

Conversation with Michael Spence – Nobel Laureate in Economic Sciences

Centre for Social and Economic Progress (CSEP) CSEP Research Foundation

6, Dr Jose P Rizal Marg, Chanakyapuri,

New Delhi 110021, India

Ph: 011 2415 7600

CSEP Research Foundation

Regd. Off: Second floor, 6, Dr Jose P Rizal Marg
Chanakyapuri, New Delhi 110 021 India
T: +91 11 2415 7600 E: info@csep.org W: www.csep.org

Speaker(s)

Michael Spence

Nobel Laureate in Economic Sciences

Laveesh Bhandari

President and Senior Fellow

Rakesh Mohan

President Emeritus and Distinguished Fellow

Moderator(s)

Montek Singh Ahluwalia

Distinguished Fellow

Laveesh Bhandari:

In 2001 he was awarded the Sveriges Riksbank prize in economic sciences in memory of Alfred Nobel for his pioneering work. The core of Michael Spence's work revolved around the analysis of market's asymmetric information. A concept that lies at the heart of economic theory. He developed the theory of signaling a revolutionary idea that shed light on how individuals with superior knowledge in a market can effectively communicate their information with those with less insights. This innovative theory mitigates the challenges posed by adverse selection of pervasive problems in various markets. Michael Spence's research has influenced in diverse fields as we all know including education, financial markets, industrial organization to name a few. His work has opened new avenues of inquiry and understanding of public policy with its impact reverberating across sectors and industries. In addition to his academic work, he has also served as a consultant to government, international institutions and businesses. He is the honorary fellow of Magdalen college Oxford where he studied as a Rhodes scholar. He was the recipient of the John Bates Clark Medal from the American economics association in 1981. It's of course, much longer but I will stop here. Welcome professor Spence. Good to have you here. CSEP distinguished fellow Montek Singh Ahluwalia is an economist. I have to start with the most important designation. (laughter). He is an economist, a civil servant, was formerly deputy chairman of the planning commission, government of India. He joined the government in 79 as economic advisor after which he held a series of positions which culminated in as the planning commission which he was the deputy chairman of. In 2001 he was appointed as the first director of the newly created independent evaluation office of the international monetary fund. For his outstanding contribution to economic policy and public service he was conferred the prestigious Padma Vibhushan in 2011. India's second highest civilian award for exceptional and distinguished service. Mr. Ahluwalia graduated from Delhi university and holds an MA and MPhil in economics from Oxford University. He is also an honorary fellow at Magdalen college, Oxford university. Welcome Montek. And may I request you to take this forward. Thank you.

Montek Singh Ahluwalia:

Great Mike. Its really nice to welcome you to what I am told is a conversation. But actually, you are the one who is going to be doing the conversing. Because I think they really want to hear your views. So, while the subject is called industrial policy, I thought it might be useful to break it up into four distinct areas. I will bounce each one of them at Mike and then he will respond. And just for the audience to know the sequence, we are going to begin with the issue that the world is really gone through phenomenal changes. What does that imply? That is one. Then we are going to turn to industrial policy which kind of is a new kid on the block. Although it's actually been lurking around the block a lot, but its now moved center stage. By which I mean the white house and every other central part of government. We also link it up with trade policy. Because clearly the industrial policy usually comes along with trade policy. So, from the point of view of countries you need to look at that. The last bit is really technology where tremendous changes are taking place and each one of these obviously interacts with each other. So, without further ado, lets kick off on the first point. Mike, I am not going to try to summarize. I think what your book 'Permacrisis', parallels nicely Martin Wolfe's phrase 'poly crisis' because everybody knows that the zillions of crises all coexisting. But calling it Perma you are

actually threatening that they are going to be around longer than we think. Which is also probably true. The question that... I am sure everybody wants you to talk about is given that state of the world, what is it that a country like India or let's just say India, should do about thinking about its own development strategy. I am requesting you to focus it on India but of course, your view about what other countries would do is also important. So, if you want to expand, by all means make it a question about developing countries. But the maximum interest here would be what does it mean for India and let's see what we come up with. Over to you.

Michael Spence:

Thank you so much. We met at magdalen college and every once in a while, we run into each other there. But he was the head of the Oxford union which is this debating society. I never had that level of skill. I don't know how to do this in general terms. I think the best way to do it is to take pieces of it. So, we have in the global economy and global supply networks an enormously different situation. We went for most of the post war period in a world that was constructed quite deliberately and then officially to be driven by business and economic incentives. It was based on efficiency and compared advantage situation. That's just clearly a bad description of what's going on now. There is a national security overlay to everything. There is a pattern of diversification in response to these shocks. I believe that is a major opportunity for people who had trouble competing with China including India if you decide to take advantage of it. You know more about your intangible assets are and which things are easy to do than I ever will. United States in the last either month or quarter, I can't remember which, for the first time in living memory, imported more from Mexico than China. This is being driven by businesses responding to shocks from climate, war, pandemics, you name it and backed up by policy in pursuit of resilience or security in many dimensions. Its really powerful. You can't now, if you just interview anybody who is on a board of a company that operates kind of globally, even if they just have supply chains all over the place, they are just moving around. Its clear. Its also expensive. So, from a kind of macroeconomic point of view we are making global supply chains more expensive and less elastic at the same time. In my view that's part of the reason why for the first time in four decades at least in the west we have inflationary pressures. The supply side just can't keep up. Now I know that central banks thought that that was all transient pandemic related problems. But those have all dissipated. There are no more semiconductor shortages, there is no more shipping... well, I was going to say there is no shipping costs, they are at six times the normal rates, but actually the red sea situation is driving them up again. So, we may see another round of this etc. You can see this once you start looking for it everywhere. We have labor shortages in all the major employment sectors in the United States economy adding up to well over half the total employment in the economy. Like government, construction, healthcare, hospitality, traditional retail. It goes on and on. And those gaps aren't closing. The older generation that didn't retire after the great financial crisis, because they couldn't afford to, hung around to build their balance sheets back up. So, they couldn't retire and now they are retiring in droves. If you just go look at the data. There is an upward trend but its just spiked recently. That is not going to do wonders for a lot of things in many places like fiscal pressure, dependency ratios, labor supply. China's labor force is declining. This is one of the major sources of supply of goods in the global economy. So, that's the general picture. Now maybe we should switch to industrial policy so, I will make a couple of comments.

Montek Singh Ahluwalia:

Before you do that, what I thought we might look at is some of this could presumably be an opportunity for overcoming these constraints by removing restrictions on trade. That's not a bad idea if you have a supply constraint in the west, they have high enough income anyway, their income growth rate might slow down. But the logical thing for them to do if they want to contain inflation is to be much more open on trade. In fact, they are doing exactly the opposite.

Michael Spence:

That's true. So, this is very hard question to get a precise fix on. First of all, what you just said is ought to happen has a supply side and a demand side component. The demand side, we are not going to do that, right. That basically means relaxing our concern with national security, taking off the restrictions on China, eliminating the semiconductor restrictions, backing off on the friend shoring policy so we are not dependent, not getting TSMC to build a plant in Arizona that will make a 5 nanometer chip at at least 50% higher cost than in Taiwan according to Morris Chang. There is a lot of things we could do that would take away some of the upward pressure and the in-elasticities on the supply side from the point of view restrictions are being imposed by places like the United States, but prominently in the United States. But we are not going to do it. I think just a realistic assessment is it isn't going to happen. On the supply side there's only two things. Let me be slightly more precise. I have described in the book and at least one article. The past 30 years as a period of enormously powerful deflationary pressure coming from the growth of emerging economies. Essentially, we just introduced unbelievably large amounts of previously unused productive capacity into the global economy. That force hasn't gone away, but its fading. There isn't another China unless India decides to do it. There are enough people in Africa to do it. So, if you want to place that bet, the bet you are placing is that those countries, all 50 of them will connect and drive global supply in the relatively short horizon. That's not a bet I would place. But it lets just put our cards on the table, that's a possibility. That's the labor supply version. The only other lever is productivity. And the productivity trends I believe will reverse because of generative AI, we may come to this at the end. But it isn't going to happen tomorrow and its not going to happen next year. Because it never does. May happen a little faster than normal. But right now, the productivity trends are negative. This is part of the supply constraint operation and they are catastrophically low, at least the ones that I looked at in America and Europe in the last decade. The post GFC the sovereign debt crisis from a point of view of productivity growth is just catastrophic. And we are talking about a broad based drop. So, if you go through an economy the way I have done with some co-authors to studying structure at the micro level, sector by sector, you have high and low productivity sectors, absolute levels. In that decade I just referenced all of them dropped. That is the high productivity ones dropped and the low productivity ones dropped to practically negligible. But as long as that's going, the other lever that isn't going to help us. So, the way I read it is, I called by the way the 30 years that where we had the deflationary pressures... I don't know if you have ever looked at the consumer price index broken down for major markets. I looked at the American one over 20 years coming up to the pandemic everything that as traded, the nominal price decreased. The nominal price decreased. And that's without adequate adjustments for quality. That means when you subtract the overall rate of inflation, the real price dropped even more. If you took away that effect that is the emerging economy effect, we would have had inflation at much, much higher rates or much slower growth because the feds would have had to sit and the central banks would have had to sit on it. Those forces are not there and not as powerful. Its very hard to prove but there is data that

suggests this is true. For example, the massive growth in trade in relation to GDP stopped at the great financial crisis and flattened. The migration of manufacturing jobs of the American economy which was very large for two decades once the China effect kicked in, stopped in the last decade. Manufacturing employment actually increased in the decade prior to the great financial crisis. No, it's not a huge increment, we certainly didn't recover everything we lost before. But you can see there is a kind of break in some pretty powerful trends that were underway. Again, that doesn't prove it but. I don't think we should dismiss opportunities for increasing labor supply, there is lots of places where women could be more effectively enabled to join the labor force. And that would make a big difference. There is lots of people including the most recent recipient of the Nobel Prize in economics who have said pretty interesting and important. I am talking about Claudia Goldin. Very important things about how long term trends in women's participation rates occur, how they look and what they are affected by and but things like adequacy of child care, the cost of it and so on and so forth. So, I don't mean to dismiss those things at all. And there is good and interesting research on all of them. But the bottom line is if I had to sort of describe what's going to happen in the global economy, it would be high variance, India will outperform, China is going to have a very tough time for a few years. Europe is basically partially stagnating because we are having trouble with structural change. North America will probably be okay, not great, but okay. And that's going to persist until something jars us out of this equilibrium. And my bet for what it's worth and this will get us to an industrial policy I imagine is, its going to be the productivity research associated with really powerful scientific and technological tools, whose names I think you all know.

Montek Singh Ahluwalia:

One question and that is before we come to industrial policy. The point you made which I think has some credibility is that the US for reasons of its national security is deciding to be less open. Maybe even discriminatory against China. That would explain your views on TREPS and that kind of technology. It doesn't really explain protectionism and everything else. So, you could ask the question that, okay, lets recognize that national security is a special good and we got to make some sacrifices to protect national security. So, we don't want XYorZ technologies transferred as freely as might otherwise happen to China or trade. But on everything else we are not actually going to close up. You mentioned India. Now obviously we hope that India will respond to whatever trade possibilities open up. But the obvious place in which that could have been done for example, was in the Quad. The IPEF right? The one thing the US has done is – Yeah, IPEF we have some trade but it won't have anything to do with market access. Now why on earth, how on earth can US rationally justify an anti-trade position vis-à-vis the guys in IPEF. It makes no sense at all.

Michael Spence:

Ok. So, Montek you are the guy who taught me about the importance of political incentives. And you just gave me a purely valid economic argument totally devoid of political incentives. So, let me explain. Trump put tariffs on everything with respect to China. Biden came in and everybody thought he would take most of them away, the ones that didn't fit into Jake Sullivan small garden with a high fence, that's the national security stuff. And the Biden administration thought about it, realized that probably the biggest self-destructive thing you could do in the context of the American political system where the only thing there is bipartisan agreement on is negativity to China is to remove the trump tariffs. So, he didn't. it's a purely political

description. There is lots of examples of this. Americans are allergic to taxes. Why is our _ in the so called inflation reduction act which has nothing to do with inflation. Entirely dependent on subsidies and incentives. Because we can't tax anything. Its simple. But it's a political explanation. And it does piss off the EU quite a bit.

Montek Singh Ahluwalia:

Of course, it's always political. US is rightly widely admired for having a very strong professional group of people. Now I agree that if you have an economist who is trying to get elected to the senate, you can't expect him to say anything sensible. But not every economist is trying to get elected to the senate. Why don't we hear more people saying, by the way, I don't expect congress to accept this, but this is just rubbish.

Michael Spence:

I am not going to try to defend the rest of my profession. I don't know. But I will defend. I think the guy who has made the most sense over a long period of time in a kind of pragmatic way about the merits and defects in our trade policy and industrial policies is Daniel Rodriguez and I think he continues to do that. If you read carefully Danny's assessment of our performance over time, our concern with efficiency and lack of attention to distributional things, he is not wrong in that. That's what Piketty and Saez everybody else have been doing too to good effect if I may add. Danny would say we are a little embarrassed.

Montek Singh Ahluwalia:

But Piketty's main critique is that the so called financialization of the US has been responsible for this. I don't see anyone reacting against financialization. I think what's happening is there is whole series of things that have made things go wrong. But the system has decided to bash up, open trade, just the wrong thing in my view. But its surprising that this is... I mean a lot of Piketty stuff has to do with the role of the financial sector, the signals it sends, its right up your area. Asymmetric information. This that and the other. I don't see any structural change in that dimension whatsoever. Talk about unemployment. For until very recently...

Michael Spence:

I am going to rename my thesis – this, that and the other. Carry on, I am sorry.

Montek Singh Ahluwalia:

Until very recently, the perception in many parts of the profession was that a lot of what's happening on unemployment is because of the inexorable effect of changes in technology. And it was wrong to blame trade policy for it. And that there were other things you had to do to adjust. I don't see anything done there. All that has happened is baton down on trade.

Michael Spence:

No, no. I mean. There is a whole bunch of subtle strands in what you are saying. The profession did engage in a slightly data free assertion that it was mostly technology. By the way I was sat in the white house once and the president repeated the conventional wisdom in economics. And its only because of David Autor and some other people who have documented that China cleaned out whole towns in the Midwest that we have a slightly more balanced view of that. But I don't disagree with you that... I don't agree with Piketty that's mainly financialization. I

think it's a failure, a broad based failure to deal with the distributional aspects of structural change. Both in the past and going forward and there's lots of components to that and it's not right to pick on one part. It's partly trade, it's partly a certain kind of automation associated with previous patterns of digital adoption. They were pretty powerful. I am talking about... let me take an aside... previous rounds of digital adoption basically didn't use AI. They used automation replacing people, doing things where we not only knew that they did them but we could document precisely the steps they took to do them. So, if we could code them, a machine could do them. And this is what the MIT people including David call routine jobs. It means codifiable and therefore automatable. There aren't any more file clerks left in the American economy. Zero. There are relatively few secretaries, certainly in academia. There are whole classes of jobs that have gone away. By the way no really serious negative effect on employment. Now we have another round coming at us in the sort of Gen AI category. So, that was a pretty big hit. Meaning, not that we had a permanent negative effect, but we had lots of microeconomic adjustment to do. And so, I think the negative thing about the American economy is we were bad at buffering the shock, with negative consequences in terms of political social polarization. We are pretty good at not getting in the way of the structural adjustment. I say that as a resident of Europe where I think we are better at buffering the shock and I don't mean there is a tradeoff. I mean one to one. But we are much less good at allowing the structural adjustments to occur and that is part of our productivity problem. By the way, those of you who don't study these things now, I live in Milan in northern Italy. The total growth in the Italian economy since the euro was introduced more than 20 years ago is zero. I don't know how many of you lived in a zero growth economy for almost a quarter of a century but it's not pretty in terms of opportunity. Our most valuable export is the most creative young people. We send them all over the place. UK, United States, because that's where the opportunities are. It is from a long term development with attention to the most important intangible asset, any economy has, this is a disaster. You should never repeat it in any economy. That's the situation.

Montek Singh Ahluwalia:

Let's switch to industrial policy. Given what's happening it's clear that industrial policy has certainly come on to the stage if not center stage. What do you think what's the best way of doing it? You have yourself along with Danny Rodriguez kind of conceded that, yes, the old nostrum that industrial policy is a lot of nonsense, doesn't hold anymore. And there is room for intelligent industrial policy. I looked at one or two things that you had written which seem to suggest that. Again, from India's point of view what would be the most sensible thing you think we should do on industrial policy?

Michael Spence:

Without trying to do it in detail, you are already doing it, right? So, in the digital area it's clear. And you all know what you have done. And it's a combination of private sector initiative and really smart public sector investment in our architectural design. I am talking about the biometric identification system and the universal payments interface. It's the best architected digital financial structures in the world. And we have talked about it routinely now in the last two days including the government minister and I am hoping it gets exported to a very large fraction of the developing world. So, I don't know whether to call that industrial policy or not. But for sure isn't the government vanishingly small and letting them market solve all problems. Because that's not the way the world works. Let me say two things, by way of preface and then

I would like to tell you what the industrial policy activities in the United States look like. One, when we were doing the growth commission together, we had to deal with industrial policy because it was a mixed bag. Danny has been a long standing defender of it without being blind to the fact that it frequently fails because of bad implementation. And we acknowledged that it was risky. Our Latin American colleagues basically thought that probability of either incompetence, waste and/or capture was so high that Latin America it was riskier than in other places and we probably accepted that. On the other hand, there is examples where it makes a pretty big difference when you are an early stage developing country and you want to open up and use the global economy to drive change, you can't build all the infrastructure you need across the economy. You probably can't afford to lift off all the tariffs, so you create a special export dorm and lift the tariffs for the intermediate products on the way in and then ship them out in a kind of contained system. This is pretty standard practice. It can be bad, well or poorly implemented. So, that's kind of the early history. My view is industrial policy in terms of its importance ebbs and flows depending on what you are trying to accomplish in the economy and periods of structural change. Big structural change are typically ones where government programs investment and support are more important rather than less. That is, you can get away with the kind of hands off approach in a relatively stable environment. You always have... I don't think this is what people mean by industrial policy. But public sector investment way up here in human capital and the science and technology base of the economy is always important. It may have been flowing a little bit but it doesn't go away and then people just sort of... because its there they forget about it. The United States budget in bio medical and life sciences and healthcare is 38 billion dollars a year. CNAH budget. It's the biggest investment program we have on the public sector side. Year after year after year. And you can see the results, right? It's the kind of table top for revolution in biomedical sciences, its coming with a big assist from the digital side. We have three big bills that Biden has managed to pass with bipartisan support. And they are an infrastructure bill, the chips and science act and the inflation reduction act. Infrastructure I think is a no brainer. We just needed to fix the infrastructure. And it has been neglected for a long time. The interesting one is the chips and science act. This is why I think industrial policy confuses. It has three components. One is just advancing our technological edge with a little bit of a spur from the fact that we are competing with China because they are good in some of this stuff. So, that's step one. Step two, is more problematic, it's bringing enough capacity both in the design and production area, back to the United States, so we know how to do it. It's we do not want to make all of the semiconductors on American soil. But we don't want to not know how to build a 3-nanometre chip, because we have never done it before and that's why TSMC has been arm twisted in the showing up in Arizona. That's an expensive proposition. But it is resilience in the national security or some conversion of the security agenda. Kind of overriding straight economics. The third one is flat out restrictions on sending stuff to China. And its all there, right. I don't know what to say about it. People think... anyway its going to happen. We are going to try to keep them from getting Nvidia chips probably unsuccessfully. So, they have trouble training the largest Gen AI models. I am sure you know this. But to train these models you need the world's biggest and most powerful cloud computing systems. They are essentially all in China and United States right now. I strongly recommend that you build one here. Because there are all kinds of benefits of that in terms of where the research gets done and whatnots. Its not cheap. But there is a long run pay off to it. It will be an expensive investment. But if I were recommending one piece of industrial policy in this broad digital advancement... I know, I yesterday talked enough for an hour with one of the

ministers. I know you are going to be in the semiconductor world. You won't start at that end, you will start at 44 and 28 nanometres for refrigerators and what not. It's the right place to start. Because there is a learning curve. And you will get there. But I think the cloud computing would be... we do not have the cloud computing system of significant power in Europe. And it's a major mistake. So, I don't know if the Europeans are going to get it together to build it or not. But we have a huge deficit in various parts of technology especially the digital ones and its going to cost us dearly down the road. Again, this is subtle, right. We are going to just like everybody else in the world, we are going to learn how to use AI because using it doesn't require the computing power that training them does, but there is some merit if you are an advanced economy or a set of them to be in the development phase. Because you are there first, you can keep the young people at home and so on. Anyway, that's where I am. That's the chips and science act. You can see it got these three parts. one of them is hard to argue with and maybe its fun to have a competitor that makes you run a little faster and train a little harder. The second one is, I think the world we live in we don't... if you take the United States and China, we just don't trust each other enough anymore to be willing to sort of go back to kind of full version of interdependence. It's not going to happen. We are going to... each both by the way, this is symmetrical, reciprocal... are going to do that. And the other one is if the first ones running faster than your competitor, the third one is trying to break your competitor's leg. So, that they can't run at all. Meaning... I don't think that's going to work by the way. I think those things are too leaky and they will find a way around it. It will probably slow them down a little bit.

Montek Singh Ahluwalia:

Let me pose it a little differently. I can see that since the Chinese have been quite commendably frank with you guys because they have said – look, we are challenging you militarily, they are challenging you technologically, we are also challenging you ideologically. Because we don't believe your democratic open liberal system is better than ours. So, that the challenge is thrown and I can understand that the US would not want to be dependent on China for many things. And also, they wouldn't want Chinese to gain strength in many things. So, that justifies the sort of relocation of supply chains. Also justifies let's say some anti-Chinese action to take care of that. But for the rest of the world... I mean, we don't have a happy relationship with China regrettably at least right now. But, as far as we are concerned should we be repeating what you are doing, which is to have a supply chain right from the beginning in India? Or should we not be saying that if the US succeeds in breaking the Chinese monopoly on many of these things, we would be one of the beneficiaries. Because actually you won't be... the Chinese will no longer be in a position where they can control these supplies. So, that's one factor. Though in India there is a very strong feeling that – look, this is what the US is doing. So, we should go for building the stuff that produces the silicon wafers, the design of the wafer, the manufacturing of the wafer, the assembly and testing of the wafer. So, you locate the entire supply chain.

Michael Spence:

How much time ___?

Montek Singh Ahluwalia:

I don't know that's been specified. But no government practically needs to rule anything out after say five or six years. So, the question is in the next five or six years we have put in and announced policies of giving substantial capital subsidies. I don't know they are substantial

enough for the really high end stuff. Because the scale of our subsidies is much lower than what the US is offering. But as a percent of the total investment is huge. 50% of capital cost the government is going to produce as a straight grant. Now you have the advantage of much more resources. We don't. so, for us these issues become quite relevant. In what's an optimal way of as it were doing a bit of learning by doing, but not sucking all the resources into this sector. You said yourself earlier that we need to improve our infrastructure, we need to do more research, we need to improve human capital. Well, there isn't money for all of that and doing all this stuff.

Michael Spence:

Agree. You should not go down this road imitating us. I mean, this is a country with a per capita income of let's call it \$3000. You should not be trying to be on any short or even medium time horizon trying to get to the frontier in multiple areas especially the really expensive ones. It's just nuts. My sense of what India is doing is navigating very successfully in a very complex environment by adopting... first being quote non-aligned in the kind of full blown sense, rejecting essentially the entire emerging economy world, the kind of cold war version with the United States choosing up sides. And then making cooperation, subject matter dependent. We will deal with you on climate change and we will deal with you on technology and etc. done with great skill. If I were giving people advice, I would tell the rest of the emerging economies watch India, do the same thing. But you are dead right on how to use resources. That would be crazy. You have got... I mean think about it... Arm is the principal designer of the chips that go into cellphones because they are highly specialized. Nvidia is the one that designs the chips that go into the kind of AI training algorithms. The ASML the Dutch firm that produces the ultra-high lithography that you need to produce these very, very dense chips. Can I take it aside? This is a quiz. In a 3 nanometer chip how many transistors are there on that chip per square mm. anybody?

Audience:

Two billion?

Michael Spence:

That's a little high. You are thinking of the whole chip, right? But I said per sq.mm. It's a good guess. Its 271 million. Think about it. Switches per sq. mm. its unbelievable. Anyway, its pretty fancy technology and it turns out the hard thing to do and this is why I think your learning curve is correct. The hard thing to do is not try to make one of those things. Its to get the failure rate up down. So, you don't get defective chips too much. And that's what the Taiwanese are so good at. Its more art than science to be honest with you. Because I don't think Morris Chang and his colleagues can write down exactly how you do that. But they do.

Montek Singh Ahluwalia:

Well, given that you clearly think that some role and most people would agree with that there is some role for an active industrial policy, at least in terms of support, certainly building infrastructure, getting logistics right, getting education, R&D, everybody agrees with that. That's not even called industrial policy. But industrial policy as people understand is identify a particular producer and decide to give them subsidies.

Michael Spence:

Or a sector. Let me give you an example. I am not saying you should, ...

Montek Singh Ahluwalia:

When you say a sector, you may say this sector, but you end up saying we are going to invite applications. In many of these cases you are not going to get too many applications. In the end you are choosing two companies and there are invariably problems on how you made the choice, terms etc.

Michael Spence:

That's not quite right. If you set up a set of incentives, you can say I will take as many as... if you want to participate in this incentive scheme, don't go overboard. Industrial policy is criticized by government picking winners and losers. There are other ways to do that that significantly affect the who participates in the economy on what basis with what subsidies where you don't pick winners and losers.

Montek Singh Ahluwalia:

There is an open invitation.

Michael Spence:

Some way it is an open invitation. Here is our infrastructure, here is our trading, here is the approvals you have to go through, etc. take a look.

Montek Singh Ahluwalia:

But a related question. What's an optimal trade policy in such an environment? You pick some people, you give them a subsidy, but you also use trade restrictions to give them protection.

Michael Spence:

I wouldn't. At least I can't think of a good argument for that. Or that it's been used.

Montek Singh Ahluwalia:

In the US you do that.

Michael Spence:

I know. We are doing it for a different reason. We don't have an import substitution policy, but we have got a policy of making sure we have a domestic version of... we are significantly modifying the market driven division of labor internationally on purpose. But it has nothing to do with economics. It doesn't have anything to do with special interest except maybe the military industrial complex. It's got to do with what they view as... then let me be clear. The national security override on international economic policy is very powerful and near complete. In my judgement and I think Rob and Rohinton probably think similarly. Well, we might put it slightly differently. Its just a different world. We did have international policy. Danny Rodriguez would say it was driven by the interests of corporations and we didn't pay enough attention to labor. I think that's fair. Now, its not driven by the interest of corporations at all or the financial sector. It's driven by the people in Washington who have got the attention of people and what they are building on there is a kind of cynical version of this. They are building on the fact that there is a bipartisan agreement that China is a threat. Whatever the economic

policy is, it has to be consistent with defending ourselves in a short and long term from that threat. But, if I were in India, I would... can I take an example? The problem that you and I talked about many years ago, I think it is still there. Which is, you need powerful employment engines that are going to go beyond the kind of knowledge, white collar work. If you are going to have reach full potential growth which is very high in India. One of the options for that and you don't have to pick one or the other, would be to make the manufacturing sector export oriented as well as serving a very big and growing domestic market. Sitting down with a bunch of people and figuring out how you might go about doing that, what it would take, would be an example of an exercise that I would put under the heading of the industrial policy without knowing what would come out at the other end. One of the things the private equity people have learnt when they come and venture capital people when they come to India and other places is, you don't take solutions or apps or something like that that have worked somewhere in general and then just bring them here. Instead, you come, find the young entrepreneurs who know what the particular problems and choke points are and then tell them we are going to back you if you solve those problems. So, my view I tell that story because I think it's right and it's the way investors behave. And I think it's the way the government should behave. That is opportunities are context specific. So, I picked the one I cited because I think there is some potential in it. But after careful study, thoughtful, smart, Indians in academia and policymaking positions might decide that's not the best option going forward. I still think the employment engine is an important challenge for the Indian economy.

Montek Singh Ahluwalia:

Ok. Well, we have dealt with industrial policy, we have dealt with trade, what about technology policy. Does that raise a lot of issues? Given what's happening, what do you see as the problems there? Where could India possibly get things righter than its doing and possibly get them wrong?

Michael Spence:

We have already... we don't have to repeat ourselves. You got an awful lot of stuff right. In at least the digital deployment. The technologies have an enormously powerful role to play in inclusive growth patterns. Whether or not they generate lot of growth is an open question. But you can with the digital technologies and various NI, AI and things like that, you can reach populations that are hard to serve. And in a developed country most of those populations are relatively small and in a developing country they are pretty large. Let me give you an example. With image recognition, object recognition, which was an enormous breakthrough in AI that preceded the Gen AI stuff and occurred about 2016. That's the point when the AI passed the average human in recognizing images. Well, this is being now used everywhere. Its in autonomous vehicles, they can now see more or less. There is a very subtle and difficult version of that that relates to robotics in an unstructured environment. But I will skip over that for the moment. So, you can do it in radiology and a couple of kids at Stanford said maybe we can do it and detect skin cancer. So, they worked really hard and assembled 120000 images to train AI and they did it and did it in collaboration with dermatologists, top people at the Stanford and they succeeded. These are prediction machines, they are fallible, they make probabilistic predictions, they are not always right, there is type one and type two errors. When you get deep into the wheels you start paying attention to that. But on balance it was pretty good. Now, I am in class and I tell students, this is an example, its not super human AI, it didn't pass the humans

in this particular application, but it's not that bad relative to dermatologists. What do you think of this and they say I am going to the dermatologist and I say you are absolutely right to do that? But live in Paulo Alto or Delhi. They said, do you think there is any use for this? They say absolutely not. It's interesting, that's how we benchmark AIs where the automation bias comes from. But doesn't look all that interesting. Now I say well, 85% of the world's population doesn't live in anywhere near a dermatologist. and so, they tend to skip this aspect of preventive primary care. Do you want to revise your assessment even though its not fully up to human? And they all say yeah, I get it. So, you take out your iPhone, your partner takes a picture of your skin. You send it to an AI, it says you have a problem. We are not sure, but maybe now its worth getting on the train and riding 85 kilometers into town to get this checked out. This when you start looking this story gets repeated over and over again. In education, in agriculture, in health care and so on. So, I would say make sure in addition to the kind of platform based, geo revolution, mobile payments system that you already nailed, is, don't pass up the opportunities that are being created for inclusiveness in the gross patters. I think they are really powerful and they are part of the development story because you can't solve the problem of delivering high quality services in the neighborhood real fast. Beyond that I think what I have heard so far about which things in the kind of advanced digital and other areas, it's not just digital, there is a revolution in life sciences. You have got a pretty important role to play in that because you have got advanced technology and pharmaceuticals and research and so on. Same in China by the way. I think this is maybe the most exciting area. So, make sure that is not underfunded in any way. But it doesn't look like there is a real problem in that area. I think the hard questions are which are the really expensive things that we talked about before. Is Mike Spence right you ought to think about cloud computing at the scale that you need to train an algorithm with several billion parameters. The next round will be several billion times ten. By the way we do not know whether the performance characteristics of this from your point of view look like this or like this. If they look like an S curve we don't know where the S is going to come. The only way we are going to find out is adding parameters until it starts to tail off. But this is literally unknown. You got a lot of smart people and I think they are staying home because of the dynamism and optimism here. That's great. There are some really interesting challenges. The AIs are black boxes. And for certain purposes that's not okay. You need to know what's going on in there for accountability and reporting purposes and so reverse engineering the AI once its discovered... they are pattern recognition machines... reverse engineering it so that you can tell how did you get from A to B is a pretty interesting set of challenges takes you back in for our purposes as economists in the direction of sort of trying to guess what model it discovered in there. I bet its not quite the right way to describe it. But its pretty interesting. I can tell you if I was starting my career over again, I would do economics and AI for sure. I just think the opportunities are so great. We worked on this together assessing growth patterns and things that were missing. And things that ought to happen and it looks pretty promising to me here.

Montek Singh Ahluwalia:

Well, I think lots of people I know who want to ask you questions. So, shall I kind of throw you into the den, have them?

Michael Spence:

I will lie down and people can stomp on me.

Audience (T N Ninan):

Thank you Montek. Dr Spence I want to raise the subject of inequality which is the big elephant in the room actually. And to ask, everything that you said about all the policies that are now in focus. Many of them actually are not going to help on the equality issue. Whether it is tariffs or strategic policy decisions, some of them will raise you said, productivity is going to drop inflation is going to climb and AI may actually take away jobs more than create new ones. So, where does this equality debate go?

Michael Spence:

You are absolutely right. As a starting point Rob does this better than I do. We have just done at least in America a terrible job of dealing with rising inequality and let me agree with you. You and I could fine tune discussion with things that are threats and what things are probably neutral. And which things might even help. But the bottom line is that doesn't look like a really powerful set of trends that are going to reverse this without some pretty aggressive intervention. We do have a bit of a reversal in labor incomes in the middle range. Because of these labor shortages, labor power has increased, unions for the first time are striking bargains and actually winning in the auto industry for example, they have got a pretty dynamic entrepreneurial head of the united auto workers union and I think those are good things, but they are taking little chips out of a mammoth piece of stone we built over decades. At least three or four decades. So, I think we are basically at the point where we can either accept the society is falling apart driven in part by not entirely but in part by inequality. I was puzzled... I am going to take a complete aside... I was puzzled about why trump's dedicated base which will support him not matter what, was willing to go along with destroying basically constitutionally based institutions. And then it hit me, I had an illumination, which is, in the way they see the world, this highly unequal world you are describing, those institutions are precisely part of the rigged system that gave rise to their relative underperformance and the rise of the wealth and power of the coastal elites. So, when those when trump and or anybody else says, we are going to tear down some of those institutions, that doesn't look like a threat. It looks like part of the solution to the problem. And I never realized that before. We just took it for granted that everybody agreed that we needed these structures. Even if we have to modify them. The only other comment I would make is and I said I don't want to be too long winded and I don't think any of the things I am saying solves any major aspect of the problem is that, AI... if Rohinton were sitting in my chair right now, he would make the point that our value creation is increasingly associated with intangible assets and they are in a startlingly small concentrated form right now. So, for example if you look at the market movements of the S&P 500, in the last few months, they are almost driven entirely by the top eight tech companies. Well, it is unthinkable before. Rohinton earlier today reported that if you go back, what is it 30 years, the fraction of market value in these assets is about five sixth tangible assets and one sixth intangible. Its reversed now. The tangible assets it essentially doesn't matter. Its all software digital capabilities and so on. That doesn't help with the inequality problem. On the other hand, a lot of the AIs are going to operate in the part of the world that wasn't affected by the earlier rounds of digital adoption. That really was a middle class blue and white collar admittedly middle class hit. And the MIT folks call this job in income polarization, its pretty easy to document across the developed world. The AIs are going to operate differently and we kind of don't know. But if they hit parts of the upper end, they may not be a bad hit from a distributional kind of point of view.

Audience:

I saw an Australian study which compared some 45 technologically advanced areas and they found that in 30 odds, the Chinese are ahead. And the Americans are ahead in about 10 of these. And few countries, one each in the remaining ones. I think without technological progress in this and some leadership in at least some areas, India can't really do well for a long time. It seems to me that the government has currently set up this budget, says that it is going to set aside a trillion rupees to promote private sector to do some research. The private sector in India is doing very, very little research. So, what do you think India should do?

Michael Spence:

Well, I know this study. You all heard of this right? So, it's based on patents with some adjustment for whether the patent made any difference. Like when anybody looked at it or cited it or used it. I am a little suspicious of it. But I think its directionally right. That China is about where this thing will tell you it is. I don't think the lead is that great. You should not aspire to this at this point. Country at India's level per capita income does not have the resources. And China wasn't there either. If you go back the 15 years it takes, they did this all in the last 10 years basically. They started building universities, investing heavily and what not. And you will get there and then you can do it. But the budget constraint is always real and so I wouldn't worry about it. That is just the way it is. I guess this is simple. We used to talk about this. India's acceleration started in the early 90s, right? You were in office. Exchange rate, balance payments crisis. And then reforms and opening up. It was all slower than China. But steady and impressive. Now you are the highest growth economy in the world in potential terms. That will pay dividends but you can't skip steps.

Audience (Amita Batra):

Two questions. First on GBC diversification and relocation that you talk about. You started by giving example of Mexico. Imports increasing. The studies that are emerging, the early trends studies that are emerging are showing that although you may have a change as far as the source of imports to the US is concerned, but the intensification as far as these sources, newer sources are concerned, there is a greater intensification of their supply chain linkages with China. So that really doesn't provide the answer to what the United States is seeking in terms of resilience as far as supply chains are concerned. The dependence remains. The single source dependence remains. That's one. The second, you have justified the US protectionism completely on the basis of national security saying that that's overriding. Agreed. But when we look at IRA for example, it not only... I mean the legislation very clearly specifies China, Russia, etc. but it also says that the local content rules and value additions or the rules of origin would be such that you will not have parts and competence coming from non FTA partners. That excludes a friendly country like India. We don't have an FTA with United States. So, this is protectionism much larger than what can be justified only on national security. What would you say to that?

Michael Spence:

I agree with that. Other than mistakes, is what I said before, it is political. Except for... I don't think everybody wants to penalize India particularly even though we may have occasional frictions. So, its inadvertent but with respect to China, failing to remove tariffs on toys is purely political. There isn't a single economic argument for it that anybody's given. I think you give the policymakers in the kind of near shoring, friend shoring thing a little too little credit. China is advancing pretty fast but they are not the main source of intermediate products. They are still

mainly assemblers. The semiconductors and the displays in your iPhone do not come from China. They come from Japan, south Korea, Taiwan, etc. By the way you have now I believe either now or in the immediate prospect, 15% of apple's offshore production. And I could easily see that expanding. That's a good thing because there are all kinds of spinoffs. When we were doing the growth commission work, intel showed up in Chile. Chile was sort of influenced by the Chicago school, that 'we don't make deals' sort of stuff. So, intel came and said what is the deal. They said we don't make deals. And intel got... picked up their marbles and left. And went to one of the central American countries remember and set up shop. So, we had this discussion, do you make deals when you get somebody who is where the spillover effects are so large that the benefits are huge. But you break the kind of rules. We never resolved that. That is an interesting tension when you are doing industrial policy. Suppose Lenovo shows up, Lenovo is going to produce a PC with a pretty fully developed AI system in it locally on your desk by the end of this year. You want Lenovo around developing all the stuff they do? Probably have to make a deal with them. So, its worth thinking in advance. I am not recommending one way or the other. Because you can get corruption pretty quickly if you start making deals. Anyway, I don't know. I certainly hope I haven't left you impression that everybody all of us want to defend in kind of full-throated form, all of the protectionist policies in the United States. I am just trying to explain at least some of the motivations of why you are seeing what you are seeing. I do think national security and fear of China is probably the single most powerful explainer of what we are doing. Plus, these political mental blockages.

Audience (Deepak Maheshwari):

So, you did mention AI quite often. And in 2016 there was a report called 'one internet', where you had served as the member of global commission on internet governance. But that report does not use the word AI at all. Just want to ask you, is it a right time to have a similar type of global commission on Gen AI?

Michael Spence:

Digital is going to be part of the work of this commission. I will probably have a role in that along with James Manyika at Google and a number of our colleagues. The breakthroughs in AI from the kind of machine learning, a neural network point of view, are about 15years old. They started in the early to mid-2000s with language recognition and speech recognition. Elements of it have been there all along. They are in the search engines, they are in Siri, they are in stuff like that. Then you got... but people weren't really paying much attention because they are narrow. You don't really have to understand them because it's just in the machine. Then we got the image recognition. That was a huge breakthrough. And that started to get people's attention because, autonomous vehicles and robots have a little bit of trouble navigating if they don't know what they are looking at. So, this was kind of a big deal. Didn't certainly solve the whole problem as you all know. Cruise is Amazon's automated vehicle thing. They just got their license pulled. I am sorry, its GM. Cruise is GMs. Good point. They got their license to operate on the street of San Francisco pulled. So, they got a fairly long way to go. And that's a pretty structured environment because they have a detailed map of the city that makes google maps look like crayon drawing in order to navigate in that environment. Because, I am going to take an aside... because I find this really interesting. Human beings at the age of 5 have the ability to process an incredibly complex visual environment that's moving and evolving with no latency. Which means no delay. And the reason we have that is so we know that a bear is

running at us and it doesn't take 5 seconds to figure that out. Because then we would be dead. This is just straight evolution. AIs and robots have nowhere near this capability and we don't even know how close we are to this. Which means in unstructured environments which we have no trouble with at all and it's not because we don't know how to hold things or we trip, it's because we know how to process that. They can't. So, robots right now are effective in structured environments. The analog of that in AI is domain specific and the reason there is so much excitement about the last round in Gen AI is that, this is the first time in AI changes domains essentially in a human like way. So, you can be talking about the renaissance, with no prior announcement switch to inflation and it knows what you are talking about. This is what's caused most of the twitter if I can put it that way. It really is enormous breakthrough. You can just talk to them and they are accessible. You can use all previous versions of AI. You need some kind of a technical background... I said this earlier, so I apologize for repeating myself...but chat GPT at 100 million users in 2 months. This has never happened before. So, anyway its powerful. Looks like the AI revolution is really the Gen AI revolution and other parts were coming along but we weren't paying attention.

Audience:

I want to ask the question to do with labor employment policy. In what way should labor and employment policy evolve in order to unlock the productivity gains that you are talking about with Gen AI so that you see the kind of adoption curve outside sort of shadow use. What should labor laws and employment laws look like to make that happen?

Michael Spence:

I think it's more labor laws. But it's a really great question. The most important thing I can say about this is a lot of us think this is an important subject of conversation and we are not sure where we are going to end up at the end of it. But it's really important. So, item one is we got to get rid of the automation bias. We know where it comes from. The Turing trap that Erik Brynjolfsson described is Alan Turing's test of progress in AI, right. Can we produce a machine that when a human speaks to it, interacts with it, the human thinks they are interacting with another human? Fine. Second, how do we benchmark AIs. Answer against humans. That's ok. I mean, got to benchmark it against something. Step three. Once the AI passes the human, why don't we get rid of the human? That's the dangerous step. But it's built into people's mindset you can see it when there is a terror, when somebody starts talking about this. It may be a bias in the way management approaches using it. So, we got to get rid of it. Because it's not the natural use of these things. The natural use is as a powerful digital collaborator assistant. I am sure of this. It will write the first draft of code, would any good software engineer hand that in without checking it, adding to it, doing the hard part? No. A lawyer wrote a brief for the court using chat GPT. And handed it in. All the legal precedents in that brief were made up. These are called hallucinations. They are well known and they do it all the time. Bard, now Gemini, at google was asked, to write an essay on inflation. So, it wrote three pages and at the end of it, because this is sort of technical subject, they were pretty good. It said, for those of you really interested you might want to read the following five papers or books. Then there were things with titles and whatnot references. None of them existed at all. So, that's step one. Step two, that I am worried about and James and others are worried about and should be worried about is there is no guarantee that we won't see a repeat of previous rounds of digital adoption where tech and finance are up here and healthcare sector and government are down here sort of not

paying attention or just floundering around. So, if we want the benefits of this both to people and the economy as a whole, it's got to diffuse across the whole economy. It is a powerful general purpose technology but that doesn't mean that market forces alone will get it there. And there is a distinct lack of policy discussion in at least in America about how to make sure that diffusion occurs and access is guaranteed. Because small medium sized businesses do not have the resources that J P Morgan Chase has to go and have three years of expensive experimentation on how to use this stuff. So, that's a big deal. And I think if we accomplish those things, get it spread out and tell people, try to convince people that this is not about we are coming for your job and we don't really care about you. And then the third one is things that are being talked about right here which is what are the skills the adaptation, training and other mechanisms in the institutions you need to get that done. If we do those things at least we got a running start at making this inclusive. To use the Indian term.

Audience:

Just a couple of comments. The first is that I think given a large number of incredibly intelligent motivated young people in India and I am not talking of well off. Very motivated young people, people who are not well off, being totally conversant of with dealing with an iPad or with a phone. I think the speed at which AI will take place in India is totally underestimated. It will actually happen very fast. I sat on the board of a very large pharmaceutical company called Dr Reddy's. And AI has been used in a big way in its product development. So, I think the speed of AI in India will be quite high, that's my first comment.

Michael Spence:

Agreed.

Audience:

And the second one is if we are going to be in a path of 6% or 6 ½ % of growth, yes, inequality will increase. But politically if the _ 30% real income rising, though rising at a lesser rate than the top 30% real income. But it rises at a substantial level and a desirable level for the bottom 30%. I don't think it means economic mayhem. I will stop with that.

Michael Spence:

I agree with both of those things. You can see this pattern in multiple developing countries. Everybody's going up and the top goes up a bit faster than the bottom and as long as everybody is going up, they are okay with it. What you don't want to do is have the GINI coefficient rise. That's what we said in the growth commission that there are limits. Second, what you really don't want is the GINI coefficient going up in a zero growth environment. We were clear on that. We are just on your side on that one. I agree with you, AI is a powerful force already in biomedical science, pharmaceutical development, vaccines etc.

Audience:

So, the thought on... this is tagging along with what sir said about inequality and also labor part of it, this is more focuses on the MSME sector. That is the Micro, small and medium enterprises. It's almost around 25% of our India's jobs are over there. Or up to 30% of our jobs are over there. So, my question is, what kind of jobs are you expecting when the AI intervention, what kind of jobs are you expecting like this particular segment? What I can see myself because I

come from an entrepreneurial background. I think AI might take away a lot of their jobs. I can clearly see that. What kind of jobs do you...?

Michael Spence:

What I see happening is... it depends on the sector. But other than the kind of stuff we are all going to use, we are all going to have digital assistance that are stunningly powerful in the thing in your pocket. Maybe that's enough. But I think what you are going to see is AI has a very big effect on the efficiency of logistics and supply chains for example. And that won't directly be the business model for a lot of these smaller players. But this is already happening. A fair amount of activity in the entrepreneurial digital ecosystems are basically kind of fixing up this supply chains while not blowing away say the small retailers. At least that is what I am told by the people who are making these investments here. So, it will be a mixed picture. I don't want to leave you with the impression that we are going to have 7 million SMEs with AI adoption programs. But I wouldn't rule them out.

Montek Singh Ahluwalia:

I am going to start moving quickly, we have just three more questions to ask. The lady there.

Audience:

My question is regarding what is Mooglu talking about. Yes, technology is good but the deduction of the technology and the role of the governments to rein in this technology when it comes to concentration. Because you talked about market capitalization. The market capitalizations of the top five technology firms who are now active in AI also. Some of them have market capitalizations higher than the GDPs of some countries. So, does that worry you?

Michael Spence:

You mean in our world or yours.

Audience:

Your world. And does that worry you and US has been slightly slack when it comes to reigning in the concentration. The Biden administration has started doing something and studying. So, do you think India should also be worried or India, it's too sophisticated and too esoteric or too elitist to think about a concentration of economic power amongst these five or six technology companies.

Michael Spence:

To me it's a very important thing. There is Selena Khan is entering the fray. I think exactly rightly. And asking tough questions about whether this is really where we want to be. By the way the concentration is really broad based as this my colleague at NYU, I forgot his name, he has written an influential book. We have been asleep at the wheel on concentration for some time in the American economy. And as regards your economy you have a competition authority. It should not be not paying attention. Period. No question.

Montek Singh Ahluwalia:

Two more. The last two. There is excess demand for questions. Compliment to the speaker.

Audience (Sanjay Kathuria):

As you said the US has been in the forefront leading the charge for the so called new industrial policy, putting in the big billions and trillions. At the same time, we know there is a logic to overall global economic output shifting towards Asia, the so called Asian century. But does this kind of industrial policy which is fiscally based and so, its based on your resources and then you talked about investing in cloud computing and all. Is there a chance that this kind of this new way of doing industrial policy might tilt or if not tilt, at least shift the global output back at least to some degree towards the countries which have this kind of fiscal fire power?

Michael Spence:

So, Danny studied this. And the center of gravity properly calculated, the global economy used to be in turkey and its now east of you. And your growth will bring it back. I think that's the most powerful force you will see over the next two three decades. Because China's growth isn't going to be that high and yours is going to be very high. And you are big enough to change the location. Other than that, I don't think these industrial policies are doing anything other than essentially adapting economy structurally to a very different environment. Some of it economic and technological and some of it created by geopolitical tensions and the rise of the power of China, eventually India and so on. We are just going to have to live with that. And find a way to make that work. But we don't have a clue how to do it now. I live in Europe, so, I am worried that Europe is not going to be able to get on with the investments that we need to adapt structurally. And the reason is we are fiscally decentralized. I have been at this and it may be boring to you but I have been at this in Europe. Mario Draghi wrote about this. He said, look this is not the world that we had when we entered the Euro. This is the world in which we got huge structural changes and deficits and things like digital. We don't have to centralize the place completely fiscally, but we do have to fund the big investments. Let's call it 10% of the total budget centrally because it's cheaper and administer it centrally. And the way I describe this to people because they think it is esoteric. If suppose the United States federal government says none of our business, we will let California, Texas, New York and Massachusetts take care of this, what would happen? We would under invest. By the way California is bigger than every European economy except Germany. We would still under invest and we would invest in our own state. The difference between this and administering centrally is, if you administer it centrally based on merit, then maybe none of it will go to Tennessee. Who cares? In Europe, you can't do that. So, X fraction has to go to Greece, and another fraction has to go to Turkey independent of whether there are any intangible assets in that location. That's where we are. And I honestly in spite of the fact that few people understand it and would like to do something about it, I don't think it's going to change and this means that an economy that's about the size of the United States or north American economy is going to start to seriously and increasingly underperform. And I think that's a bad thing for the global economy.

Audience (Rob):

Mike, I want to ask this kind of big open ended question. When I was young at MIT, I took courses with Thomas Shelling who was one of your mentors. I thought with the bulletin of atomic scientists, how many minutes to midnight that, this was very important and then it seemed to be diminished as a danger to society. The kind of work say Daniel Ellsberg did was about the danger to the upper atmosphere and everything else and destroying life on earth. But now we are seeing a kind of relationship between the military and the economic reemerge. And

I don't sense that we have a coherent measurement or metric about these interactions. You said early in this what inspired me, you said early in this conversation, the military's decided that we got to keep the chips here. In my interaction with high level Chinese government and the American government, everybody likes the platforms, say the google and Amazon and apple, make in China. But they are afraid its also a spy database. Similarly, Huawei in the United States. Its in reverse. How do we measure the interaction between threat to national security and economic well being because it feels like occasionally the military fears override everything? Then people sometimes accuse the military industrial complex of conjuring fear so they can sell more weapons. And then we have all the kind of economic costs of this anxiety. And I haven't seen anybody that can kind of what you might call put it all in one book or on one spreadsheet and create a sense of direction of where we should compromise, where we should fortify. It just seems like it's a bunch of people in their little pocket using game theory and mathematics and so forth. But when you integrate it, it just becomes confusing. I think we have to deal with it. Our young people have to learn how to integrate and measure these things to drive our ship into the next generation.

Michael Spence:

You are right. I don't think anybody has an answer to that. Rob. We put it differently, we are on a journey, like we don't really know what the dangers are in data. We know they are there kind of. We don't know how with in any specificity how great the dangers are and kind of cyber warfare, can they really take down the entire Indian electrical system if they want to, whoever they are. Do you have non-state actors? So that's different from the nuclear era mostly which was handled at the state level by highly responsible people. Tom Shelly once told me that in Vienna in Austria, there was an organization that Howard Rafer created and that's where everybody got together and when there was newcomer to the nuclear club, there was a little meeting and it was basically a school. It was how to handle nuclear weapons responsibly and basically all the nuclear powers now are experts in managing nuclear weapons. Security, etc... now, I think we have to go down the same road with respect to the digital weapons. But it's hard to know where we are going to end up because we haven't done it yet.

Montek Singh Ahluwalia:

Rand Corporation must be doing a study along these lines no?

Michael Spence:

Maybe. But I don't know what it is.

Montek Singh Ahluwalia:

They are the right guys to do this.

Michael Spence:

They were in that era. Rob, I wish I had a better answer to your question. But I think we are going to have to figure it out.

Audience (Rob):

... towards integration in the way you approaching things and I just wanted to raise this challenge because I think its important to measure what is the quality of life.

Michael Spence:

My final comment on this one, most of the AI people I know say, the first thing we need to do is have an agreement not to have fully autonomous weapons. Period. No exceptions. Would be a step in the right direction.

Montek Singh Ahluwalia:

My masters over there say that we run out of time. I suggest you grab Mike at the end of this session. And meanwhile I think Rakesh will wind up the somewhat later than we had thought. He is going to give you his comments and an overview and so on.

Rakesh Mohan:

That was a feast of discussion Montek, Mike. Very seldom do we have such a feast of wisdom. As well as humility I would say actually. I think that's what impressed me a lot in this. Just as Laveesh said in the beginning that you don't need any introduction but he will introduce you, so I am going to say that this doesn't need a closing but I will give closing. I have actually, the latter part of the discussion was much more really mostly to do with AI. So, I will have nothing to say on that. Because I neither have much intelligence nor do I think I am artificial. So, I will go back to some of the in some sense great I would say, broader issues that you all started with. One issue which came up to me when I was teaching for almost 7 years a course in Yale on strategies for economic development and one of the issues that foxed me and continue to fox me is that one could characterize what generally accepted strategies were in the 50s, 60s maybe possibly the 70s, mostly to do with planning, import substitution etc. which we all know about. Then one could characterize overall development strategy to open all that up, be more market oriented, be more export oriented etc. In terms of closing the course let's say the last one or two sessions I couldn't figure out what to say what is development strategy now. That is generally kind of accepted. So, that's the key comment I want to make, that from the time both of you on the growth commission that, its worth thinking about that. If there was another growth commission today and I am obviously not going to ask you to answer it now because session has ended. But we can be able to talk about it over dinner. That, if there was a growth commission today, what would we say now on what are the sort of broad directions of development strategy that we should follow. Or is it that there is a greater variety of developing countries, emerging markets, etc. so you can't do the kind of overall view. But nonetheless I think that this is a very interesting issue. I have suggested to people in Washington I met couple of weeks ago, that look, its probably worth putting together another group perhaps not in the same way. Maybe more discussion even than putting together and putting up a report of the kind that you did. How do we think about what to do next? Especially just having glanced at your book this afternoon, especially with the Permacrisis, so to speak. How do we in emerging market say, economy is less than what \$2000 or \$4000 or something like that. How do we think of the future so that we keep growing? One thing that I was stuck by in your book as well as discussions today, we have always for a long, long time talking about the importance of trade and exports for development. That discussion is really come down. Except for my colleague Amita Batra who is sitting right there. That's why we imported her from Nehru university. I think that's really very interesting. Here, we also have a former deputy director general of WTO. He left a about the right time before the WTO went and started sinking. I don't know if there was a correlation between his leaving... Harshvardhan Singh is leaving and WTO sinking. But really, I think this issue that certainly bothers me. We can understand of course, that you don't

expect the kind of overall trade growth that we have seen in the last 30 or 40 years in terms of increasing share of as a proportion of global GDP. But nonetheless I am a little bothered actually... services of course, are growing. That's quite correct. The second thing I wanted to say is to do with both maybe supply constraints as well as overall demand constraints and that is really to do with Asia. Which Sanjay Kathuria right here mentioned just now that we have say about 4 billion people in China plus India plus ASEAN plus the rest of south Asia. Maybe a little more. So, if it is the case that our average income even though the income varies from say around 2000 or something to 12000 in China, I don't know what the average is. I think its something around 4000 or 4500 or something. If 4 billion people, assuming that population growth rates are going to be relatively low now, if 4 billion people do have GDP growth or GDP per capita growth of something like 4%. Which I think is still reasonable to think about in this whole 4 billion people region. There is certainly not going to be any shortage of demand for anything. Whether its services, whether it's consumer goods, whether it is capital goods, whether its infrastructure, intermediate goods or whatever. So, there is no shortage of demand. Second what you were also referring to was that, with the entry of China in the early 2000s till recently, there was a huge supply, that surge took place which brought prices down etc. You did mention of course, if we go into action, the same thing will happen. But I think that is larger than us in the sense, this area minus China. If we really go into action that's 2.5 billion people. If you go into action there should be no shortage of supply either. Both in terms of actual numbers of amount of labor. Even more so skilled labor actually. The kind of expansion that has taken place in India, of the number of people graduating with BAs in the last 20 years is phenomenal actually. Now, there is an issue of quality. No doubt about that. You first have quantity and then hopefully quality. So, there is something. When Larry Summers talked about secular stagnation, I went to Harvard chatted with him and said, look, what do you mean stagnation. Talking about your side of the world. If you also take the next 20 years, if the numbers suggested actually are correct, then the magnitude of demand growth will be higher than the magnitude of demand growth that took place from US and Europe which propelled Chinese exports. Because they were only growing at 2.5 or 3% or whatever the number it was. Already was relatively saturated with consumer goods. Whereas here, you are starting on that process now. What this will do to the environment I don't know. And whether the environment or the climate change will make this feasible or not. So, to my mind very, very interesting thing that the world is getting into with this change in the center of gravity of the global economy. I have been saying it that its moving from the mid-Atlantic to the Indian ocean. But its perhaps somewhere in between the two. But I think this is really something that most people have grappled with. We at CSEP have. So, now we have an annual conference, only the second one in a couple of weeks from now on Asia actually. We have excluded all economists from west of India. Only people from the east of India. Just to make sure that we try and understand what's happening in Asia. On industrial policy, what I find interesting something that Montek said also earlier, is that, it's very interesting to us that with Laura Tyson, Danny and others, essentially in the business of justifying industrial policy. If you read those words, not very different from what we used to say in the 50s and 60s. That we have to invest in steel, just like you have to invest in chips now. We have to invest in heavy electrical just like we have to invest in semiconductors or electronic stuff now. So, the thing that puzzles us, I should say since Montek said something similar, although I haven't asked him if he agrees with me, that its puzzling to understand the politics of it. Here also there was a politics. Immediate post-colonial view. Both Latin America and here, that you had to do import substitution planning etc. and then no, no.

you are being stupid is what we were told all through when most of us were educated by United States. But now the same people Laura started at Princeton when I was there. Actually, the first job when I was there as a graduate student. So, the same people are saying just turning around. We understand the politics of it but as Montek said very puzzled on why the economists are keeping quiet in general. I am sure there are some exceptions. That's on industrial policy. I don't want to go into detail but that's a general view of not even going to say right or wrong. I am talking about the general view from the economists was so hostile in to quote industrial policy and now the same people are justifying it as long as their countries are doing it. (Background conversation) (laughter) Coming back to trade, just the last point or so that, the issue of labor intensive exports powered the whole of Asia. Whether that bus has left and what I wonder about again is the same thing I started with. If there are 4 billion people for the next 20 years still hungry for all kinds of goods. Why do people say that the bus of labor intensive exports? Yes, it is true that with difference in technology the capital labor ratio in each of those labor intensive industry is of course, going up. No question about that. But this is the kind of thing that you also sort of said that in terms of Indian industrial policy, we need to find ways and means of really emphasizing labor using manufacturing industry. And then go further at all kinds of things. Thank you very much.

Montek Singh Ahluwalia:

Thank you, Rakesh. Thank you all for coming and listening to Mike. I can't help making one comment which I am sure Rakesh will think about. It's a very powerful statement to say, that we are 4 billion people, why the hell can't we grow. But the short answer is if we are 4 billion people, we should have a free trade arrangement amongst us. If we are 4 billion people consisting of a large number of countries, each one of them are following industrial policy in the lead of the United States, I think we will just get general slowdown of the whole system and that's a real issue. Because I think in India the trade implications of industrial policy are not well understood. Anyway, thank you all for staying much beyond the time. Thank you.