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P R O C E E D I N G S

MS. BRAINARD: Good morning. I'm delighted to welcome you here this morning.

I'm Lael Brainard here at Brookings, and I'm actually just going to hand it to Barry Bosworth to introduce Angus Maddison.

MR. BOSWORTH: Thank you. I really am delighted to have this opportunity to introduce Angus Maddison.

Many of us, I think, over the years have done some work on economic growth and accounting and measures and data. I remember looking at long periods of time, like a quarter of a century even, 25 years.

Angus Maddison is the author of a book that covered two millenniums of global economic growth a few years ago, and that was sponsored by the Development Center of the OECD, and this latest book is a focus and update of a previous study that he did on China, again sponsored by the Development Center of the OECD.

And so, without much more to say, why don't

I let Angus start?

MR. MADDISON: Okay. Well, the talk I'm going to give today is based on a book published by the OECD Development Center last year, and this is a quantitative economic history of China, but it's also an analysis of Chinese modes of governance. I think history is really quite important if you're looking at China because the past has quite a lot of resonance in the present and, in fact, the way the Chinese have regarded their place in the world economy is extremely different from that of the United States. So I think it has some lessons although they may not be all that obvious at first sight.

I call this *Six Transitions in China*, and there of them are in the old regime. One is about the Sung Dynasty which was from 960 to 1280. The other is about a new push for growth which happened in the 18th Century. The third is about the collapse of the Chinese economy under foreign and internal pressure from 1820 to 1950. The next is about the Maoist period. The fifth period is the reform period, and my

sixth transformation is a venture into futurology.
I'm trying to project what might happen up to 2030.

So if we start with the Sung Dynasty, this was a dynasty which changed China in a way that had long-term consequences. The population almost doubled in the period that the dynasty lasted and per capita income grew, I think, by about a third. So you had both extensive and intensive growth. At the beginning of the 8th Century, three quarters of Chinese lived in North China, and they were growing wheat and millet as the major food. By the end of the 13th Century, three quarters of people lived south of the Yangtze and were growing rice.

So the government played a large part in this transformation. It promoted the import of quick ripening rice seeds from Champa in Vietnam. and it had, at that time, printing. They had printed books already in 960. They were able to distribute books on best practices in agriculture which were widely disseminated. There was this major transformation plus the fact that they introduced cotton as a crop in

China, and it took gradual greater importance as a way of getting healthier clothing.

The changes in China were determined by a meritocratic bureaucracy that was there because they had passed their examinations in Chinese classics. They were responsible for keeping together a huge nation-state. They were basically secular. They got rid of the Buddhist properties, and they concentrated on Confucianism. They had no competition from a priesthood, from an aristocracy, from a judiciary, from dissident intellectuals although an urban bourgeoisie, and very rarely was there a challenge from the military.

So this was very, very different from what the situation was in Europe in that time when we had William the Conqueror and we had serfdom and little bits of government. It was a very efficient kind of system of governance, if you compare it with the multilayered ruling groups in Europe and Japan.

The other thing about China which was important and affected the social structure was that

there was, compared with Europe, a land shortage so that you didn't have serfdom or slavery to force people to stay on the land. There was a shortage in land, so you were able to have working proprietors, tenant farmers and wage laborers. So it was very, very different from feudal Europe.

The system was very efficient for agriculture, but the drawback in this type of bureaucracy was that in the cities, and there were some cities of some size in China, they prevented the development of a set of entrepreneurs as businessmen as you had, say, in Europe, in Bruges or Ghent or Venice or Genoa, people whose power was such that they had property rights. That wasn't the case in China where capitalism didn't develop in the cities, and there wasn't any development of merchant trading companies such as the Europeans used in the Asian merchant capitalism to deal with Asia.

Now one thing which happened in the Sung and which happened to some extent in the Yuan Dynasty later and the beginning of the Ming Dynasty, something

which wasn't characteristic of China in the long run, that is they indulged in international trade. This was something which China stopped doing around 1440 and cut itself off from the rest of the world.

Now one thing I thought was useful was to show the type of technology which the Chinese had at that time. This was under the Yung-lo, Emperor of the Ming Dynasty. He had a pal who was a eunuch, Cheng Ho, who was an admiral of the fleet, and his boat was several times larger than Columbus' boat or Magellan's boat at that time. The ships had waterproof bulkheads, and the navigation equipment and knowledge was better than Europe had at that time. So the Chinese could have discovered America if they had chosen to look that way.

But, in fact, what was arranged was really quite amazing. They had these seven voyages of a type which was intended to promote good will with the rest of the world and perhaps to get a few more tributaries to China. Now these were very large in terms of numbers of ships. They moved down the Pacific to

Indonesia. They moved to India. They moved to the Persian Gulf. They even moved to Africa. The idea was not really commercial. It was exchange of gifts. In Africa, they brought back some exotic animals like they hadn't seen in China.

But, in fact, the early Ming had a class, which was competing with the meritocratic rulers of the country, of eunuchs. For some reason, the Ming had a group of eunuchs who were powerful politically, but after the death of Yung-lo and of Cheng Ho the bureaucrats stopped making these voyages. They thought they were a waste of money, and they wanted to concentrate resources on a new capital in Beijing.

So I think this is interesting in terms of the technological situation in China, that in fact it ended up with this not being used for international trade. Shortly after these voyages ceased in 1433, the whole ship-building of these large vessels was closed down and private trade was forbidden.

The second big transition which I think is important in China was what happened from 1700 to 1820

when there was rather extensive growth. You had the population increasing three-fold which was much faster than in Europe at that time. You didn't have any intensive growth. You didn't get any increase in GDP per capita, but the area controlled by the government was about twice as big in 1820 as it had been in 1700. They acquired control over Mongolia, Manchuria, Siberia, Tibet and Turkistan and Xinjiang.

One of the reasons why this was possible in feeding the people was at that time there was an expansion in use of American crops of maize and sweet potatoes, Irish potatoes, peanuts and so forth, things which could be grown in hilly, sandy and mountainous terrain and which made it possible for this growing population to be fed.

However, at the end of the 18th Century, there was a mission sent by the British, by King George the III. He sent a chap called Lord McCartney in 1793 to try and make some sort of deal with the Chinese, and he brought 600 cases which had modern technology of the times that the Qianlong Emperor was

reported as saying he wasn't interested in, these foreign gimmicks, and he rejected the idea of establishing relations, diplomatic relations with the U.K.

So I think this is typical of China at that period, that it was very ethnocentric. It had no real interest in what happened in the rest of the world even though the Jesuits had been in Beijing for 300 years and had been willing to share their knowledge of the West and its technology with the Chinese. But, in fact, the ethnocentric approach was very deeply ingrained in the Chinese ruling group, and they had a great disdain for the rest of the world.

So I think this was a great weakness of the Chinese in the third transition period which I'm describing, which was the period from 1820 to 1950. In this period, you had modern economic growth. Per capita income in the United States increased by nearly eight-fold, in Europe, four-fold, Japan, three-fold. But in China, in this period, per capita income dropped by 10 percent, and its share of the world GDP

fell quite a lot.

You can see at the bottom of the table here that in 1820 the Chinese were producing about a third of world GDP and, by 1952, it had dropped to 5 percent. That was a drop in a share that was growing for the rest of the world but not for China.

Now the reasons for this disastrous performance in China were two-fold. One is there was internal disorder. The Taiping Rebellion lasted from 1850 to 1864. The Taiping were, to some extent, interested in or influenced by Christianity. They weren't really Christians, but they were against the Manchu rulers, the Qing Dynasty, and they wanted in some extent to get rid of it. This cut down the population.

I think in the handout you have, Table 6 shows an indication of what happened to the population in areas which were affected by the Taiping Rebellion. In 1819, the population of those areas was about 154 million and, in 1953, it was only 149. Also, in the provinces affected by latent Muslim rebellions, you

got more or less a stop in the population growth, but elsewhere in China you got population growth.

So these were the internal problems.

This period of transition was also affected by European penetration. Now European penetration of Asia had hitherto (before) the Napoleonic Wars been a beg your neighbor thing. We had British and French and Dutch companies which were rivals of each other. The British got India. The Dutch got Indonesia. Nobody managed to conquer China or penetrate China largely except the Portuguese. At an early stage, they got a port at Macau, but they weren't really very powerful in exploiting China.

The kind of imperialism you got after the Napoleonic Wars was collusive imperialism. It was founded when the British and French made a most favored nation trade treaty. This was, in fact, applied by other powers in their takeover of parts of the Chinese economy.

Now the British started with a war with China to take Hong Kong in 1842 and get permission to

export opium officially to China. From 1858 to 1960, the French and the British had a war against China where they managed to knock down part of the imperial palace outside Beijing. Now these were free trade imperialists. Once they got their trading positions with extraterritorial privileges, they weren't really too much concerned with quarrels with their other imperialist comrades.

There were 92 treaty ports which were created with extraterritorial rights to these foreign imperialists. Although they were called treaty ports, the funny thing is that Jaopin, which is the middle of Manchuria, was a treaty port and Chungking, which is 1,700 kilometers up the Yangtze, was also called a treaty port. This was the terminology which was used but in fact these foreign implantations were in places other than just ports.

The other thing is that most of the cost of invasion or pushing things in China was borne by the Chinese because they were forced to pay indemnities to the foreign powers for the costs they had in

conquering their bits of territory.

Apart from this collusive imperialism, territory was lost to particular foreign powers. The Russians got 82 million hectares in Siberia in the 1850s. They got the Khanates of Tashkent, Bucaris and Kipa, and they got suzerainty over Outer Mongolia. Burma went to the British, Indochina to France. The Japanese got Taiwan, Korea and Manchuria.

Now all of this foreign penetration of China did have some effect in increasing Chinese output, particularly in the nonagricultural sector, but most of the profits were made by foreigners. Ultimately, in 1900, the Chinese Emperor started a war, the Boxer War, against the foreigners as a whole, but this failed and the foreigners won so that the empire actually collapsed in 1911 and was replaced by four decades of civil war. So I think it's useful to keep in mind that China had this awful experience of decline or relative decline at a period when the rest of the world was growing.

Now my fourth transition is the period from

1949 to 1978 when Chairman Mao took over, driving out the Kuomintang regime which took refuge in Taiwan and extending government control over economic activity to the lowest levels of economic activity. The whole of agriculture was collectivized and peasant ownership was taken away. Although there were some very negative aspects of the Maoist regime, the population doubled between 1950 and 1978, and there was also an increase in per capita income which was a little less than the world average but was certainly much better than China had before. By 1978, industrial output was bigger than agriculture output.

But Mao's activities were such that the nations which had supported China economically after the Second World War, they cut off relations in 1960 because the Chinese were beginning to develop atomic weapons. The U.S.A. had a trade embargo, a complete trade embargo from 1952 to 1971. So this was also a period of great separation from the world economy.

There were risky experiments like the Great Leap Forward in 1958 to 1960 and the cultural

revolution. These were self-inflicted wounds. Given the amount of investment that was going on, the economic results were pretty poor.

Now my fifth transition is what happened in the reform period from 1978 until the present. This was a shift to pragmatic reformist led by Deng Xiaoping, and it undid a lot of the controls which were imposed by Chairman Mao. In this period, Chinese GDP was supposed to be 9.6 if you take the official Chinese measure. I think that they are exaggerated, and my reestimate is that they were growing at about 7.9 percent. I'll say later why I come to that figure.

If you take my amended estimates, the growth of China in this period was similar to that of Japan in the period from 1952 to 1978. Japan then slowed down sharply.

Now the rate of capital inflation was not increased very greatly over the Maoist period, but there was much greater efficiency in production as you can see from this Table 8. Total productivity in

China from 1978 to 2003 was 2.95 percent a year whereas it was negative in the Maoist period. So this was a successful reallocation of resources with a gradual reduction in the role of the government in the economy.

The other thing which was very striking was that China reversed completely the attitudes it had to the outside world and built up its exports which grew 18 percent a year from 1978 to 2006. They also managed to attract large-scale foreign investment. Part of it was helped by the fact that there was a Chinese diaspora who were willing to bring in capital from abroad, but a lot of it was other kinds of foreign investment.

It was also a period of political success in recuperating Hong Kong and Macau peacefully and hoping for better relations with Taiwan which now seems to have come to pass. China wasn't particularly aggressive in getting these old territories. I mean they could have taken Hong Kong back from the British in 1945 quite easily, but they were judicious in this

because Hong Kong was very useful for them as an intermediary.

I think it's useful to compare what happened with this transition in China with that which happened in Russia because they both gave up being basically Communist-controlled economies.

The first thing that was different from Russia is that priority was given to agriculture, and there was scope for encouraging agriculture in China which no longer existed in Russia because Stalin had done too much damage to expectations. So, in the early stages up to about 1990, there was a very big increase in productivity in Chinese agriculture.

The second thing that differentiated it from the Russian transition is that the state did not disintegrate. The ethnic minorities were about half of the Soviet population whereas in China they are only about 10 percent.

Then, of course, there was the role of the overseas Chinese. The Russians didn't have that sort of outside support.

The fourth point is that the Chinese were starting from a very low level in 1978. The per capita income was about 15 percent of Russian's, and now it's about 80 percent. So they had what are called advantages of backwardness. They were imitating rather than innovating to a large extent in their growth.

The fifth point which was important was family planning, the legal limitation of families to have only one child in urban areas. Now this is meant that between 1978 and the present, the percentage population of working age has risen a great deal. It's now about 70 percent, and this is very favorable to production. Of course, it's going to have its counterpart later on with a larger population of old people.

The other thing about China which was important is that in the reform period, they were sensitive to the dangers of hyperinflation. They had that under the Kuomintang before the war, so they were very careful not to have the thing which happened in

Russia where people's savings were wiped out by hyperinflation.

The other thing was that, in China, state enterprises were reduced by attrition and not by giving them away to oligarchs that knocked down prices which you had in Russia.

The last thing is it was an impressive integration of China in the world economy across a wide range of manufactures which simply didn't happen in Russia where people depended on oil and natural gas.

The sixth transformation I had in mind was the future. I've made some projections in this book of the likely growth of per capita income in China from my benchmark which is 2003 up to 2030. I'm assuming that per capita income will grow by 4.5 percent a year on average for that period although I've got it dropping gradually throughout the period, but that's the average. That compares with 6.6 percent in 1978 to 2003.

Now Goldman Sachs did some projections three

or four years ago, and they projected 5 percent increase in per capita income over this period, again, with some scaling down over the years. Perkins and Royalsky have made a projection of 5.5 percent. Both of these are somewhat higher than mine but not wildly different.

Fogel, who got the Nobel prize for economic history, ventured some forecast in the Journal of the American Academy of Arts and Sciences where he projected a growth rate of 8.2 percent per capita which he took to be what had happened in the past and I think exaggeratedly. Now I think that's quite a silly projection.

The other point is, as I mentioned before, the population is aging in China, and also when people get prosperous they may cut their working hours. So I think the labor input role will be fairly marginal in their increase in this period.

Basically, what I'm projecting is that by 2030, in times of my numeraire which is 1990 Scot dollars, I expect China to have nearly \$16,000 per

capita income compared with nearly \$46,000 in the United States. China will have surpassed the United States in total GDP, I think, around 2015 but by 2030 it will still only have a per capita income of a third of that in the United States.

Well, these are the projections I made and, of course, all projections of this kind are quite different from history. You can turn out to be wildly wrong in a way that you can't if you're looking at the past.

Now I had marked three kinds of problems which I foresaw in China. One is the extreme inequality you now have in China because a lot of the growth is taking place in urban areas and has favored a sort of new middle class. If you look at the gap between regions, you find that Shanghai has 10 times the nominal per capita income than Gui Zhou which is the province with the lowest income. Now, of course, prices perhaps are lower in Gui Zhou than they are in Hong Kong, but still it's a very large inter-regional gap. It's about the same as you had in Brazil not so

long ago, but it's much bigger than you get in any capitalist economy otherwise.

Part of this is a rural-urban thing even within the same provinces, and that's quite substantial. The other thing which is, I think, particularly touchy is that in urban areas, in order to be legally employed, you have to have the kind of papers which say that you're an urban resident. Because 17 percent of the people in these urban areas don't have these papers, they're easily exploitable. It's easy for employers to hire them and then not pay them or hire them at very low wages. So, within the urban areas, you have a sort of heavily exploited labor group.

The second thing which is related to this is private property rights need to be strengthened. In fact, you have a situation where the conditions for the average citizen are rather like they were in England around 1840. The people don't really have much in the way of rights. But foreign investors, in fact, are better protected than the ordinary citizen

in China, and they find it easier and so do Chinese capitalists to expropriate land of peasants with poor compensation or to demolish their homes without adequate compensation.

A lot of this goes on because the party elite, although they didn't create the oligarchs as was done in Russia, profit from a scale of corruption on a low level. So there's a sort of crony capitalism. You pay off somebody who's a party official, and he gives you a permit to do something, and it happens much more quickly.

Now I think equity and efficiency would both benefit if property rights were strengthened and the judiciary were less subject to official pressure. I think this is quite a serious possibility as incomes rise.

The third point I made in terms of a major problem was energy as an environmental problem because 60 percent of Chinese energy is derived from coal. In the United States, it's about 23 percent; in Russia, it's 17 percent; and in France, it's 5 percent.

The coal in China is dug from 20,000 mines, and mining in China kills off thousands of people every year. Of course, the coal-burning does a lot of damage to the environment as well, but it's going to be difficult for China to change this dependency on coal unless they can somehow get much more oil and natural gas from Central Asia.

Energy consumption in China is second after that of the United States. Many of the people who talk about the Kyoto Protocol complain because China doesn't have any obligations but in fact, although it's second after the U.S. in per capita energy consumption, it's only 13 percent of that in the United States. The energy efficiency per \$1,000 of GDP rose 3-fold between 1973 and 2003.

So I don't think the Chinese are particularly delinquent in what they're doing on energy, but their carbon emissions, because of the dependency on coal, per capita are 29 percent of those in the United States, but their total emissions are bigger than in the United States even though their

energy use is smaller.

Table 13 here has the figures for China, the United States and for the world as a whole. I got these from the International Energy Agency in Paris.

I want to finish by talking about a couple of measurement problems because, as I said, I've modified the growth rate of Chinese GDP in two major dimensions. One of them is from my colleague, Harry Wu who is a professor at Hong Kong Polytechnic University and was in the gulag for about six years as an adolescent and lived in Australia, and we worked closely together.

The measurement of industrial output in the official accounts is done by people at lower levels of activity reporting the value of output which is then deflated by a price index. Harry's approach was different. He took 117 items and made a quantity index, a volume index for industry.

Now, in fact, the rate of growth of industry is still quite high after his adjustment. I mean for 1950 to 1972, he gets 10 percent a year growth instead

of the official 11.5 percent. For 1978 to 2003, he gets 9.8 percent against the official 11.5.

The other big adjustment was one which I made for non-material output. Now these are services; health, education, military, police, civil service, which, under the old Marxist system, weren't treated as output at all. They are now, but they aren't shown very explicitly in the accounts. The official growth rate imputes very large productivity growth in these sectors at 5.1 percent a year from 1978 to 2003.

Now the official United Nations guidelines to people making national accounts are such as to suggest you shouldn't assume productivity growth. I, in fact, used employment as a measure of output. So I got quite a bit difference between my estimate for this sector and the official ones.

As I say, the official estimates of GDP growth for 1978 to 2003 are 9.6 percent a year. This is knocked down by 0.79 percent for the industrial difference and by another 0.82 percent a year for my measurement for the service sector. Then there's a

very marginal difference because of changes in the sector weights.

I think my estimates are quite robust but, of course, the World Bank and the Monetary Fund, I think, still use the official figures when they talk about Chinese growth. I think they haven't made any serious attempt to make adjustments.

The other thing which is important if you're measuring things to compare countries is to get the purchasing power parity. If you compare China's output at the official exchange rate, you get a much lower performance than if you take the purchasing power parity because the Chinese currency is greatly undervalued. So the difference between the PPC and the exchange is rather big.

Until recently, there was no official measure of purchasing power parity in China. They didn't participate in the international effort in this respect. I used estimates of a chap called Ren Rouen in a book he published in 1997. What I use as my numeraire for measuring across the world economy is

1990 prices in Geary-Khamis method of estimation.

Now Ren Rouen worked with Stanley Fischer in the World Bank, and he worked for MIT at a time. He spent five years on his estimates, and then I got him to come to OECD for six months, and he wrote a book. It was 1997 that I used his results there.

Rouen made estimates for 1986 which I updated to 1990 as my benchmark. He made a binary comparison with the United States, and I had to make a proxy estimation of the difference between his geometric average and a Geary-Khamis measure.

This gave me a suitable numeraire for incorporating China in my world economy estimates. What I got for 2003 is that the Chinese GDP was about \$6.2 billion, U.S. dollars and Geary-Khamis dollars, whereas the U.S. was 8.4. So it was fairly close, and I expect China to catch up by 2015.

In terms of per capita income in 2003, China was at \$4,800 and the U.S. was at \$29,000. So the gap is much bigger in per capita terms.

Now, recently, the World Bank has made

multilateral estimates of PPP. They've had a huge new exercise and spent \$26 million comparing levels of output and PPP for the year 2005. So I pushed my estimate which ended in 2003. I made a provisional adjustment up to 2005.

You probably can't read this, but it's the last table on the handout. You can see that for the western offshoots there isn't much difference at all in the results that I get on the left-hand side in proportions to the U.S., and isn't all that different for OECD countries in Europe. But, if you look at Asia, you can see that the World Bank has got per capita income in 2005 less than 10 percent of the United States whereas I get about 19 percent. This low estimation for Asia applies to India, Pakistan, Indonesia and Thailand as well.

Now I think there's a downward bias in the Banks for these countries, and I think one should be skeptical about them. What they did is they got five regional types of study for different parts of the world, and they linked them together using the EKS

method of aggregation. This is one which is used in the European community. There, they treat Luxembourg with the same wage as in the United States.

Actually, Irving Kravis, Alan Heston and Robert Summers, in the masterpiece study of 1982 which was a pioneer of this kind of work, they found that the Geary-Khamis result for the lowest income group was 16 percent higher than the EKS measure. So I think that's one technical reason why the World Bank is underestimating China.

The other thing is that the other countries produced estimates of price level for the whole country, but China did it for 11 cities, and there was a disproportionate selection of items at the higher end of the product range, more expensive outlets in the cities selected. So I think there was a bias.

Here, I've relied partly on my friend, Michael Ward. He used to be the World Bank's expert on such things. He thinks that it was a bias in China because they were trying to sort of get results where they had pricing similar goods in China to what was

really more characteristic of American consumption than Chinese production, such as Vuitton handbags.

The thing is that the World Bank has published these new estimates without any comment on their plausibility or even their relationship with estimates which the Bank previously published. Now there was a thing called World Bank Development Indicators which contained estimates from China, which were derived from Ren Rouen's work. I mean they had the same type of sources I had and similar results. The Penn World Table also used the same sources I do.

Instead of trying to reconcile or look at problems of comparability between the two sets of estimates the World Bank said that the other ones were based on very old and very limited data. Well, considering that my time horizon is 2000 years, of course, my conception of what's very old is very different from the World Bank's. I mean I prefer to use my 1990 estimates which are based on PPP results from several different exercises since the 1950s than the weird results for China, India and other countries

in Asia that the World Bank has.

Now when Kravis, Heston and Summers produced their 1982 book and, indeed, their earlier books, they had a very sophisticated analysis explaining the sensitivity of their PPP results to different measurement techniques. This is completely lacking in the recent World Bank study.

Finally, if you look at the intertemporal implications of what the World Bank has done, they're quite implausible. If you take their estimate of the GDP level in China up ahead in 2005 of \$4,000 and you project it backward with my estimate of growth, you get a level of \$326 in 1950 which is below subsistence. If you believe the official Chinese estimates, you get a 21-fold increase over the 55 years, and then the 1950 level would be \$1.196 per capita. So they're just not plausible if you try to apply them, if you merge the level and the growth aspect to get intertemporal comparisons.

Anyway, I've finished now.

MR. BOSWORTH: Well, with that, I think we

should open it up to some discussion and comments from other people. Does somebody want to start?

Yes.

QUESTIONER: Angus, what is your view on the fact that industries are now moving towards higher value products and the labor they require is more high quality than large quantities?

What impact is this likely to have in the next 10 to 20 years on migration from the poorest areas to the industrial centers and is the rate of absorption going to be able to cope with draining this reserve army of labor and raising their standards of living?

MR. MADDISON: For 2003, I looked at the Chinese figures, and the proportion of the working population in urban areas was 45 percent of the total. I projected roughly that this would rise to 55 percent in 2030.

One of the problems is that the productivity is rising in China so that you may get some deficiency in demand for the labor that's available. On the

other hand, it seems to me that now a lot of Chinese workers work very long hours, and a lot of them are very poorly paid or they're cheated to some extent in their earnings, particularly these people in urban areas.

I would have thought that there will be pressure increasingly in China even though the political regime is different from that in Europe. As people get higher incomes, they'd like to have some tradeoff for the time they spend working. So I think that may offset the problem you have in mind.

So I wouldn't like to come to any clear-cut conclusions on that, but it didn't seem to me like a very important problem.

MR. BOSWORTH: Nick Lardy?

QUESTIONER: My question is on your adjustment to the official growth rate for the years since 1978. As I recall, you had a multiple part exchange with Karsten Holtz in which he took the view that your downward adjustment of 1.7, or whatever it is, percentage points was not warranted. As I recall

the exchange, it was a bit of a standoff. I don't think you changed your mind, and I don't think he's changed his position. At least that's my memory of it. It was a couple years ago.

My question is not who's right or who's wrong, but what kind of evidence do you think would resolve the difference, additional evidence would lead one of you to change your mind?

MR. MADDISON: Well, I've never met Karsten Holtz and he is from Germany. I assume that he's from East Germany because he argues like an old-fashioned Communist. The government cannot be wrong. I mean it's just his position that you can't be wrong.

Now I've been doing this sort of estimation of economic performance for about 50 years, and I find even in the United States, for instance in the interwar period, I think the official estimates exaggerate growth because they used hedonic indexes there which other countries don't use.

So I don't think Karsten Holtz has any standing in this field. I mean he's never done any

work trying to do the measure. He's simply saying that there's not much point in doing what I do and that the officialdom must be right. That's my reading of what he's saying.

QUESTIONER: I'm Albert Keidle at the Carnegie Endowment. Nice to see you again.

As you know, I have been engaged with these measures of Chinese growth for almost 30 years. I think we need to pay a little more attention to the underpinnings, for example, of the more recent PPP exercise. I'm very familiar with the Rouen data that you've used. They were the basis of the World Bank numbers, and I criticized them in a consultant report for the World Bank in the mid-nineties as exaggerating China's PPP value.

I think we really need to give some credibility to the professionalism of this survey in China. I mean I think you've mentioned that it was carried in several cities, but one of those cities, for example, was what they call Chungching. It's tens of millions of people in a heavily rural part of China

that has a city in the middle of it called Chungching, but from the people that did those surveys, they got a lot of rural data.

The Rouen data were based on memories of graduate students of the prices they had paid. It was pioneering because of its methodology at the time. As you mentioned, he worked with Stan Fischer. But I think the statistical underpinnings really required an adjustment, and we've now seen that with this new survey exercise which is done, as I said, with the inherited methodology of Kravis and Summers and Heston.

I'm interested in just touching on your comments about how, for example, the intertemporal adjustment going backwards renders these new numbers questionable. I would like to know what kinds of work have you done on the index number problems going back in time. When relative prices, particularly of manufactured goods, are changed radically so that if you take a number for the current time period and go backwards, you need to be extremely careful what

you're doing with price changes within your aggregate because it can really make, as you say, the numbers look ridiculously small when you go back.

I also wonder how you interpret the meaning of purchasing power parity which really, when done in a current time period, is based on products that are for sale that may have the same nutritional value, for example, as a much cheaper, much less well-processed product 40 or 50 years ago and, therefore, not comparable.

Yet, if you take that straight back with the growth rate -- which, as I've mentioned also, I'd be interested to know how you checked those -- you can come up with what look like implausible conclusions, but you're really taking back a PPP that is based on current product descriptions and their processing.

Finally, I wonder if you could just brush over again your thinking on the growth rates going forward. By my casual look here, they look to be less than 4 percent or roughly 4 percent growth when you get less than doubling going ahead when the other East

Asian economies that introduced similar financial systems to China in the last 40 to 50 years, or Japan even earlier, when moving from \$2,000 per capital to \$10,000 per capita, all brushed close to 10 percent and then started to come down to 9 and 8. So to have China suddenly drop down must have some foundation in your understanding of the Chinese economy, and I'm just curious if you could respond to those questions.

MR. MADDISON: I think you're wrong in what you said about Rouen using the memory of people from the past. I mean he spent a lot of time looking at prices in China. The guy spent five years on this, and he spent six months in OECD working on the book, and I was there talking to him all the time. I know what he did.

QUESTIONER: I have met him. I was a consultant for the World Bank at the time, and I was hired because I had already 10 years working experience on the Chinese statistical system. I actually was a consultant on the World Bank's mission in 1990 to review their statistical system and, again

when we reviewed it again in 1999, they took me along, and I have a consistent picture of the Chinese statistical system.

I met with Rouen. I also studied his materials extremely carefully. You can find my report which didn't get past what they call gray cover in the Bank because it had other items in it that apparently didn't conform, but I had a very clear idea how he did it.

He did have price lists, but the comparison of quality was really all that he was able to do was to make assumptions, for example, that physicians should be valued at the same value even though they were combined with much less capital. I think this is a difficulty when you, also as you have done, project services just based on labor force because the quality of the product is labor combined with modern equipment in so many cases. Health is the greatest example.

But, he had some serious issues that they made some minor corrections for, but I think that they were not based on surveys. Yes, he spent five years,

but his initial data collection was quite early, and that paper was done quite early.

So I just invite a more serious review of those methodologies when they're used as a way to criticize what was -- in the tradition of Kravis, Summers and Heston -- a survey that had very careful quality comparisons and, as I understand it from those that did it, a broad effort to find out what kinds of things rural people bought.

MR. MADDISON: Well, you see, there was a study in 1981 by Irving Kravis in China which was based on much weaker material because there weren't any proper national accounts in China at that time, and he did it with the help of some other people who were very respectable in their economies at the time. His results in China were too high. I mean he placed China at 13 percent of American per capita income in 1981.

Now Ren Rouen used the same methods as Kravis did, and I'm not willing to accept your suggestion that what Rouen did was very crummy.

QUESTIONER: I'm not saying it's crummy.
Please, don't characterize my comments. That's really
not what I said.

MR. MADDISON: Excuse me. I think at the
time that he did it, he had much better information
than Kravis had in 1981.

QUESTIONER: That's true.

MR. MADDISON: But what I'm saying is that
the quality of the data which the World Bank has
accepted for China is dubious. I say that because my
pal, Michael Ward, who used to be the World Bank man
dealing with this sort of thing and is now retired, he
had a look at it, and he suggested to me that the
Chinese made exactly this type of error. They weren't
pricing goods which were characteristic of China but
characteristic much more of the United States. So
they exaggerated the price level in China.

Now the other point is that these things are
open to argument. I mean you have an opinion; I have
an opinion. This is a very recent study. It only
came out in December of last year. I haven't seen the

actual data the Chinese had, as Michael Ward has.

What I'm saying is that the World Bank made no effort to describe the sources carefully or to explain their comparability with work done earlier. They just dismissed all the earlier work as being too out of date to be worth mentioning. So if you compare their results of their report and comparing it with Kravis, Heston and Summers in 1982, there's no comparability at all because that had 300 or 400 pages concerning the reliability and the nature of the evidence, which the World bank hasn't done.

QUESTIONER: I'm just saying we need to take these new estimates quite seriously and, as you suggest, find out more about them. I was at a week-long conference with both Michael Ward and Rouen last September in Beijing, hosted by the Statistical Bureau and the Journal of Income and Wealth, and we had long discussions about these issues.

Rouen made a public statement that my data are no longer the standard; we need to move on. It's very clear that he's persuaded that these are better.

Michael Ward and I, with whom I went to China on that 1990 mission and have known for a long time, discussed these in some detail. There is the issue about, well, why didn't they have a nationwide one and that there may be -- and I agree -- some question of adjustment, but the overarching conclusion is that this is a far superior collection of statistics with much more careful attention to the quality differences or quality similarities. So it deserves very serious consideration rather than just staying with the Rouen numbers which I think Rouen himself says are now really out of date.

MR. MADDISON: Well, I know Rouen pretty well, and he's given no explanation whatsoever why he thinks his old figures are no good. I think he's been bought in some way or other by the World Bank. I mean you can't rule that out, you see.

QUESTIONER: I rule that out. I'm sorry. He's a fine academician. I don't think that's a factor.

MR. MADDISON: Well, I didn't mean it in a

purely commercial sense. He may be fading or something. If you do a series of reports. The World Bank publishes stuff. He wrote an article in the Review of Income and Wealth. He did this book for OECD. They were all based on careful reasoning. For him to get up in Beijing and say in a meeting that he has changed his mind without saying why is very odd indeed.

MR. BOSWORTH: Let's try Alan Heston.

QUESTIONER: Well, I think that one should certainly give credence to the effort the Chinese put in collecting prices the way Burt has suggested. They did go to 1,700 outlets which is an amazing survey. However, I think that there is a major problem. The Bureau of Statistics does say that they chose the cities and the locations because they would have the kind of outlets and goods that would carry the kind of specifications that were there. So it's a very special survey of an urban area, and the Chinese were did a very extraordinary job in that.

I think Burt is misrepresenting the extent

of rural coverage in the sense that --

MR. MADDISON: I'm sorry. Could you just repeat what you think?

QUESTIONER: I think that Burt Cadelle is misrepresenting the extent of rural coverage in this survey in the sense that about 20 percent of those 1,700 were in rural areas and they were generally characterized as urban, not really rural outlets.

My own recommendation to the Asian Development Bank was that they give these estimates as they were and not do what they did which was to move them to an all-China basis. Well, my influence was not very strong.

So I come out agreeing with Burt that this was an extraordinary survey on the part of China for this kind of effort but a very narrow survey. What we really need to do, and I think what Michael Ward is saying too, is to understand how you move this from these 11 cities to all of China. The Poverty Group, for example, within the Bank is not accepting the Bank method for their own purposes. They are substantially

cutting the price levels -- at least that's their preliminary plan -- to make an allowance for the rural areas.

MR. BOSWORTH: Other comments?

QUESTIONER: Ernie (inaudible).

Can I go on beyond PPP? Is that permitted?

I think this is a very useful discussion.

It's good that now we're seriously discussing the best estimates of PPP as a relevant measure rather than having it dismissed as many experts seem to have done before December, but my question is more on stage six, the projection to 2030

I think a significant component is, I would say, the almost inevitable need for a pretty fundamental restructuring over the next several years of the Chinese economy away from this excessively export-oriented growth related to the exchange rate because last year, in a situation of a current account surplus of over 11 percent (pretty much unprecedented for a major industrial country) and this extremely high percentage of investment share of GDP, 45 percent

are official figures in part related to the capital-intensive export or manufacturing for export growth and related infrastructure and also SOEs are getting very large investments and consequently, a very low level of personal consumption, again almost without precedent for a major country, official figures have it below 40 percent, 37 or something.

My question is when the adjustment has to finally take place, the current account surplus begins to come down and almost certainly the investment share, the excess of 45, begins to come down. Both of those means minus signs for overall growth to be offset almost all by personal consumption at such a low base and not to mention the obstacles for growth related to domestic consumption -- be it, as you say, property rights, the legal system, the banking system is not very functional, et cetera.

So my question is: Is there some way to build into your projection what I would see as a very difficult restructuring with a number of obstacles and might that have a significant impact in terms of a

longer-term projection of where China is going?

MR. MADDISON: Well, it might. I didn't think it would be a major problem.

QUESTIONER: It would or would not? I'm sorry.

MR. MADDISON: Sorry?

QUESTIONER: It would or would not?

MR. MADDISON: Would not. I mean the Chinese Government has all sorts of apparatus for changing policy, and I think they are reasonably sophisticated. It is very odd for a country to go on accumulating foreign reserves to that extent when they don't really need them. So I don't know quite what's at the back of their minds, but I think they're afraid of changing and the whole thing will come toppling down.

I mean, after all, what happened in Japan was a very sudden drop to more or less zero growth after their momentum ran out. I think if you've had a high momentum and something stops it, it may have dangerous recuperations, but I'm not quite sure that

that's covered by the points you make.

QUESTIONER: Thank you, Professor Maddison.

I'm Nassar Kiljey from the Department of Energy, the Energy Information Administration. Basically, what we do is we do forecasting and projections of energy futures. Your work is always helpful when we move to purchasing power parity when we look at world growth rates.

My question is in the projections that you do for China here, per capita, did you take into account the recent runup in energy prices and what is your view about the long-term outlook for energy prices and how they may impact China's growth, given that it imports a lot of oil?

Thank you.

MR. MADDISON: Well, the answer to your first question is no because I wrote this about eight months ago. But, in fact, what the Chinese do is subsidize energy, and they were doing that before, and they're probably doing it on higher scale. I think that's a mistake.

I think the rise in energy prices is good in the long run by inducing people to economize the use of energy or look to other ways of producing it.

I do think the Chinese are in a very difficult situation, having so much coal and so few other possibilities except for importing. Obviously, there is a kind of political thing in the sense that Saudi Arabia and the Middle East are more or less pro-American sources. So they're going for Angola and for Sudan and even Chávez in Venezuela, but these are fairly marginal sources of supply. I think their range of possibilities is a bit narrow.

I think even in the United States, there will be more use of coal as a result of this.

Does that answer your question?

QUESTIONER: Most of it, but the main thing is in your projection, you talk about 4.5 percent per capita GDP growth over 2003 to 2030. In your mind, when you were thinking about that projection, you must have had some outlook on energy prices and input prices to get that kind of figure. But, given that we

are in a new environment where we are projecting oil prices to be nearing \$200 or \$250 by 2030, will China be able to achieve that kind of 4.5 percent growth that you had in your projection?

MR. MADDISON: Well, 4.5 percent is the average. I was projecting 5 percent for up to 2010, and it gradually going down to 3.6 from 2020 to 2030. So, no. I mean I wasn't as energy-centric as you are in making the projections.

If you're relying very substantially on coal, I mean prices are a bit arbitrary in China because the supply situation hasn't changed all that much. I think it's not all that difficult to expand Chinese output. It's just going to be very dirty energy. So, in a sense, they have got their energy supply in their own pockets, a large part of it.

How do you see it affecting Chinese growth, this rise in international prices? They're obviously willing to pay quite heavily to Sudan or Angola.

QUESTIONER: That's true. You mentioned very correctly the subsidies that are being given by

the Chinese to the producers. So they are cushioning them from that, and they have a lot of reserves to do that for the time being.

Although you may think I'm energy-centric, we all believe oil is the life blood of transportation.

MR. MADDISON: I didn't mean it as an insult.

QUESTIONER: Like the U.S.A, for example, it only imports half of it. In our estimations that we have done, we find that every recession in the U.S.A. since 1971, except for maybe the last one, the 2001 recession, was actually preceded by high oil prices. So that's a lot of empirical work out there. That's what the experience shows for the U.S.A.

But, for China, that's the reason I'm here, to gather information on what China would be doing over the next 22 years as these oil prices go through.

MR. MADDISON: Well, I didn't mention it in my presentation, but I did have some estimates of the stock of automobiles in China in 2030. In 2003, they

had 19 million vehicles in circulation, and I was projecting 300 million for 2030 which is about twice the present stock in the United States. That would provide a car for every five persons. As the per capita income level in 2030 would be fairly similar to the West European one in 2000, it seemed to me a reasonable ratio.

If you go to Peking, they've broadened the arteries, but it still has pretty crowded streets and it's pretty polluted, but I'm presuming that the automobile thing will be spread out through China.

Now, of course, they are in a situation where they can control it. They can raise the prices for cars and taxes. I think I'm telling you this because the problem may be even bigger if you know what I'm projecting for cars.

MR. BOSWORTH: San Jin-Weh.

QUESTIONER: Thank you.

My question is also on energy use and carbon emissions but now from a different angle. Given the current discussion on international policy response to

climate change, the U.S. position is it won't make sense to cap U.S. emissions if China, India and other large countries are not brought in and cap their emissions. The counterargument made by those countries is that developed countries today, in the past, have contributed so much to the entire stock of emissions.

I wonder, using your talents and your knowledge about our primary sources of data, are there data that can give us a good estimate about contribution by the U.S. and by Western European countries to the current stock of carbon emissions when compared to China's current level of per capita GDP to whatever the U.S. and European current levels of per capita GDP may be, so that we can either give Chinese and Indians the credit for them to grow to that level or probably, more sensibly, advise them not to emit as much as Europeans and Americans used to.

Are there data out there that would allow? How would one go about to estimate contributions by European countries and the U.S. to the current stock

of carbon emissions?

MR. MADDISON: I think it's not difficult to measure what is actually happening. The Energy Agency attached -- it's not part of OECD, but it works more or less there -- was my source of the information. If you look at the table I've got for China, you say that per capita use of energy is much, much smaller in China.

QUESTIONER: (Inaudible.)

MR. MADDISON: So I disagree completely with the official U.S. view. I think they should have a carbon tax and start reducing their energy per capita use because it's very extravagant by any other standards.

To complain about China not being in the Kyoto Protocol is ridiculous because the Chinese have done quite a lot to increase their energy efficiency. I think if the U.S. were to take more official measures to economize on energy, they'd have much more leverage in pushing China to join the Kyoto Protocol in the next round, and it would be a normal member.

But that's a question of American politics. It may change a lot next year.

Is that answering your question?

QUESTIONER: Are there sources that allow you to estimate? You said it's easy to estimate.

(Inaudible.)

MR. MADDISON: Sorry?

QUESTIONER: Did you say it's easy to estimate contributions?

MR. MADDISON: Well, it's easy to estimate the energy use and the efficiency of the use and the carbon emissions. The carbon emissions in China are higher per capita than in the United States because they're using coal.

QUESTIONER: That's today. Is it easier to partition the global stock of carbon emissions -- (inaudible).

MR. MADDISON: I think that you can argue on the equity of demanding some change in the U.S. on the fact that their per capita is so high. Per capita emissions are high compared with a country like France

which has atomic energy and so forth. But I mean the emissions per capita in the U.S. are lower than China because of the lesser importance of coal.

I think, politically, the U.S. is taking a situation which is unfair to the Chinese and the Indians.

MR. BOSWORTH: That's the American way.

QUESTIONER: I would like to ask a question in terms of how do you factor the inequality that you mention in your projection in the future between now and 2030?

As we know, the Chinese economic level is not homogeneous. Essentially, if I want to simplify and sin by simplification, I see the Chinese economy as three economies in terms of the economic level and developmental level: the coastal area, the central area and the western part excluding Szechwan possibly. Each one of them has a different kind of quality of infrastructure, of human resources, institutions, different structure of the economy. One is you have a more advanced service, for example, for part of the

economy than others. Essentially, what I'm saying is that I see three clusters of different economic developmental levels in China.

As we know, the government in China is trying to generate a little bit more of economic development on the west like with the Go West Policy or the (*Chinese*) and a number of other policies that the Chinese are implementing.

My question is the fact that you do have less developed areas in China could be a source for growth or it could be a burden. I would like to ask you how did you factor that in your projection in the future, the inequality per se?

MR. MADDISON: Well, what's happened so far is that the rapid development in China has led to greater inequality, but it hasn't impoverished those at the bottom level. I mean impoverished areas are not actually worsening particularly. I think that it's difficult in China to change that politically, and I don't think the government is breaking its back to do that.

For instance, in Tibet where they're having some political problems, they have built a railway to Tibet. They have done something to increase living standards there. I think that there may well be a growing sensitivity to the needs, particularly if there's political pressure or some sort of demonstration, the effect of people rising and so forth. They may be induced to pay more attention to the inequality.

I was saying in my judgment that the inequality is a big problem in China. It's likely to lead to political problems.

QUESTIONER: My question is in and by itself, the inequality, was it a factor in your projection in terms of the GDP per capita growth?

MR. MADDISON: No, I didn't do it on a partition basis. I did it for the aggregate economy.

QUESTIONER: Just to stay with the inequality, how much importance do you give in terms of the problems to inequality in the structural urban-rural shift?

It looks like from Chinese census data and inter-census statistics that more than half of the current urban population in China comes from families that were rural in the early 1980s. In other words, you've gotten a really rather permanent move of large numbers of what were rural families into urban status. So it kind of muddies the water a bit about the distinction between urban and rural populations.

But even if you take the two distributions, the urban and the rural ones, the national distribution used to be dominated by the rural because the population share was so much larger. Now almost half of that has bled or migrated into the urban. So we have a double-humped distribution which, by its definition, gives you a much higher Genie Coefficient.

If you project it forward and continue the migration, you've moved back towards a single-humped distribution, but it's urban, and the Genie Coefficient stabilizes and then begins to come down.

At the same time, you've had dramatic reductions in poverty levels throughout, in all

regions of China over the last 20 years so that the technical measure of inequality may be less important than whether large numbers of people are being left behind below the poverty lines, whether you take the Chinese or the old PPP or the new PPP, whichever one you want to use.

How do you factor in the problem of inequality with the fact that it seems to be part of a natural structural shift that has been experienced in other countries and that, in fact, represents incentives luring people to more productive occupations where they also have higher income and therefore promotes dramatic growth?

In other words, I want to try to take apart a little bit the issue that inequality is a serious problem going ahead, and I've given you some ideas about why I wonder about that. I wonder if you could respond.

MR. MADDISON: What's happened so far is an increase in inequality as there has been growth, and I don't really expect that to change much. But I think

it's a dangerous situation politically to let it happen because the system could break down somewhere, the political system, if the inequality became a major power in the opposition.

QUESTIONER: Thank you.

MR. BOSWORTH: Well, I think that uses up our time.

I want to thank Professor Maddison very much for coming, giving this presentation.

I am reminded on your first version, you cited some problems back then as well. I think the banking system was one. We shouldn't underestimate China's ability to solve its problems and keep on going. I think that was the lesson from your first book, that the economy turned out to be very adaptive and has done extraordinarily well. So projections of slowdown should be taken a bit cautiously.

But I didn't think this was a sharp slowdown. This was a pretty optimist view from this book, of China's growth going forward. For a country to maintain as far out as Angus has these projections,

an increase in per capita GDP of 4.5 percent would be an amazing accomplishment. So I think the fundamental story of this book was his optimism, not his pessimism.

I thank you very much for coming and making the presentation.

MR. MADDISON: Thank you.

(Applause)

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