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PROCEEDINGS

Shamika Ravi: Good afternoon. Welcome everyone. Welcome to Brookings India. We are very excited for the development seminar today. We have a high-powered panel of economists across the spectrum and we are very excited to have Bertrand Gruss, who's going to present the World Economic Outlook, a publication of the IMF and Bertrand's gonna present Manufacturing Jobs: Implications for Productivity and Inequality. And after he makes his presentation, we will have two distinguished discussants, [Montek Singh Ahluwalia and Ajit Ron Adia]. And then we will request our guest of honour, [Bibi Debroy] to make his comments and then we have some time at the end for some Q&A. So, Bertrand, if I may request, you have half an hour to make your presentation.

Bertrand Gruss: So, thank you very much for the invitation. Thank you for receiving me here at Brookings, it's a pleasure. So, this is one of the chapters of the World Economic Outlook, the World Economic Outlook comes out twice per year. The first chapter is on global prospects and policies of the global economy and then it has a sequence of analytical chapters. This is chapter 3 on manufacturing jobs and in particular, the decline of manufacturing employment and the implications you may have for productivity, income per capita and inequality.

So, let me get started and let me show you a key observation that has attracted attention and that is that manufacturing appears to be fading as a source of jobs. This chart shows the share of manufacturing aggregate employment from a broad set of advanced economies, which is shown in red, and a set of emerging market and developing economies shown in blue. The line denotes the simple average, the shading area, the interquartile range of the manufacturing employment shares and we can see that the share of manufacturing jobs has been steadily declining in advanced economies over the past five decades. In fact, it has declined in every single advanced economy we have in the sample. While in emerging market and developing economies, the share of manufacturing employment has been much more stable, it actually has tended to level off at relatively low levels, that's the most remarkable fact. There are some exceptions and we all know that manufacturing in China is still expanding and it's currently reaching a level of around 20% but most developing countries have seen a flat level of manufacturing.

So, there are two concerns that have been raised regarding this observation. For developing economies, the concern is that employment in the sector seems to be peaking at a much lower level than in economies of developed areas. A phenomenon that Dani Rodrik and others have called ‘premature industrialization’, but actually

in most developing countries, rather than the industrialization, is a lack of industrialisation to start with. This chart shows, for example, on the vertical axis, the maximum manufacturing employment share attained by each country since the 60s or 70s and in the horizontal axis, the level of income per capita at which that maximum is attained. And we can see that developing countries that are shown in blue, tend to be towards the bottom of the chart and towards the left of the chart; so, at lower levels and at lower income per capita.

What is the concern on this? Well, productivity in advanced countries, typically tended to slow when resources started to switch from manufacturing to services – that's something that was first raised by Beaumont several decades ago. We also know that the countries that managed to reduce income gaps with advanced countries quite rapidly, like Korea, went through a process of manufacturing expansion in employment and in exports. We also know that productivity in manufacturing tends to converge to the global frontier, that is, it grows faster where it is relatively low, which means that it provides an escalator for productivity in the sector and for the economy as a whole but there's little proof of what happens in the rest of economy, out of manufacturing and for the economy as a whole, typically, we don't find evidence of unconditional convergence. So, the concern is that skipping

traditional industrialisation phase will imply slower income per capita growth and will affect the possibilities of developing countries to catch up with income levels in advanced countries. Now, of course, out of manufacturing, the set of activities are very diverse and that's something that we're going to look in this chapter in more detail.

There is also concern, as I mentioned, mainly for advancing countries where manufacturing jobs are disappearing all together – so they are declining in absolute terms – that this may contribute to an increase in income inequality. The reason is that the sector typically provided large number of jobs, well-paying jobs for relatively unskilled workers. So, the observation there is that in countries that tended to experience relatively large decline in the manufacturing employment share, aggregate inequality increased. This could reflect, for instance, that mean skilled workers that are displaced from manufacturing end up taking low-skilled jobs, low paid jobs in the service sector, that leads to a hollowing out of income distribution and increase inequality. But you could also reflect that those countries just have been more exposed to other trends that tend to rise inequality on the aggregate.

So, with that background, the chapter does three things; first, is it looks at the stylist fact, it takes stock of what has been

going on manufacturing activity both at the global and country level over the last decades but then it turns to revisit the evidence that is behind those two concerns I mentioned. First, it seeks to answer where skipping our traditional industrialisation phase would affect, they would hurt aggregate productivity growth and income convergence prospects of the developing countries and this is the part that will focus most today because I think it's more relevant for this audience. The last part of the chapter explores whether labour earnings in manufacturing are higher and more evenly distributed than in services and also tries to see to what extent the decline in manufacturing jobs may have contributed to an increase in aggregate labour income inequality in advanced countries.

So, you saw this before, this slide. There we go. A preview of the findings: in terms of stylist facts, we document that the share of manufacturing in employment and output at the global level has not changed much over the last four/five decades, but there's a lot of differences between different groups of economies – advanced, developing and across individual countries. Second, our findings suggest that the levelling off of manufacturing at relatively lower levels does not need to hurt growth and income convergence because several service sectors do show high levels and growth rate of productivity, they also show evidence of

unconditional convergence to the global frontiers of productivity growing faster where it is relatively low. And also, we find that the shift of labour that we have seen over the last 10/15 years that were primarily from agriculture to market service in developing economies, contributed positively to aggregate productivity growth. This does not mean that growth and convergence is guaranteed but it suggests that a lower role of manufacturing does not need to hurt necessarily. The last part, in terms of inequality implications for advanced countries, we find that although labour earnings are a bit higher and a bit better distributed in manufacturing than services, most of the change in aggregate inequality that we saw in advanced countries has been driven for changes in all sectors; so, it's not due to reallocation of labour but more to changes in all individual sectors.

So, let me give you a quick preview of the stylist facts. As I mentioned before, at the global level, the importance of manufacturing has been relatively unchanged. The sector still employs the same share of the glow work for that they did in the 70s, that's shown by the blue line that is relatively horizontal in this chart. In terms of output, the share of manufacturing has also been relatively stable when measured at constant prices, that's the yellow line, and has actually increased a little bit

over the last decade or so. But this stability masks a bit of an important difference across different groups of countries; in developing countries, as I showed in the first slide, the share of manufacturing employment has been declining steadily and the share of manufacturing in output has been relatively stable during this period. And instead, developing economies as a group, experienced a sharp increase both in employment and output shares but that reflects to a large extent the role of some large economies and, notably, China; when you remove China, the evolution is much more stable. There's also a lot of difference across individual economies. In this chart, we are showing the average annual change in the employment and the output share and we see that, for example, in the group of developing economies that you have on the right, there's important difference; there are some countries that have experienced sharp contractions in the employment share of manufacturing, other developing countries that have experienced this whole period an important expansion, (Thailand, Malaysia, China, etc.).

We devote a bit of the chapter to discussing what may be the reasons and provide some evidence but I will actually skip that in the sake of time. The other important transformation over the last decades has been the sharp increase in the share of service employment. Service employment has increased everywhere. In

advanced economies, this reflects that the flipside of the decline in manufacturing employment, that's the top panel you have there, the yellow bars represent the share of service employment. In developing countries, instead, what has been going on is that labour has been shifting from agriculture to service, largely bypassing the manufacturing sector. The other thing that we document is that within services, there has been an important expansion of market services. Non-market services are the government, public administration, defence, but also education and the health sector, all other services are market services. In developed countries, non-market services expanded importantly, they account for one-third of the expansion but in developing countries, more than 80% of the expansion of service employment is on market service industries and this is important because those industries tend to perform better in terms of productivity.

So, what does the decline in manufacturing employment or the fast rise in service employment imply for productivity and per-capita income growth? I mean, the key question is whether there are some non-manufacturing activities and, in particular, some service activities that can perform a similar role to manufacturing in terms of driving productivity growth? We follow contributions in the literature and we focus on labour productivity as the normative benchmark of analysis in this section but we extend the analysis

to an extent possible to look at the total factor of productivity and we do three things in this part of the exercise. The first thing is that we use granular data to compare productivity growth rates across disaggregated manufacturing and services sub sectors to extent possible, to the extent that data allows. We then look at whether the recent shift in employment across sectors have tended to benefit or hurt aggregate productivity growth. And finally, in the last part of this sub section, we examine whether productivity convergence across countries is unique to manufacturing or is something that is also found in some service sectors.

So, let me start by the first part. This chart plots the difference in the growth rate of labour productivity between manufacturing and the service sector as a whole – so, taking all services together. And we know that over a long period of time, this shows data since the 60s, the average labour productivity growth of manufacturing has been larger than in services. But what we see also is that during the recent period after 2000, the difference between the labour productivity growths of the two broad sectors has been shrinking in many economies, in particular, in many developing economies. So, the distance is lower and in fact, since 2000, labour productivity growth in services has been larger than in manufacturing in several developing economies, including China,

India and several economies in Southern Africa. And this is again taking the service sector as a whole, which includes very diverse activities. So, when we zoom in and we try to get more detailed information, we find that productivity growth in some services is comparable to top performing manufacturing industries. In this chart, I'm showing the distribution of average labour productivity growth per decade and per individual manufacturing and service industry, expresses deviations from the growth rate of the country and period and at different levels of this aggregation. I mean, when we want to have a very broad representation of countries, which is the first panel, we only have five service sub-sectors and manufacturing as a whole. When we reduce the number of countries, we can see much more of this aggregated data and if you look at the data in the US, we have up to almost 40 individual service sub-sectors and we see that the key takeaway is that there's a large overlap. The distribution of manufacturing is slightly to the right, but there’s a lot of overlap, there are several service industries that have productivity growth rates comparable to top manufacturing industries.

The other aspect that we look is a difference in productivity levels, which is important because doing structural transformation as labour shift from one sector to the other, the difference in the productivity levels will determine to a large extent, whether

a structural change boost aggregate productivity or not. And we confirm a few a few facts; in this chart, we are showing the cross country distribution of the labour productivity in each sector relative to the aggregate economy and we see that in most countries, agriculture is on the bottom – it has the lowest level of productivity; we see that manufacturing in two-thirds of the of the countries we have, the level of productivity in manufacturing is above the economy-wide average; but we see that there are two at least market service sub-sectors that have relatively high labour productivity. And if we look, for example, where India stands in this comparison, we see that in the service sector, it turns to score relatively high and relatively low in agricultural productivity, that means in agriculture, labour productivity is particularly far from the average and in service, it is relatively above. So, movements of labour from agriculture both to manufacturing or services will tend to boost aggregate productivity growth.

Actually, that is what we assess next. We look at how recent shifts in employment have contributed to aggregate productivity, we follow the work done by Diao, McMillan and Roderick and we decompose aggregate productivity in two components. The first component, which is what we are showing in blue in the right chart, is within sector productivity. So, productivity growth within each

of the sectors in the economy dually weighted. The second term, which we call 'structural change', is the contribution to aggregate productivity from the movement of labour across sectors. And what we see is that in almost all economies, the contribution of structural change has been positive, the exception is in advanced economies, it's negative but it's very small and that, if you look at the left-hand chart, reflects the fact that labour has been moving mostly from manufacturing to services in advanced economies, which is the first blog to your left but among services, labour has tended to shift to non-market services. Instead, in developing countries, labour has shifted mostly to market services and the contribution has been positive, that changes contribution positive to aggregate productivity growth between 2000 and 2010, in some regions, it was particularly large. And if we put India in perspective, we see that it follows that pattern, there has been an important expansion of market services during this period, 2000 to 2010. There has been some expansion of other sectors in India during this period, I believe this is mostly construction and structural change during this period, the contribution was positive in the case of India.

Now, the last part of the of the analysis look at unconditional convergence – convergence across countries. Because even if labour shifts to relatively high and fast-growing productivity sectors

in the economy by national standards, that may not be enough to close the gap with a global frontier. So, we want to see whether productivity tends to be faster in a sector country where the initial level is relatively low because that would give an escalator to growth. That has been proved before for manufacturing but the concern is what happens out of manufacturing in non-manufacturing sectors. So, we test this for each individual sub sectors, we are looking for evidence of unconditional convergence – this is a bit convergence regression. So, to keep it simple, what we are looking is we are running a regression at the sectoral level, we are looking for estimates of beta conversions parameter. We want that parameter to be negative and statistically significant and that would be reflected on the left-hand side on this chart, so the bars to the left and solid are good news in terms of unconditional convergence. And we confirm that manufacturing shows evidence of unconditional convergence in a sample of 19 advanced economies and 20 developing economies with data since the 60s. But we also find that three market service industries also show evidence of unconditional convergence. Interestingly, the sector that does not show evidence of convergence is agriculture and giving that, you know, it still employs half or more of the workforce in many developing economies that helps to reconcile the fact that many times, we don't find evidence of unconditional convergence for the economy as a whole.

We repeat the analysis for data that has more granular information on manufacturing and services and we find that even within manufacturing, it's not the case that all manufacturing industries show evidence of unconditional convergence, about half don't. Like, for example, in rubber, food and other sub-sectors, they don't show evidence of unconditional convergence but several civil service sectors do fine.

Okay. So, this could be relatively good news for developing countries that are bypassing manufacturing but there are few challenges, of course. So, one concern is that although the service sub-sector that tended to perform relatively well during the recent past are not small in terms of employment of the size, in terms of employment share, the ability to expand going forward may be limited by two factors. The first is growth of domestic demand; I mean services are less tradable than goods, manufacturing had this nice attribute that you could export your way to development easily, and services are more complicated. We know that the tradability of services is smaller than goods but during the recent past, there has been important expansion in the degree of tradability of services. In the left chart, you see the change in the set of services in overall exports for a wide set of countries between 1990 and 2014 and we see that for a large number of countries, the share of services in total export has expanded

significantly. The mix of service is also changing and we document that in the chapter, we also document the role that services play within manufacturing because a larger content of manufacturing is now comprised of services. But the other important piece of information is that barriers to international trade and investment in services are much larger than in the goods sectors and moreover, they are very high particularly developing countries. So, there is scope for increased tradability of services with the right policy action.

The second concern for the possibilities of services to absorb workers going forward is skills. There is a perception that, you know, services are much more skill intense, so there may not be sufficient skilled labour in the economy to drive a further expansion down the road, and that is a concern for some of the top performing services but not for all. If we look, for example, at the top tier in terms of… we rank service industries in terms of the growth of productivity in the recent past and we take the top tier, we find that it's not that different from manufacturing in terms of skill intensity. Some are financed business activities but not all, I mean several of the trade services have shown high productivity growth and the skill intensity is not that different from manufacturing. The services that are really skill intense are the ones that, at least in the way we measure productivity in

services, tended to be low productivity growth (health, education and public administration). But I mean, regardless of these findings, of course, skill development will be a top top priority to continue this going forward.

So, in terms of the implications from disappearing manufacturing jobs in advanced countries, what we do in the chapter – and this is not a chapter on inequality, that has to be clear, we just looked at one angle and we wanted to assess these two things; whether, is it really the case that income is higher in and wages are higher in manufacturing and services and are more evenly distributed, so it's a more equal sector than the services and the other is whether part of what we see on the aggregate is explained by [Layro Schiff's] across sectors. So, for that we used micro level data from household surveys from about 20 advanced economies since the 80s and we found that if we look at average wages, they tend to be slightly higher in industry – we had to look at industries rather than manufacturing due to data limitations but two-thirds or more of industry jobs are manufacturing jobs – they tend to be slightly higher for the high skill segments and for the low skill segments in industry than services, not by the very large amount, but they are indeed higher for 20 advanced economies for which we could have data. We also found that labour income in industry is more evenly distributed, so labour inequality is

slightly lower in industry than in services, you can see that in the right-hand side chart by the fact that most countries are below the diagonal line, so they have lower labour inequality in services than in industry but country characteristics matter a lot. I mean, if you look at a country like Denmark and you compare it with the US, you can see that labour inequality both in services and in industry is about one-third of the level of labour inequality in the US.

So, the final exercise that we do – and we do a bunch of different exercise to answer these questions – is we try to assess to what extent aggregate inequality was driven by changes in the sectoral location of employment and in particular, by decline in manufacturing. We start by a simple decomposition analysis that suggest that most of the change in the aggregate inequality was due to changes in inequality within sectors. About only 10-15 percent of the increase in inequality in advanced countries can be explained by the reallocation of jobs across sectors. We did other exercises, we use the mitral data and some assumptions on the jobs that disappear in manufacturing during the last 20 years. We assumed, for instance, that most were mostly workers and tried to assess what would have been the effect on aggregate inequality if all those jobs had moved to the low-skilled segments in services and on top of that, they would have taken relatively low in wages

in that sector and try to assess how much could have contributed of the aggregate inequality and their results on average are in the order of nine/ten percent, in the worst case, around 25 percent. So, the conclusion is that it does not explain a lot of the aggregate and changing inequality.

So, let me wrap up so we'll leave time for discussion. Our findings suggest that the decline in manufacturing job does not need to hurt growth convergence or that it's a main driver of inequality. Of course, our findings do not mean that income growth of convergence is guaranteed, regardless of whether manufacturing is expanding or not and there's a set of policy implications that we highlight in the chapter in this regard. For developing countries, there are two set of priorities; one, is to remove obstacles to the reallocation of resources towards the higher productivity sectors and specific priorities on that regard have to do with removing barriers to entry in services behind the border barriers in service sector but also removing barriers to international trade and investment in services that would allow to boost the trade ability of a sector and then it would allow export of services to play an important role in having a higher labour absorption capacity of the sector going down. The other aspect, as I mentioned before, is skill development. I mean, working and ensuring that the skill of the workforce is aligned with the needs

of the more dynamic sectors. The other pillar of priorities for developing economies is working on reforms that boost productivity growth across the sector rather than focusing on individual sectors. As I showed before, in some regions, within sector productivity growth is very limited, like in South Saharan Africa and Latin America, so there is a need to increase productivity across the board.

There are some priorities there, like promoting competition but there's a need for a comprehensive approach including improving the access to education and the quality of education, improving physical infrastructure in some countries and of course, improving business and investment climate. In advanced economies, even if our findings suggest that most of the change in aggregate inequality is not due to reallocation of employment, the disappearance of manufacturing jobs will affect segments of the population and policies need to tackle that. A first priority is to facilitate, make cheaper and easier the risk killing of displaced workers, facilitate their reallocation across sectors, including by helping on the regional mobility, which in some countries, is a big obstacle because as you know, manufacturing tends to develop in hubs, in regions and then when jobs disappear, there’s a whole region that gets affected. And the cost for some

will be particularly large, so improving safety nets and raise true policies in general will have an important role play.

Let me close here.

Thank you very much.

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