there was no authority, no way to raise finance, what it is. Here's the money, you can buy your flyover, you can do some things. And that was fine. It made some transformation. But again, one piece of work we did with my colleague we looked at the issue of convergence that you were raising. So basically we sliced it in tiny places and we saw what was happening to them.

There's a lot of convergence going on in the level of cities. There is not convergence going on at the level of states. There are states that have not been able to generate (inaudible). They are in this hinterland that you put in there. So we looked through (inaudible) what was the best predictor of a place growing well in the following decade. And you can think of all sorts of things. You can think of the education level, do they have manufacturing, do they have this and that. Indian connectivity, the distance part, and the basic infrastructure came in very, very strongly.

So I would say competition between cities is fine but getting the corridors that go to places, getting the electricity, there are things that you can help from the central government side and will make a big difference.

MR. KHARAS: Great. So, Caroline, let's take that thread through. So everybody said there is connectivity, infrastructure, that's the answer. China comes up with a Belt and Road initiative which is ostensibly designed to do exactly that. And then everybody says yes but they haven't really got it right, they don’t take care of this, these airports are empty. So we all know that big infrastructure is a complicated thing, so I'm sure that it's easy to find anecdotes of failures as well as one can find anecdotes of successes. But how do you see the Belt and Road initiative in this effort to really have a big push on connectivity? How do you see that playing out? Is it a good idea being sort of poorly or moderately implemented? What's the sense?

MS. FREUND: Thank you, Homi. I want to start by taking a step back and just something that really struck me when Indermit was presenting because I'm working on the current World Development Report on global value chains. And there is kind of another fourth big change, or maybe it's a cross-cutting change that is happened since that WDR was written which is data and empirics. So economics has become much more empirical and there is a lot more data.

So, in looking at global value chains they have this chart in their report where they have intermediates in trade rising over time since 1960. Well, we're not just looking at intermediates, we're looking at foreign value added in exports. Your value added in other countries' exports.

So, the way we're calculating things has changed a lot over time. And this is going to bring me to distance and division because I'm actually a bit worried after being reminded of his WDR how we're going to go much beyond in terms of the policy implications because we come up with a lot on distance and division as well so far but we still have a few months to find something more novel.

But this is going to bring me to the BRI and to the answer to your question which is despite this movement towards data, the data and definition around BRI is very, very vague. So there is no one single definition of the BRI. So some economists at the Bank have studied it and in doing so we had to come up with our own definition and our own data. So, I guess my first plea before we say it's a bad initiative or it's a good initiative is let's actually look at the data to decide.

So what we did was we looked at the six corridors and just defined the Belt and Road initiative to be along those six corridors, so it's 70 countries mainly in Eurasia, south Asia, and a few in Africa, and then looked at how much trade is there, what are the infrastructure gaps, and so forth. And this is a really big region; it accounts for 40 percent of trade. But if you use a gravity model, kind of a standard methodology to see do they trade as much as we would expect, actually it's about 30 percent less than what would be predicted by a gravity model in part because there is under- trading as we know in south Asia very much and there is also under-trading in central Asia.

So, what are the gaps? Well, there are both hard and soft infrastructures. So, there's hard infrastructure missing in some places; it's really, really not there. And then there is soft infrastructure missing in the sense that tariffs are still very high in many of these countries, in the teens. There's also border delays that range up to 300 hours compared to 10 or so in G7 countries. So you have delays at the border, tariffs, and in some cases poor infrastructure.

But then you think, okay, well, how do you fix this? And is the Belt and Road initiative the right way? Well, fixing it requires coordination, so there are some things countries can do on their own to help development but when it comes to trading across borders it requires coordination. It requires coordination because if you build a road and another country builds a road and they don't meet there is a problem. If you have different rail size as we know happens, the narrow gauge and the standard gauge rail, then you have to wait at the border to change and so forth. So it really requires coordination to get this right. In some cases there are also your own incentives to put in barriers, to protect industry or for terms of trade reasons, and the best way to get rid of those is with reciprocal kinds of negotiations.

So, I think there are reasons to coordinate. The Belt and Road initiative can help. We've looked at the infrastructure. One of the papers finds that some of the infrastructure is the right infrastructure to build and it's particularly when it connects very active, economically active, areas. But some of the infrastructure is not the right infrastructure to build and that tends to be the infrastructure in low economic activity areas.

We also find complimentary policies are important so infrastructure is not enough obviously, you have to deal with tariffs, these border delays, and I'm looking at Somik because his work -- he also worked on the WDR -- shows the real importance of labor mobility because if you have some areas that are going to thrive then you need to have labor be able to move.

But there is another issue which is just the cost of the infrastructure. So building it may have positive gains but you have to take into account that it's very costly to build, and for some countries that is going to mean debt sustainability issues and this is a reason data is so important. We need to understand that debt and we need to understand the terms of that debt because that's what's going to come back to bite if there are debt sustainability issues.

We also need to understand governance a bit better. So, is government procurement open? It should be; that's how you get the most efficient provider. So, this is where data would come in handy as well. It's good to have your own workers build infrastructure because then you get the boom from that as well. And in some countries they do actually. Pakistan is a country where it's mainly Pakistani workers who have been building the projects that China has been financing, and in some other countries that's not the case.

Finally, I think the point that Indermit got to around the environment and social issues -- I mean, this is another really, really important area. I didn't know that much about the environment so when I thought about environment and building infrastructure I thought it was about literally building the infrastructure and what you do to the environment. Turns out that's not the big damage, it's that you're changing economic activity by building this infrastructure and that itself is going to have huge implications going forward.

MR. KHARAS: Thank you. Indermit, I'm going to turn to you because you had this explanation of what happened in Brexit, et cetera. But as I was reflecting on what you said, you know, we all know that the EU had big amounts of so-called structural funds to basically do infrastructure to help connect some of these lagging regions in the world. Everybody complains about how inefficient and ineffective those are. Then they also emphasized labor mobility and your pictures of the Polish workers, and then you tell us where that doesn't work because of the political backlash.

So if you can't do infrastructure investments and you can't do labor mobility what exactly is it that one can do in places like Europe?

MR. GILL: Actually, if you look at the data, Homi, you actually find that those sort of structural funds and so on have helped many of the countries, like countries like Poland and Germany and France and so on as well. So, I guess if you look at the concentration of -- Spain, Portugal, and so on. The way that you look at that is if you look at the concentration of economic production that has become more concentrated in all these countries, but if you look at equality of per capita incomes that include these transfers and so on, those actually have been pretty good in many of these countries. I think the UK was a bit of an exception in that sense and unfortunately I don't know enough about the efficiency of these transfers in the UK. I suspect that because the UK is more of a market economy than these others you actually find that market forces have been stronger there and these structural funds have not compensated for that speed in a sense. Speed of the spatial transformation away from (inaudible).

But I had really short remarks on each of the comments that were made by Rachel, by Martin, and by Caroline. So, in terms of the comments that Rachel made, the thing that we have been doing at Duke University is that we've been looking at middle income countries in Sub-Saharan Africa as well. One of the things that you find is that when one looks at what really matters in Sub-Saharan Africa, especially when it comes to spatial transformation and so on, you have to pay special attention to five countries, five middle income countries: Nigeria, South Africa, Angola, Sudan, and Kenya. It's for a very simple reason actually just beyond math, which is if you add up the GPD of these countries it adds up to more than two-thirds of Sub-Saharan GDP. So you have to sort of do well on this one.

Now, if you look at China's activities in these countries you find that China's activities are actually pretty closely correlated with the size of the economy. So, in the sense that they tend to be very active in Nigeria, and Angola, in Sudan, and Kenya, and so on. So I guess say, for example, that you actually look at the contrast in terms of the activities of the

French or the Indians, for example, they tend to be much more along colonial lines not on economic lines.

Now, then the question comes up, and this is a question that we also looked at, is China adding more to development than it is to debt? When you look at the numbers -- and you have the data problem, right? But when you look at the numbers, the static numbers, when you look at them you actually find that the share of China in the total debt of these countries, total public debt of these countries, is not that high. But we know that debt sustainability doesn't only depend on debt to GDP ratio, it also depends on the rate of increase of these debts. When you look at those you start to sort of see that in fact the change in China's debt to these countries has been relatively rapid. So one has to look at that. I mean, essentially take a look at a country like Kenya, for example.

Now, in terms of what is it that concerns me about the Chinese strategy? What concerns me about the Chinese strategy is that, at least as compared in the World Development Report, it's a little inconsistent with that because what we said in the World Development Report is that you always start with common institutions. You try to sort of make sure that you have good education, good health, et cetera, et cetera, you have security, and then you focus on things that you call soft infrastructure, Caroline. So, for example, if you look at the approach taken by the TPP, the Trans-Pacific Partnership, there is much more on the softer side. Then if you look at the VRI it's not the soft side at all, it's actually much more of the hard side. So what we said was you first build on these common institutions and then you move to connective infrastructure and then you moved to corrective interventions. That is the discomfort essentially that we have.

Now, in terms of Martin's comments, the only comment I had is that you do have some cities in India, Martin, where these guys who actually run the cities have the political power and these are the union territories. Do they do better than others? I'm not so sure.

And one last thing, in terms of the WDR if you need sort of help on that one

I now work for wages and we'd be very happy to help you out. (Laughter) If you wait a little bit Martin will also be working for wages and he'll be able to help you out.

MR. KHARAS: Let me open it up to the floor. We've got some microphones so there's a gentleman here. We'll take a round of three questions. Please introduce yourself. If you can address the question to a specific panelist that's helpful but if not any of them can do it

MR. READING: Thank you very much. Steve Reading, Princeton. Fascinating presentations and a great panel discussion. I just want to ask a question of Indermit about his presentation. I thought the charts of divergence in the UK were fascinating. I think they were GDP per capita but it wasn't clear from back here. I wondered about house prices, and of course what ultimately matters to people is the real income where they live which depends an important way on local house prices. London has surged ahead in terms of GDP per capita but so have house prices. So I sort of wondered what's going on here in the background. In a model of spatial equilibrium we'd expect everyone is actually indifferent everywhere because in the declining regions house prices fall to keep people there, and if people aren't indifferent then is it something about barriers to migration, frictions, as has also been discussed? So, what are the policy implications? Should we be doing something about those barriers? Is there a market failure there?

And if it's not about barriers, if people are staying in regions even though their real income is lower then elsewhere what other policies should we be thinking about for these left behind places which seem to be a real challenge? Just sort of thinking about how everything fits together in terms of house prices and real income I thought it's very interesting.

MR. KHARAS: Thank you. Right next door.

MR. HOROWITZ: Thank you. I'm Elliott Horowitz and I used to work at the World Bank among other things. I want to thank the panel for a great presentation. Dr. Gill, you said that among the three big changes since 2009 have been migration. I'd like you to comment further on that. Thank you very much.

MR. KHARAS: Let's come closer to the front.

MR. MACRAE: Hello, Chris Macrae, Norman Macrae Foundation. I'm looking to the three things I think you said starting with the biggest problem or differentiation of all is where is (inaudible) born. And then looking ten years ahead you didn't really mention how technology leaped forward, and particularly mapping technologies. I mean, you know, most laws are a hundred-fold more, analysis needs time, and then maybe even more so in the next ten years.

So, the question is could there be some kind of app which took all of your data but could be used at a community level sort of going forward to actually put all of these sorts of missing dynamics into something that could be done off map. I do a lot of work in Bangladesh and I think they could help with some kind of app like that because if they can do B Cash which is a bank for a billion poorest people why can't we move your area into that?

MR. KHARAS: Thank you. Why don't I turn back to the panel and then I'll come back for another round of questions. Indermit, do you want to start?

MR. GILL: So, let me start with Steve's question. Steve, the short answer is I don’t know. I don’t know the answer to your questions. I guess the problem here is that instead of people moving from lagging areas, in Britain you found that people have started to -- that folks from lagging countries in the EU moved very quickly, right? So, I guess to that extent you might think that if -- or you may not think this but Trump would think this, that essentially if you slowed that migration down then maybe you'll create stronger incentives for people to move from within the country. So, I guess you essentially have this race between internal migration and external immigration. And I think that's the calculus that people are thinking about and that might be the reason why immigrants are so unpopular both in the U.S. as well -- why immigrants have been scapegoated both in the U.S. as well as in the UK. But I don’t know the answer to that.

MR. KHARAS: Sorry, but Indermit that sets up immigrants and domestic residents are competitors for jobs. All the empirical literature I've seen suggests they're not competitors, that they actually both benefit each other.

MR. GILL: Well, they're not economic competitors but they're definitely political competitors in the sense that to the extent that you cannot help a lagging area you then start to sort of face the problems that you see in places like Michigan and so on. So, I guess you're absolutely right in that sense. One shouldn't think purely economically, (inaudible) in terms of economic geography which includes the politics in there. And I think part of the reason why we didn't do that very well was because the chapter in the WDR was written by Truman Packard, who is right over here, and it was a weak chapter, right? (Laughter) So it was his fault.

MR. KHARAS: Welcome back, Truman. (Laughter)

MR. GILL: But we are going to try to fix that problem because we now have Chalar Osden, I think he's over here, who is actually going to look at this. One of the sort of things about migration is -- and this is an answer to Elliott's question -- is that part of the contradiction in the case of migration, at least from the way that I was educated by Chalar, is that if you look at the share of migrants to the total population that has not changed in the world for the longest period. But if you look at what has been happening in terms of attitudes towards immigrants that has changed very rapidly. So, I think one has to -- and the only way that one explains this is trying to look at spatial disparities within a country rather than another thing.

QUESTIONER: (off mic)

MS. GLENNERSTER: Yes, that's perfect for me. So, on mapping technology, there has been a lot of recent really interesting work trying to use technology to solve some of the problems in cities. I think, just to give you a couple of examples, looking at the traffic problem and whether you can use technology to peak price. So you charge people for travelling at peak traffic time because you're using the technology to track where they're travelling. It turns out actually while that does reduce congestion it's not necessarily an optimal policy because reducing people's travel at any point during the day improves traffic congestion equally. So there isn't actually an economic incentive, or an economic rationale for sort of peak pricing. So it's slightly counterintuitive but it's one of the ways that people have looked -- so that's not a solution but they at least looked at that using this technology, and obviously using technology in general to price traffic and transport is a really interesting and important approach.

People have used technology and sort of big data to try and provide kind of private services that the government is failing to do, so there is like Uber for toilets. There's an interesting study on Uber for toilets where you need to get your latrines emptied if you're not on a sewage and so you can kind of call someone to empty your toilet, and that has led to more investment in sanitation.

If we go outside cities it's also important. Agglomeration is actually really important in agriculture as well as in cities, so when we're looking at trying to get African agriculture into kind of bigger value chains and get higher export agriculture one of the problems is they're not sufficiently dense to kind of create enough export, you know, to fill a crate or container full of avocados. You know, you can't export half a container.

Often small countries, low density population, they can't get that all together so there's potential for kind of using technology to coordinate and bring all of that product together, even just getting traders out to farmers. There's a lot of work showing they don't want to travel all that way and then find the farmers don't have any product to sell. So you see the introduction of cell phones arriving, really improving the functioning of the trader network.

It's not the kind of high-tech ag-tech that people have talked about in terms of farmers being on the internet and finding their price, it's more traders that use technology to find their farmers. So I think this is an area where there's been a lot of testing and rigorous research and some of it is promising. Also some of it is not promising, so we have to be really careful to test. You know, people get very enthusiastic about technology. We need to test it because sometimes it works and sometimes it doesn't.

MR. KHARAS: Thank you. Let's go back. There was a gentleman here who has been very patient. Right here, yes.

QUESTIONER: I'm Gavin. I'm a graduate of Hofstra University. I was wondering, so technology has a wonder effect of bringing people together and making jobs more efficient. It takes less people to do a single job. Does that play into your thinking on density and distance? The two Ds you mentioned at the beginning, Indermit?

MR. KHARAS: Thank you. The gentleman in the back?

MR. LUTTER: Hello, Mark Lutter, Executive Director of the Center for Innovative Governance Research. One of the themes that was emphasized is the importance of governance in that many of these challenges require administrative structures that are effectively able to build out infrastructure, et cetera. More specifically I wanted to ask about the potential for charter cities. I believe Martin mentioned some of these private city developers, and what we at the Center for Innovative Governance Research do is work with these private new city developers as well as the governments of the host country to create legal frameworks that allow them to have very substantive improvements in governance to make them much better places to do business as well as to build out the necessary infrastructure. I wanted to get your thoughts on that. Thank you.

MR. KHARAS: One more here. The gentleman with the white shirt.

QUESTIONER: Hi, my name is Luis with the doing business at the Bank. I had a question for Ms. Freund. So, you basically mentioned the importance of global value chains but I wanted to ask if getting rid of the hard and soft borders that you mentioned is enough to bring central Asian countries into the global value chain? That's it, thank you.

MR. KHARAS: Should we go in reverse order? Caroline, do you want to take that first?

MS. FREUND: Sure. So, when we're looking at the determinants of where global value chains go and I guess trade more broadly certainly trade costs are important which are to do with the hard and soft borders, but it's not enough, no. Other things come out to be very important as well including openness to investment. So really getting the agriculture sector even going depends on foreign investment. Political stability is important. And then a lot of still these kinds of behind the border constraints, some of which are directly part of the soft that I mentioned but some might also be within a city. So being able to start a business, because how do you get the supply response to trade openness if you can't start a business? A lot of growth comes from new businesses, expanding businesses, et cetera. So it's really the broader development agenda but certainly the borders are part of it.

Since I have the mic I just want to say one word on the technology question because it's something that's going to be a main focus that will be different from the previous WDR and the current one, which is technology has effects both on trade costs directly because it's easier to call, it's easier to find out where markets are. A lot of goods can even be shipped digitally. Shipping companies are using AI to be much more efficient and lower cost, et cetera.

But automation also affects productivity at the firm level so you need fewer workers and you can do some of the stuff you might have imported via robots and so forth. But what we're finding looking at that is that actually trade increases because the productivity effect leads to more demand for the goods, more intermediates and more raw materials are needed. And we're finding similar results around 3D printing as well, that there's actually more trade in goods that become 3D printed because the quality and the (inaudible) is so much better. So just a word on that. I'm not a techno pessimist about jobs and isolation.

MR. KHARAS: Martin, charter cities?

MR. RAMA: I would like to take together the point by Indermit on why state capitals and union territories do better. I think both questions are issues of governance that come across. Let me start by one example of why I will not necessarily be too optimistic about the state capitals which is you take nations' capitals like Dhaka, you will assume that while this is the capital the prime minister can have some say and make things happen. You have one department still working for I don't know how many years on a bus rapid transit corridor and one other department building several flyovers over that route and just messing up entirely the project. But this said, we do find that state capitals do slightly better than other cities with other administrative governance. Opposite to the case of Dhaka we'll see a lot of the dynamism I see in the case of Delhi, which is the flip side of that pollution you showed but also that in turns traffic, is probably from the fact that it is the nation's capital. I think at the time of your WDR the expectations in Mumbai have much more potential then Delhi. You look at population growth, you look at night light time in (inaudible) city, Delhi has done better. And that's probably you see the construction of the metro of Delhi, what they built in just a decade, it's phenomenal.

So, there may be something about these state capitals, but then there are other elements of governance, the soft part you refer to, that seem to be coming across. When we do this work with UA on who is converging faster things like the crime rate, the labor flexibility of the state, so things that are beyond the city seem to be also playing a role.

Which brings me to the difference with the charter cities. I think when people think about charter cities they also think about having governance that is different from the national governance. Like, you can have the legal redeem of the UK than if you are in Honduras or things like that. I think what we have been discussing is much narrower, it's what kind of arrangement can there be with the private sector that will accomplish what Homi was referring to which is you increase the GDP per capita knowing that that will have a very strong spatial dimension while spreading the welfare of it.

I think in terms of creating the agglomeration, handling the congestion, these examples of private players are much better. Sometimes private players are not the ones you expect. (Inaudible) is run by the armies in south Asian cities where traffic works much better. And these people who are involved in developing this are big private developers and they're really big. They know the Jane Jacobs, they know all the stuff. So they are very good at agglomeration part.

But the part of spreading the wealth is the part that becomes complicated. That happens in two ways. One is that a lot of the land consolidation is basically when you don't have very good regulations on land happens through ways that are questionable at best. So there is a lot of land grabbing of agricultural land, farmers who are pressured to sell the land to consolidate. And so you have an appropriation there. The other appropriation is that of course these people maximize the rent and they take as much of the rent of the place as they can. So that part of the splitting you may see less.

I think our core will not be to see it as a silver bullet but something where having urban authorities that can deal in a reasonable way that involves taxation, safeguards on land and all that will be extremely important.

MR. KHARAS: Great. So, we've got two minutes left which gives us 30 seconds apiece for any parting thoughts from the panelists. Rachel? Thirty seconds.

MS. GLENNERSTER: So, one thing I would have to -- I'm very excited about this work moving forward about continuing to push on geography as an integral part of economic development. But I think it's really important to think about the demographic and geography at the same time because we talk about density but also with migration of different age groups mean that you might get concentrations of different of ages of population in different places and that has a really important impact on dynamics. So you see this in the UK, you see it in eastern Europe, where you get migration into the cities of the young and the impact of demographic change is just interacted with these geographic issues. I think it's a really important one

Finally, monopoly power and how that fits with trade because if you break these barriers at the border but we're still particularly in Africa seeing so much monopoly power within a country that a lot of the benefits of trade are not dispersing to many parts of the country.

MR. RAMA: Just one minor point. I think Indermit and his team a decade ago put us on a very good track. I think it has been a great contribution. Some World Development Reports really shape the way we think for a long time. I would say the poverty World Development Report did that and yours did that.

So, the first thing is I hope we will continue thinking spatially about the development problems. But second, as Caroline said, one difference in these ten years is the availability of data. I think the other element is to go much more into the empirics of spatial development now that we can do it.

MS. FREUND: That was actually similar to the point I was going to make, that I think with big data and all these new data sources looking at -- whether it's web scraping or looking at night lights, satellite imagery, putting RFIDs on trucks, we're thinking about revamping the logistics performance indicator that way. I think we're going to learn a lot more and it will be interesting to see what changes with that knowledge.

MR. GILL: So, I'll try to answer Gavin's question really quickly in trying to sum up. I guess the short answer to your question, Gavin, is that it's complicated. And it's complicated because when you look at the work on economic geography you see a lot of nonlinear effects. So, for example, when you get essentially a decrease in transport costs initially it leads to greater concentration. When you get even more decreases in transport costs it could lead to greater dispersion. So you have to sort of figure out where a country is on that spectrum. Essentially what may happen is that the U.S. is at a very different point than India or China is, for example, and you need to sort of look at this thing.

What's also clear though is that one of the big changes that has happened over the last 20 years is that there is a big change in the nature of economic development, and the reason is that until recently most of the development was taking place in temperate areas of the world. Now what you're seeing is that you're starting to see a lot of development in the more tropical areas. So, when one thinks about technology, the kind of technology or the kind of technological process that one needs, you have to keep that in mind as well.

Now, even though things are very different in the U.S. and so on what you find is that when you look at the kind of things that people want in other countries they are very similar to the kind of things that we want in the United States. I can think about three things. So, the first one is air conditioning. Those places are really hot, right? So, if you go to Phoenix, for example, people want air conditioners. Well, so do Indians. So there is going to be a massive increase in air conditioning demand. So you have to sort of keep that in mind.

Now, here's the other thing. Basically, I don't think it's as complicated to see this, you just sort of have to see where is the middle class of the world going to be? And there is lots of work that Homi has done on this one. Basically, what you see is that Asia, which had a very small share of the global middle class, is going to be -- two-thirds of the global middle class is going to be in Asia, especially in parts of Asia that are tropical.

So, what's going to happen is that these guys are going to want the same things that middle classes want everywhere, and that is air conditioning, that is cars. I mean, you might say, you know, look, we're going to have these autonomous vehicles and nobody is going to have to have a car anymore and so on. Maybe. Maybe ultimate. But the first thing that a middle-class person wants is that they want cooling, they want cars, and they want accommodation. They want houses. The things that Americans do a lot is they cool the air a lot. They have really good cars. And American houses are the best houses in the world. Well, that's what the Chinese want. That's what the Indians want, and so on.

So, in a sense I think technology has to start to answer these questions and try to come up with more efficient ways to do this. Instead of focusing as much on, for example, climate change we should be thinking more climate control and so on.

MR. KHARAS: Please join me in thanking out panel for a wonderful discussion. (Applause)

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CERTIFICATE OF NOTARY PUBLIC

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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