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The Wide Angle

Is Outsourcing History?

Periodical

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Summary

- For decades, outsourcing of manufacturing and later of services to Asia has defined the trajectory of global production. However, sharp increases in wages/salaries in both China and India have led some observers to question whether or not this dynamic is coming to a close, particularly in view of the renewed competitiveness of US manufacturing.
- We found that the American manufacturing worker is indeed the most competitive in the developed world given the weak dollar and decades of efficiency gains. However, our study suggests that an industry that has moved already to China is unlikely to move back to the developed world. China's main problem is that it needs to move up the value chain even as low-end products are competed away to even cheaper locations. The country's inland provinces are unlikely to protect it against the shift. Unfortunately, China's cost advantage falls in high-end sectors and it will most likely succeed in segments where its large domestic market gives it critical mass.
- India too will find that it has a falling cost advantage in high-end services due to sharp increases in salaries. However, recent experience suggests that it can hold its own as one goes down the value chain. We found that companies have discovered ways to tap a large pool of low-skill workers from the hinterland. If it gets its policy framework right and avoids appreciation of its real effective exchange rate, it could potentially do the same in manufacturing.
- The British worker was found to have improved the most in the developed world although still lagging behind his/her German and French counterparts. Meanwhile, the Japanese worker looks the most vulnerable at current exchange rates.



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Background

For decades, the evolution of the global economy has been about shifting low-value added activities from the rich and expensive West to the cheap and labour-surplus countries of Asia. Japan pioneered the path followed by what used to be called the Newly Industrialized Countries of Taiwan, Singapore, South Korea and Hong Kong (denoted by the once popular acronym NICs). In turn, they were followed by the countries in South-East Asia till their stride was broken by the Asian Crisis of 1997-98. By this time, China had become a major player in the global production chain and has only expanded its role since. From the late nineties, India too has entered the fray by using the communications revolution to export many kinds of services.

Of course, other parts of the world have also participated in the evolution of the international division of labour. Parts of Eastern Europe and Latin America have benefitted significantly from joining the global production network in the last two decades. Natural resource rich countries too have gained from growing global demand for energy and raw materials. Nonetheless, it would not be inaccurate to say that the deployment of Asia's cheap labor force has been the central dynamic guiding the trajectory of the global economy for some time. By-and-large this is a unidirectional process that keeps an economy climbing up the value chain even as low value production moves out to ever cheaper (i.e. poorer) countries.

Given the size of China, it was believed till recently that the country had an almost inexhaustible supply of workers and that the process of outsourcing manufacturing to the country could go on for a long time. Similarly, it was believed that multinationals could indefinitely outsource services to India. However, sharp increases in salaries and other costs have now questioned the linear extrapolation of past trends. There are signs that production hubs can be shifted to even cheaper locations such as Vietnam (for manufacturing) and to Philippines (for services). More interestingly, the last recession has forced down wages and real estate prices in the West, particularly in the United States. The combination of a weak dollar and years of productivity improvement have driven down American unit labor cost to levels not seen since the early 1980s. One wonders if this could seed the revival of manufacturing in the advanced countries and/or slow the outsourcing of services. If this happens, it would be major break in the unidirectional flow that we have witnessed since the Second World War. In this report, we investigate the new realities in order to gauge the future trajectory of the global production network.

A Brief History of Cheap Labour

The Industrial Revolution began in Britain in the end of the eighteenth century and for much of the nineteenth century it was the dominant industrial power in the world. By the 1880s, however, it was bypassed by United States and then by Germany at the turn of the century. In both cases, the newcomers benefited greatly from absorbing and deploying British technology such as the steam engine and the Bessemer process for steel making. The newcomers initially grew by leapfrogging technologies and ramping up production capacities on an unprecedented scale. Sounds familiar? Consider what happened to the railways. In 1830, the United States had barely 40 miles of railroads but the network had jumped to 28,920 miles by 1860 and further to a staggering 163,562 miles by 1890 – more than the rest of the world put together¹. Before the end of the nineteenth century, United States was itself at the cutting edge of technology. The US Patent Office issued Patent No 174465 to Alexander Graham Bell on 7th March 1876 and within four years there were 60,000 telephones in America and twenty years later there were 6 million. In the next half century, the US would invent technologies ranging from the airplane to the radio, and then press them

¹ United States Census Bureau

into mass production. Germany would do the same with products such as automobiles and chemicals.

Technological invention was very important for turning Britain, Germany and the US into industrial powers but the key factor that allowed mass production was the deployment of cheap labour. The share of urban population in England and Wales jumped from 20% in 1800 to 62% in 1890 as people from the countryside migrated into the industrial cities. The US saw wave upon wave of migrants who pushed up its population from a mere 10 million in 1820 to 152 million in 1950². In the popular imagination, these migrants headed west to settle in remote farms or participate in the Gold Rush. In reality, the migrants were usually absorbed by the booming industrial sector. At the turn of the century, around 80% of New York's 5mn population was either foreign born or children of migrants. Many of them were squeezed into the slums of the Lower East Side with as many as 25 people sharing a single windowless room and sleeping in shifts. Most indicators suggest that living conditions were significantly worse than in the slums of present day Mumbai.

Even as the West was industrializing, the experience was very different for China and India. These two giants had been home to large artisan-based manufacturing sectors in the pre-modern age and had been exporting manufactured products like textiles and porcelain for millennia. However, both of them found it difficult to adapt the changing world. As the Mughal Empire in India crumbled in the early eighteenth century, it appeared for a while that the Marathas would replace it. When the Maratha bid for power stumbled, India dissolved into chaos with many indigenous and foreign groups vying for power. The uncertain political conditions severely affected the investment climate and caused many parts of India to de-industrialize. The re-establishment of order under British colonial rule, however, did not help. The Industrial Revolution had taken off and cheap goods produced by British factories flooded India from the early nineteenth century, further damaging the old artisan-based sector. Note that this happened even though Indian labor was much cheaper than that in England. Even in 1820, Indian per capita incomes were less than a third of British levels but the largely illiterate workforce was not capable of absorbing new technology. The building of new infrastructure like the railways also did not help but, on the contrary, worsened matters by allowing imported goods to penetrate further inland. Therefore, the de-industrialization of India is a good illustration that neither cheap labor nor improved infrastructure is useful unless the overall investment eco-system is in place. Readers should always remember that the productive deployment of cheap labour depends on many factors ranging from property rights and general governance to the prevalence of basic literacy.

Japan was the first Asian country to experience industrialization and, from the 1890s, output rose very rapidly. Despite the devastation of the Second World War, Japan had built up a competitive industrial sector by the 1950s. Yet again, the deployment of cheap labour was a key component of this success. As recently as 1980, when Japan was already considered a developed country, the unit labour cost in nominal USD terms was barely half of today's levels³.

We found that the sharp increase in Japan of the cost of labour input in the last three decades has been due mainly to the exchange rate. The currency appreciated from JPY 250-240/USD in 1985 to just over JPY 120/USD by the end of 1987 and then further to JPY 84/USD in 1995. The Yen would drift weaker to the JPY 100-150/USD range for the next decade and a half before appreciating back to the current range of JPY 80-85/USD. This currency movement undid the 0.5% per annum decline in unit labour cost in local currency terms that Japanese manufacturing has sustained over the last three decades. This goes to

² "The World Economy: A Millennial Perspective", Angus Maddison, OECD 2001

³ US Bureau of Labour Statistics data

illustrate how the exchange rate is an important factor that needs to be considered when dealing with the international competitiveness of labour. It is possible, of course, to compete on design and quality but a strong currency does make matters difficult. We recognize that a cheap currency can have a number of undesirable side-effects but we are not concerned with these in this particular report.

The exchange rate was an important factor in the re-emergence of both China and India on the world stage. The CNY depreciated significantly between 1990 and 1993 before the currency regime was unified on Jan 1, 1994 and the exchange rate was depreciated by 50% from CNY 5.8/USD to CNY 8.7/USD. There is a great deal of academic debate about the exact impact of this move but it would be hard to deny that Chinese wages, already low by international standards, became even more competitive. According to official data, the average annual wage in China was CNY 5,348 or USD 637 in 1995.

The Indian Rupee too experienced sharp devaluations after the external crisis of 1990-91. The exchange rate depreciated in a number of steps from around INR 18/USD before the crisis to INR 31.4/USD in 1993. It is no co-incidence that the world came to recognize the competitiveness of Indian white collar workers in the subsequent years. In 1994, a fresh MBA graduate from one of India's top business schools was offered a starting monthly salary of INR 35,000 by an international consulting firm. This was equivalent to less than USD 13,375 per year at the prevailing exchange rate but it was considered so high that it made the front page of a number of newspapers. It was more than a senior civil servant made after decades on the job. At that time, a graduate from a good engineering college could be hired for less than INR 4,000 per month (i.e. less than USD 1,500 per year).

Note that in both cases, the cost effectiveness of labour was only relevant because reforms had created conditions where the workforce could be deployed in the global supply chain. Moreover, the workforce was educated enough to absorb modern technology. By 1990-91, China had a literacy rate of 78%. The literacy rate in India was still low at 52% because of inadequate focus on primary education, but investments in elite schools like the IIMs and IITs had created an educated but under-employed middle-class. The difference in their initial labour endowments partly explain China's subsequent success in mass manufacturing compared to India's preference for exporting white-collar services.

How Competitive is America?

"Detroit's decline has been going on for a while. Auto production soared to an all-time peak in 1955 – but there are already worrisome signs. In the face of growing foreign and domestic competition, auto companies merged, or quit, or moved out of town to get closer to markets. Automation began replacing workers in the plants that remained. In the past seven years, Chrysler, the city's biggest employer, has dropped from 130,000 to 50,000 workers."

Believe it or not, the above passage appeared in an article called "Michigan: Decline in Detroit" published in the Time magazine on 27th October 1961⁴. As one can see, the US manufacturing sector has been facing severe competitive pressures from internal and external sources for a very long time. For half a century, therefore, American manufacturing has been trying to stay competitive through product and process innovation, outsourcing to suppliers, moving to cheaper locations, squeezing efficiencies from labour and so on. From the nineties, the communications revolution has forced similar competitive pressures on an array of services. So, how costly is the US worker after all the effort?

⁴ <http://www.time.com/time/magazine/article/0,9171,873465,00.html>

A survey by the US Bureau of Labor Statistics showed that, if one includes social insurance and benefits, the hourly labour compensation cost in manufacturing in 2009 for the US stood at USD 33.53 compared to USD 46.52 for Germany, USD 40.08 for France, USD 30.78 for the United Kingdom and USD 30.36 for Japan⁵. The hourly compensation was much lower in emerging markets at USD 8.32 in Brazil, and USD 7.76 in Taiwan.

Table 1: Hourly labour compensation costs in manufacturing - USD

Countries	2000	2005	2009
Germany	25.48	38.18	46.52
United States	24.63	29.74	33.53
United Kingdom	20.47	31.58	30.78
Japan	25.34	25.56	30.36
Hungary	2.96	6.71	8.62
Brazil	4.38	5.05	8.32
Taiwan	7.30	7.93	7.76
Poland	3.35	5.47	7.50
Mexico	4.47	5.36	5.38
Philippines	0.88	1.06	1.50

Source: US Bureau of Labor Statistics

Note: Hourly compensation costs include (1) total hourly direct pay, (2) employer social insurance expenditures and (3) labor-related taxes.

The problem with the above data is that it tells us nothing about relative productivity and, therefore, is not very useful as a measure of competitiveness. A better measure of labour competitiveness is provided by unit labour cost. The Bureau of Labor Statistics provides data on the unit labour cost for the manufacturing sector in major countries calculated in local currency as well as on a US dollar basis (i.e. after accounting for exchange rate movement). The data showed that unit labour cost in US manufacturing in 2009 was 14% lower than in 2000 and 20% lower than in 1991. Indeed, it is now below the level in 1980!

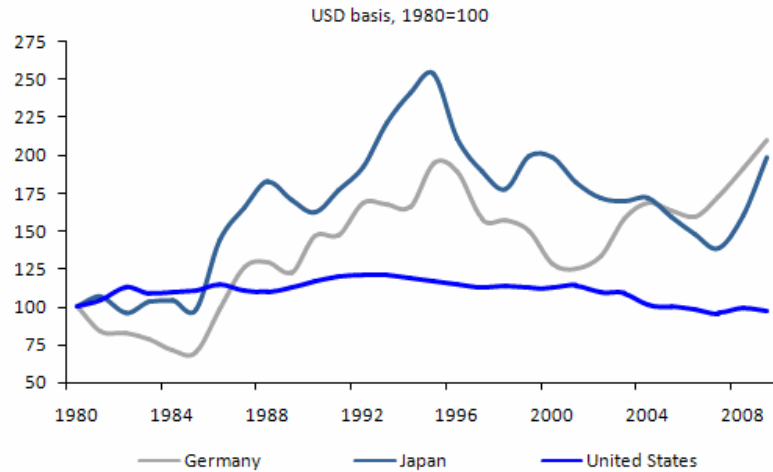
The trends for German manufacturing are strongly affected by the exchange rate. The unit labour cost in dollar terms jumped 57% between 2002 and 2009 but by only 6% in local currency terms. German unit labour cost in local currency terms had, in fact, declined by 8% between 2002 and 2008, but jumped up in 2009 as the recession caused output to decline. Thus, the performance gap between USD and local currency terms is actually even larger than suggested by the 2009 data. Fortunately, the gap is partly tempered by the fact that Germany enjoys a fixed exchange rate with many trading partners thanks to the Euro. No such buffer cushions the Japanese who have also suffered from swings in the exchange rate. Unit labour costs had jumped sharply despite efficiency gains in the late 1980s and early 1990s due to sharp Yen appreciation. It has suffered the same problem in recent years as the Yen has risen towards JPY80/USD.

The data from US Bureau of Labour Statistics (BLS) shows that the Americans clearly benefit from dollar weakness but they also need to be commended for improving labour productivity on sustained basis. This has been achieved through improvements in automation, design, supply management and so on. However, this was not achieved merely by bulking up capital investment since the contribution of capital intensity of manufacturing has only gone up by

⁵ "International Comparisons of Hourly Compensation Costs in Manufacturing, 2009", Bureau of Labor Statistics, 8th Mar, 2011. Note that this includes wages, directly paid benefits and social insurance. For instance, hourly compensation in the US is made up of USD23.03 in direct pay, USD2.6 for directly paid benefits/bonuses and 7.9 in social insurance etc.

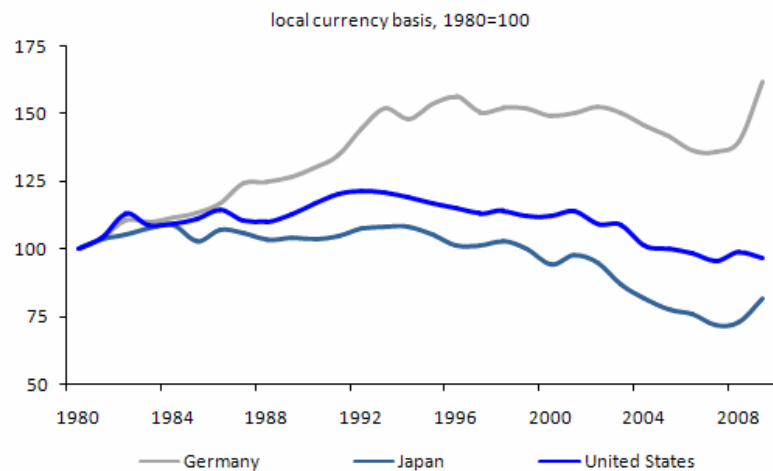
13% since 1987 and has been roughly stable since 2005. Instead, multifactor productivity has gone up more than 40% over the last two decades.

Figure 1: Unit labour cost in manufacturing (USD basis)



Source: Bureau of Labour Statistics

Figure 2: Unit labour cost in manufacturing (local currency basis)



Source: Bureau of Labour Statistics

An independent survey of labour productivity has been published by the UK's Office of National Statistics⁶ and has come to similar conclusions. The study calculated the GDP per worker (adjusted for PPP) for major developed countries over two decades (1990-2009). Note that the data relates to the whole economy and not just manufacturing. The numbers showed that Japan's workers are the least efficient in the developed world and produced 17% less GDP per hour than the British worker in 2009. In contrast, the US, German and French worker respectively produced 23%, 22% and 17% more than their British counterpart.

⁶ "International Comparisons of Productivity: Revised Estimates for 2009", Office of National Statistics, 15th Feb 2011

Moreover, the study also provided a gauge of efficiency improvements over time. The American workers produced 40% more per hour in 2009 than in 1991 while the Germans produced 33% more. The British were the most improved with a 44% increase while the Italians increased output per worker by a mere 17%. The Japanese had managed 33% increase in GDP per hour worked between 1991 and 2009, but appeared to be working less hard. As a result, GDP per worker had increased only 14% over the 18 year period despite the efficiency gains. The broad conclusion is that the American workers had improved efficiency very significantly since the early 1990s and are now the most productive in the developed world. The British worker was less efficient than other Europeans but had seen the most improvement. The Japanese worker had improved performance per hour but had become less competitive overall, particularly if measured in USD terms.

Table 2: GDP per hour worked - Current PPPs

Year	United Kingdom	Germany	Japan	United States
1991	100	133	95	134
1995	100	129	91	124
2000	100	121	84	119
2005	100	121	84	120
2009	100	122	83	123

Source: International Comparisons of Productivity - Revised estimates for 2009 - Table 2 - Office for National Statistics

Table 3: GDP per hour worked - Constant PPPs

Year	United Kingdom	Germany	Japan	United States
1991	100	100	100	100
1995	114	111	109	106
2000	129	126	118	120
2005	142	134	131	133
2009	144	133	133	140

Source: International Comparisons of Productivity - Revised estimates for 2009 - Table 4 - Office for National Statistics

How Expensive has China become?

Both China and India are countries with very large populations, and their entry into the global labour market dramatically changed the dynamics of global production networks from the nineties. Yet, sustained economic growth has been pushing up their wages and salaries (as well as other input costs). In China, the economic pressures on wages have been met by official acceptance that wages need to rise and that working conditions need to be improved. The Labour Contract Law of 2008 is an example of how policy has tilted in favour of workers. Similarly, minimum wages have been drastically increased. Beijing city, for instance, increased its minimum wage by 21% from 1st January 2011. This was on top of a 20% increase announced just six months earlier⁷.

Chinese wages have been rising for years albeit from very low levels. In 1995, the average annual wage was CNY 5,348 or USD 637. A decade later it had risen to CNY 18,200 or USD 2,247⁸. We estimate that the average wage currently stands at around CNY 41,300 or USD 6,353 per year. In other words, the average wage in China is now ten times its 1995 level in nominal US dollar terms. Most of this is due to nominal wage increases although exchange rate appreciation between 2005 and 2008 also played a small but significant role. Our informal discussions with analysts and businesses suggest that nominal CNY wages can be expected to rise by around 15-17% per year for the next couple of years. This could further accelerate in the long run as China's aging demographics sap the working-age population.

⁷ "Beijing city to raise minimum wage 21%", Jamil Anderlini, Financial Times, 28th December 2010

⁸ China Statistical Yearbook 2010

The question is whether or not the ten-fold increase in nominal USD wages and the prospect of more increases in the future have made China unattractive for further outsourcing of manufacturing from the developed world. This must be gauged against the fact that Chinese workers have also become far more productive due to education/training, improved infrastructure and so on. Our estimates indicate that the average Chinese hourly wage is now around USD 2.7. Wages in the manufacturing sector are generally lower at around USD 2.4/hour. Our informal survey suggests that the average Chinese worker is at least a third as productive as an American. Thus, we should compare USD 7.2/hour to USD 25.6/hour in US manufacturing⁹. This is still a very large gap even allowing for 15-17% annual increase and perhaps some CNY appreciation.

Of course, the cost of labour is not the only input that a business needs to consider. In most manufacturing sectors, employee costs constitute 15-30% of overall costs. There are other costs such as those of working capital, machinery, real estate, transportation and logistics and so on. The economics of outsourcing manufacturing to China, therefore, varies a lot from product to product depending on the relative importance of each input. On one hand, China now has a number of established industrial clusters with their eco-systems of supply chains, manpower and so on. These clusters are being helped by the fact that China itself is a growing market for many products. These factors give Chinese manufacturing a degree of cushion. On the other hand, real estate prices have spiraled out in China in recent years. There are also concerns about the costs and risks of maintaining long supply chains for products that are still mainly sold in developed markets.

At the risk of generalizing, our overall assessment is that rising Chinese wages in themselves have not closed the case for outsourcing manufacturing to China. An industry that has already moved to China is not likely to move back to the developed world. The real competition in these industries comes from other developing countries. This is particularly true for low-end products with wafer-thin margins. For instance, Vietnam's wages are half of those in China. Although the quality-adjusted gap is smaller, Chinese wages are rising much faster than Vietnamese wages and therefore making it increasingly worthwhile to shift certain kinds of manufacturing south of the border. It has been argued that China can compete back by encouraging investments in the cheaper inland provinces but we found that the wage gap is not large enough to justify this for products meant for export. The average wage in the large inland province of Sichuan is only 23% lower than in the coastal province of Zhejiang (the gap is much smaller for manufacturing wages)¹⁰. After accounting for the additional logistical cost of moving inland and for future wage growth, we feel that an export-oriented industry that is no longer viable on the east coast will move abroad rather than inland. The inland provinces will mainly succeed in sectors aimed at the domestic market or where there is special government support.

Is it still Worthwhile Outsourcing Services to India?

India has turned itself into a major hub for services exports since the late nineties. By taking advantage of the communications revolution, it has deployed its educated but previously under-employed middle-class into the global economy. The resulting white-collar boom, not surprisingly, has also dramatically pushed up salaries. As with China's manufacturing sector, investors are now questioning whether or not India retains a competitive edge in services outsourcing. Indeed, wage inflation is a much more critical issue for services because employee costs are a much higher share of overall production costs (ranging 35-50%).

⁹ The US wage rate is calculated excluding social insurance but including directly-paid benefits/bonuses. Bureau of Labour Statistics data.

¹⁰ China Statistical Yearbook 2010

As already discussed, a salary offer of USD13,375 to a fresh MBA made newspaper headlines in 1994. In comparison, we have seen offers in the USD 75,000-100,000 range in recent years which are at par with global levels. Even if one ignores exceptional individuals, the average salaries for high-skill white collar workers have gone up dramatically in the last decade and half. A recent survey showed that an MBA from one of India's top business schools could expect to be paid on average USD 42,674 in 2010 compared to USD 88,485 in the United States, USD 99,300 in the United Kingdom, USD 78,158 in Germany and USD 43,233 in China¹¹. This is a very small and elite sample, but it goes to illustrate that Indian (and Chinese) white-collar workers in high-end jobs are already at half the price of equivalent developed country professionals. This is perhaps not surprising since these professionals are internationally mobile. Nonetheless, they illustrate the point that the gap at the very high-end has closed significantly and, in our view, is no more than 10-20% when adjusted for productivity (they may be talented but they still have to deal with sub-optimal infrastructure). In short, the case for outsourcing is now marginal for very high-skill jobs. If Indian companies wish to compete in this space, they have to do it on quality and innovation and not price.

Table 4: Average Salaries for MBAs from Leading Schools in 2010

Country	Salaries in USD
India	42,674
United States	88,485
Germany	78,158
United Kingdom	99,300
Brazil	71,000
Russia	71,235
Mexico	54,529
China	43,233
Singapore	67,071

Source: "QS Top MBA Jobs & Salaries Trends 2010/11", QS Quacquarelli Symonds Ltd.

The gap grows, however, as we move down the value chain. When researching medium-skill business process outsourcing jobs, we found that there was still a significant saving from moving a job to India. For instance, a back office job moved from London allowed a saving of 35% in employee costs if moved to Birmingham or Florida and of 70% if moved to Mumbai or Bangalore. We accept there are some efficiency losses from moving jobs away to a remote location, but found it difficult to quantify them as they vary widely between different types of jobs. Training costs are also rising as companies have to dig deeper to find employees. Nonetheless, our overall impression is that India is still competitive for a range of medium-skill activities. Note that salaries in India are rising in this segment as well (by around 10-12% per year) and other costs such as real estate are also rising, but the gap appears to be still big enough to justify the business model for the time being.

India's cost advantage grows larger as one goes further down the value chain. An entry-level worker in a call-center or data entry job in Gurgaon is paid around USD 4,000 per year. A similar person in a location in the US would usually cost USD 25,000-28,000¹². This is not only a significant saving but the evolution of the industry tells an interesting story about how costs may evolve in future. Back in 2001, call-centers used to hire workers from second-tier colleges from the bigger cities. For instance, Gurgaon had access to graduates from Delhi. The entry-level salary was around USD 2,500-3,000 per year and the average entrant was usually very proficient in English and generally had fairly high skills for the job. However, the situation had changed by 2006. The entry-level salary had jumped to over USD 3,500 and yet it was difficult to hire/retain workers. Attrition rates had jumped from less than 10% to almost 30%. Call center-center managers were forced to dig deeper and source workers from small

¹¹ "QS Top MBA Jobs & Salaries Trends 2010/11", Nunzio Quacquarelli, QS Quacquarelli Symonds Ltd.

¹² A data entry keyer in the Chicago in 2008 was paid around USD26,590 while a switchboard operator/answering service worker earned USD26,690. Data from the BLS's Midwest Information Office.

towns and lesser known institutes scattered in the hinterland. These workers had to be given more training but the managers discovered that they were also less likely to change jobs. Attrition levels soon fell below 20%. Moreover, the pool of potential workers from smaller towns and even from slums was found to be an order of magnitude larger than from the large cities. A company that was able to set up an efficient training system could access this large pool. As a result, the pace of salary increases in this segment is running now at 5-10% per year, barely keeping up with inflation if at all. We feel that it would have been even lower if general inflation had not been so high in recent years.

Implications for the Global Production Network

Our study indicated that the US has emerged as the most cost competitive developed country due to sustained efficiency gains. American workers now generate 40% more real output per hour than in 1990. The US also remains very innovative. Just look at the successful products that the US has invented in recent years – Facebook, Google, iPad and so on. The average British worker remains slightly less efficient than his/her counterpart in Germany or France, but has experienced the largest improvements of any major developed country. We will watch this space closely. The German and Japanese workers too have improved efficiency levels but appear to have been hurt by exchange rate movements, especially in the latter case. However, even adjusted for purchasing power parity, the value-added by the average Japanese worker is a third less than his/her American equivalent.

An important facet of the US economy is that wage costs vary very widely across the country. Thus, a generalization about the US sometimes misses the point. In the table below, we provide a comparison of wage/salary levels in different jobs in different parts of the country.

Table 5: Mean annual wage of select jobs across states in the US

Job description	Lowest paying	Mean paying	Highest paying
All Occupations	Mississippi	Michigan	District of Columbia
	33,930	43,280	73,440
Automotive Service Technicians and Mechanics	West Virginia	Texas	Alaska
	27,320	37,390	51,870
Assemblers and Fabricators	West Virginia	New Mexico	Kansas
	22,000	28,670	43,650
Accountants and Auditors	North Dakota	Wisconsin	New York
	52,270	62,340	85,230
Bookkeeping, Accounting, and Auditing Clerks	South Dakota	District of Columbia	Wyoming
	27,490	48,470	34,150
Civil Engineers	South Dakota	Nebraska	California
	64,740	77,250	94,970
Computer Operators	Arkansas	Louisiana	District of Columbia
	30,050	36,750	54,930
Computer Programmers	Wyoming	Michigan	Massachusetts
	50,890	69,010	90,620
Construction Laborers	Arkansas	Pennsylvania	Hawaii
	24,290	33,290	51,240
Construction Managers	Oklahoma	North Dakota	New York
	64,240	87,880	131,800

Job description	Lowest paying	Mean paying	Highest paying
Computer Hardware Engineers	South Dakota	Wisconsin	New York
	68,830	90,590	115,240
Customer Service Representatives	South Dakota	Nevada	District of Columbia
	25,980	31,570	39,800
Data Entry Keyers	New Mexico	Utah	District of Columbia
	23,530	27,740	39,000
Desktop Publishers	South Dakota	Nevada	District of Columbia
	22,890	37,070	51,770
Editors	Wyoming	Illinois	New York
	37,120	51,630	74,690
First-Line Supervisors of Production and Operating Workers	Mississippi	Florida	Wyoming
	47,150	55,260	68,670
Market Research Analysts and Marketing Specialists	Louisiana	Georgia	Oregon
	44,320	61,380	82,290
Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders	West Virginia	Indiana	Maryland
	27,250	34,730	43,940

Source: Bureau of Labor Statistics - Occupational Employment Statistics (OES) Survey, May 2010

Meanwhile, China remains very competitive vis-a-vis developed countries in its current product space. Wage increases of 15-17% per year, however, will eat into margins and push out certain industries to Vietnam, Indonesia and so on. The real question about China, therefore, is whether or not it can climb the value chain. This is a more complex problem because it may not have an established critical mass in many of these industries and furthermore, will be facing a very competitive American workforce that has been steadily improving productivity for decades.

This is not to suggest that the Chinese cannot compete on innovation and high-value activities. After all, it is a country capable of high-tech nuclear and space programmes. Recent census data also showed that the proportion of college graduates jumped from 3.6 to 8.9 per hundred between 2000 and 2010. Nonetheless, the Chinese cost advantage declines as we go up the value chain. As already shown in the previous section, Chinese MBAs are already half as expensive as equivalent Americans. The gap may be smaller after considering relative productivity and the pace of salary increases. In our view, therefore, the future trajectory of China's production base will have a strong bias towards activities where the domestic market gives it critical mass. According to Jun Ma, Deutsche Bank's Chief Economist for China, rising wages will create a big domestic market for equipment and machinery and the country could even leverage this for the export market¹³. At current exchange rates, we think that Japan could be at most vulnerable to such a development. It could even affect Germany in the long run despite its famed ability to compete on design and quality.

India is faced with a similar problem as China at the high-end but potentially enjoys a big advantage at the low-end. We found that the economy is losing its cost competitiveness in high-end white collar jobs. India does have some companies that can compete on innovation and quality, but they can no longer rely purely on a cost advantage. However, the equations

¹³ "China's Manufacturing Upgrade", Jun Ma et al, Deutsche Bank, 31st August 2010

change as we go down the value chain. Companies that can create efficient training systems have found that they can access large pools of eager workers from smaller towns and lesser known institutions to fill low/medium skill jobs. This has tempered wage pressures despite high levels of general inflation. Of course, India faces competition from other countries like the Philippines. Our investigations suggest that the Filipino skill base is not as deep at the high-end and that it is somewhat more expensive at the low end. However, salaries are roughly equal in the medium skill segment and it is possible that the Philippines could build up a competitive edge in the long run because wage and general inflation pressures are lower there than in India.

In the long run, the ability of China and India to compete in high-end sectors will depend on their ability to innovate. This will be the subject of a future report in this series. Both countries could benefit from the return of their nationals who have studied in foreign universities or have worked in foreign laboratories/innovation hubs. China is seeing some of this and even India is beginning to attract back a steady trickle, but ultimately it's the local education system and innovation capacity that will have to deliver. Our impression is that China is making more rapid progress but it is also under greater time pressure because its demographics will soon begin to deteriorate (for a fuller discussion see our previous Wide Angle issue, "The End of Population Growth", 13th May 2011). India will probably find it easier to expand in the lower-skill services segments. If it can get its policy framework right and stop its real effective exchange rate from appreciating, India could potentially do the same in manufacturing. Its demographics will remain favourable till the 2040s and, unlike Vietnam, it offers China-like scales. The latest census data showed that India's literacy rate is now at 74% - roughly where China stood two decades ago - thereby fulfilling an important necessary condition for the mass deployment of cheap labour in basic manufacturing.

Appendix 1

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