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China, India and the future of the global economy

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Globalization is commonly noted process and probably this is a main reason that there is growing interest on the future of global development. In the first part of the paper an overview of the long-term global economic growth forecasts is presented (e.g., forecasts of Uri Dadush and Bennett Stancil of the Carnegie Endowment for International Peace, a report by HSBC, CitiGroup report, reports of PricewaterhouseCoopers, or Goldman Sachs reports). In this context, the diversified views and opinions on future economic development of China and India (currently considered as the fastest-growing major economies in the world) are presented. A common feature of almost all studies on long-term economic future of the world is that the authors conclude that China and India will dominate the global economy and in the middle of the twenty-first century they will be one of the largest economies in the world. To what extent this belief is justified is a subject of discussion in the second part of the article, where we present extrapolative forecast of global GDP and an estimation of the economies of China and India in global production by 2050 based on the so-called evolutionary model of competition.

The evolutionary model of competition enables to estimate the competitiveness of national economies, therefore in the second part of the paper we presents the results of estimation of the competitiveness of the economies of India and China after World War II. One aim of that research is to compare the competitiveness of China and India with the leaders of economic development in the twentieth century, namely the United States, Great Britain, Germany, Japan and the European Union. The summary of these considerations are estimations the shares of GDP of China and India in the global product based on global scenarios of the competitiveness changes of these economies over the next 40 years.

An overview of the global forecasts

A kind of 'reference year' of future studies is 2050. Numerous conferences and great number of publications are undertaken with the general theme 'The World in 2050'. One of the latest big, worldwide conference in that mood was that held in Berkeley, 23-24th of January 2009, *The World in 2050: A Scientific Investigation of the Impact of Global Population Changes on a Divided Planet*.¹ To give as an example of latest book on that subject, let's mention the important one, namely Laurence C. Smith, *THE WORLD IN 2050: Four Forces Shaping Civilization's Northern Future*.² The four global forces which will shape the future of the next 40 years are (in opinion of L.C. Smith) are following: (1) population demographics, (2) resource demand, (3) globalization, and (4) climate change. In the first part of the book Smith identifies key world pressures and trends (among others urbanization,

¹ <http://bixby.berkeley.edu/research/population/world-in-2050/presentations/>

<http://www.prb.org/Journalists/Webcasts/worldin2050/worldin2050-overview.aspx>

² Laurence C. Smith, *THE WORLD IN 2050: Four Forces Shaping Civilization's Northern Future* [Dutton / Penguin USA, published by Dutton in September 2010 [UK edition titled THE NEW NORTH: The World in 2050, Profile Books 2011].

population aging, energy technology, water supply, immigration, and a historic transfer of wealth and power from west to east). In the next part he describes the emergence of a new region, so called "Northern Rim" (NORCs), which consists of eight northern countries: the northern United States, Canada, Greenland/Denmark, Iceland, Norway, Sweden, Finland, and the Russian Federation. In the final part Smith "explores some more extreme, but less likely potential outcomes; and the power of societal choice in shaping our future".

Numerous institutions undertake almost systematic future studies on global development. Some of them will be outlined later in that section of the paper, but as a kind of the summery let's present a list of that publications.

Goldman Sachs, one of the biggest investment banking and securities firm, started to publish future study reports since the beginning of the 21st century, among them are:

- *Building Better Global Economic BRICs*, Jim O'Neill, 30th November 2001, Global Economics, Paper No: 66
- *Dreaming With BRICs: The Path to 2050*, 1st October 2003
- *BRICs and Beyond*, Tushar Poddar and Eva Yi, January 22, 2007
- *Ten Things for India to Achieve its 2050 Potential*, June 16, 2008
- *The Long-Term Outlook for the BRICs and N-11 Post Crisis*, December 4, 2009

In fact it was Jim O'Neill, who in his 2001 report coined the acronym BRICs, to refer to the four countries, namely Brazil, Russia, India and China. The acronym is now commonly used as a symbol of the shift in global economic power towards the developing world, away from currently the most developed G7 economies.

The other global institution systematically publishing the reports on future development is PricewaterhouseCoopers (PwC), the world's second-largest professional services firm and one of the 'Big Four' audit and accountancy firms. We will refer to its four reports, namely

- *The World in 2050. How big will the major emerging market economies get and how can the OECD compete?*, John Hawksworth, March 2006
- *The World 2050, Beyond the BRICs: a broader look at emerging market growth prospects*, John Hawksworth and Gordon Cookson, March 2008.
- *The World in 2050. The accelerating shift of global economic power: challenges and opportunities*, John Hawksworth and Anmol Tiwari, January 2011.

Other reports included in the review:

- Sandra Poncet (2006), *The Long Term Growth Prospects of the World Economy: Horizon 2050*
- Uri Dadush, Bennett Stancil, *The World order in 2050*, 2010, the Carnegie Endowment for International Peace
- Karen Ward, *The World in 2050*, January 2011, HSBC Global Banking and Markets
- Willem Buiters Ebrahim Rahbari, *Global growth generators: Moving beyond emerging markets and BRICs*, 21 February 2011; Citi Investment Research & Analysis, a division of Citigroup Global Markets Inc.

Goldman Sachs future reports

The 2003 report on *Dreaming With BRICs: The Path to 2050* focuses on the comparison of development of the four BRICs countries and G6, currently the most advanced economies (US, Japan, UK, Germany, France and Italy).³ As we see in Figure 1, according to that report,

³ As the authors of the report comment: "In focusing on the G6 (rather than the G7 or a broader grouping), we decided to limit our focus to those developed economies with GDP currently over US\$1 trillion. This means that

in 2025 the BRICs countries reach the 50% level o GDP of G6, and around 2040 their GDP will be greater than the total GDP of G6.

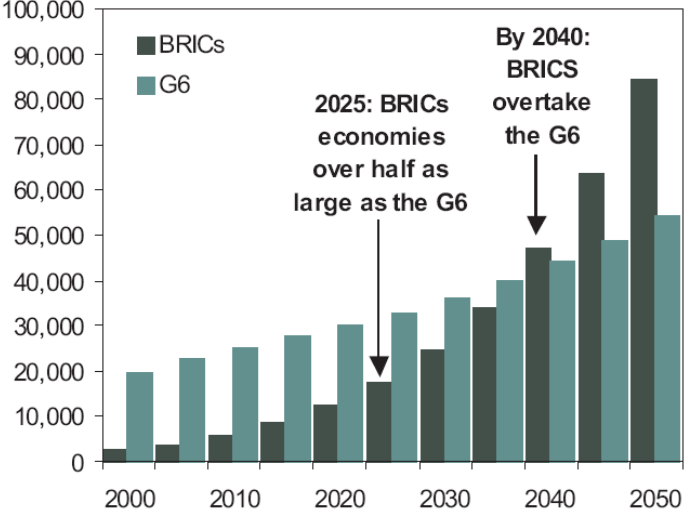


Figure 1. Projection of GDP(in 2003 US\$bn) of BRICs and G6 countries (after Goldman Sachs, 2003)

This rapid growth will be mainly due to high development of China and India. As it is seen in Figure 2, according to the prediction of Goldman Sachs made in 2003, Chinese economy will be the largest in the world in 2050, followed by currently the biggest US economy, but on the third place will be India. Economies of Brazil and Russia (respectively on the 5th and 6th positions in 20050 ranking) will be much smaller, although larger than the economies of UK, Germany, France and Italy.

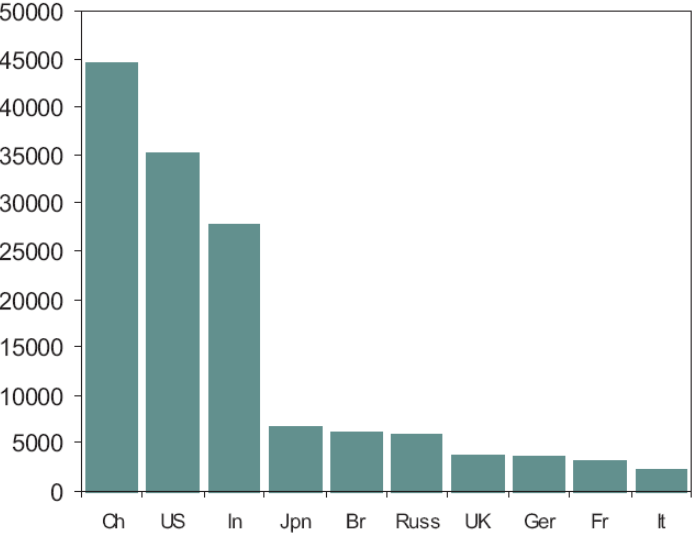


Figure 2. The largest economies in 2050 (in 2003 US\$bn); (after Goldman Sachs, 2003)

The projection of development of the five biggest economies, as envisaged by Goldman Sachs (2003) is presented in Figure 3. According to that prediction Chinese economy will be greater than that of US around 2040, but what is really interesting that India will experience impressive economic growth in the next decades and will be very close behind the China and

Canada and some of the other larger developed economies are not included. Adding these economies to the analysis would not materially change the conclusions.”

US in the middle of the 21st century; around 2033 the Indian economy will overcome the Japanese one. This process is nicely illustrated by the diagrams in Figure 4. It is clearly seen that the enormous economic growth of China and India is accompanied by rapid demographic process. The population of China will growth from 1316 million in 2005 to 1418 million in 2050, but at the same period the population of India will growth much faster, namely from 1087 million to 1601 million. Therefore in spite of very rapid economic growth, India will not catch up the Western societies in terms of economic welfare, although the growth of GDP per capita will be quite large, more than 5 times greater in 2050 compared to that in 2005. In 2005 the GDP per capita in India was equal to 3344 US\$ and in 2050 will be 17366 UD\$, still more than twice smaller the current GDP per capita in US. In the period 2005-2050 the GDP per capita in China will growth from 7204 US\$ do 31357 US\$ (i.e., more than four times) while US per capita only double (from 41399 to 83710 US\$). So we see that in spite of very high economic growth of China and India the welfare of the Western societies will be still much higher than in China and India. The Western Europe will experience stagnation in terms of demographic process in the first half of the 21st century (in fact slight decline of population from 397 million in 2005 to 391 million in 2050, while at the same time US population will growth from 297 million to 420 million) and much slower growth in terms of economic welfare (GDP per capita will growth form 29227US\$ in 2005 to 49154 US\$ in 2050, i.e. less than double).

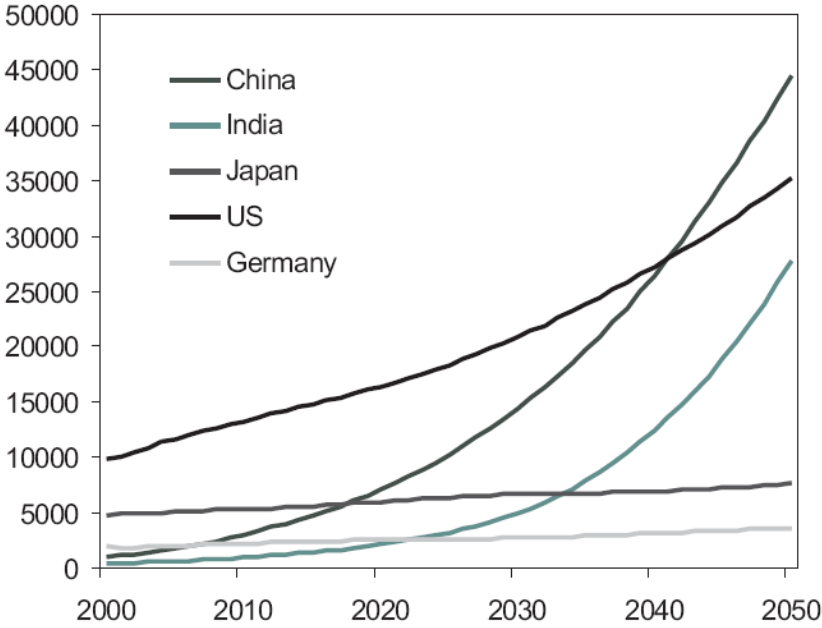


Figure 3. Projection of GDP growth (in 2003 US\$bn) of five largest economies (after Goldman Sachs, 2003)

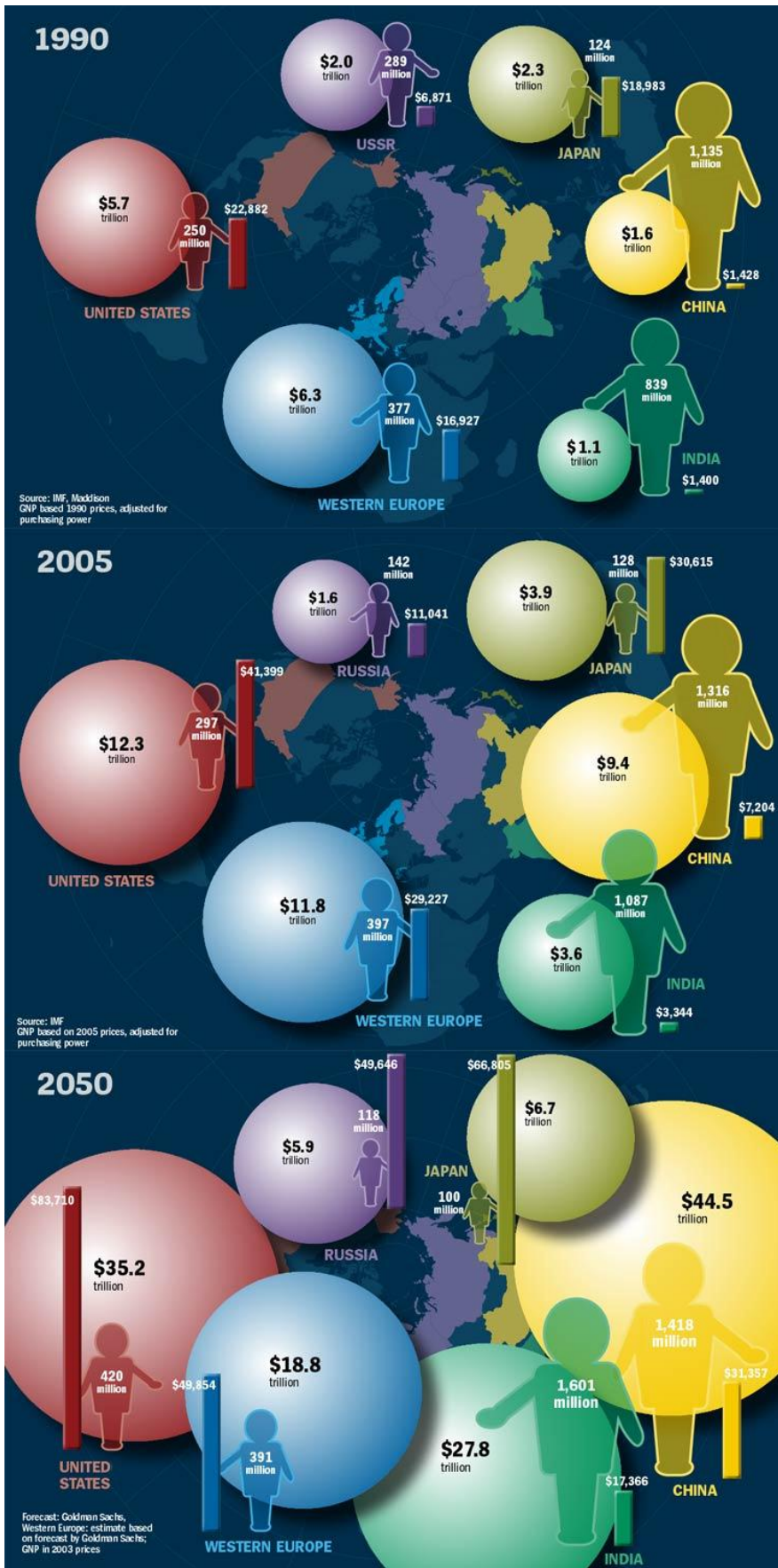


Figure 4. Illustration of economic and demographic growth of six countries/regions up to 2050 (after Goldman Sachs, 2003)

Important note

It is important to note that in all presented and outlined reports on future development the neoclassical model based on the simple Cobb-Douglas function is applied. The predictions highly depends on subjective assumptions made by the researchers. Let's motion the model presented in the Goldman Sachs report published in 2003, but all other reports and forecast are using more or less similar approach.

It is assumed that GDP growth (Y) is described by a simple (Cobb-Douglas) function of three ingredients, namely labour (L), the capital stock (K) and the level of "technical progress" (A) or Total Factor Productivity (TFP):

$$Y = AK^\alpha L^{1-\alpha}$$

To predict growth of GDP it is necessary to make predictions concerning growth in employment, growth in the capital stock and technical progress (or total-factor productivity (TFP) growth). For, L, the projections of the working age population (15-60) from the US Census Bureau is used. On the basis of the initial capital stock and assumed an investment rate (investment as a share of GDP) together with assumed depreciation rate (δ) the capital stock is calculated as:

$$K_{t+1} = K_t(1 - \delta) + \left(\frac{I_t}{Y_t}\right) \cdot Y_t$$

For A, the description of technical progress, it is assumed "that technology changes as part of a process of catch-up with the most developed countries. The speed of convergence is assumed to depend on income per capita, with the assumption that as the developing economies get closer to the income levels of the more developed economies, their TFP growth rate slows." To calculate A the following formula is applied:

$$\frac{A_t}{A_{t-1}} = 1.3\% - \beta \ln\left(\frac{Incomepercapita_{DC}}{Incomepercapita_{US}}\right)$$

where β is a measure of how fast convergence takes place and 1.3% is the assumed long-term TFP growth rate for the US.

As the authors of the 2003 report write: "Depreciation rate (δ) assumed to be 4% as in the World Bank capital stock estimates. Investment rate assumptions based on recent history, for Brazil (19%), for India (22%) for Russia (25%) for China (36% until 2010, declining to 30% thereafter). Income share of capital assumed to be 1/3, a standard assumption (α) from historical evidence. US long-run TFP growth assumed to be 1.33%, implying steady-state labour productivity growth of 2%- our long-run estimate. Convergence speed for TFP (β) assumed to be 1.5%, within the range of estimates from academic research."

So we see that large number of assumptions are quite arbitrary, therefore it is not surprise that sometime large differences in the forecasts are observed. For example the Goldman Sachs report published four years later (in 2007) contains essentially different projection (see Figure 5). China in 2050 is almost twice ahead of US, and US and India economies are comparable in 2050. Also Japan is far behind Brazil, Mexico, And Russia.

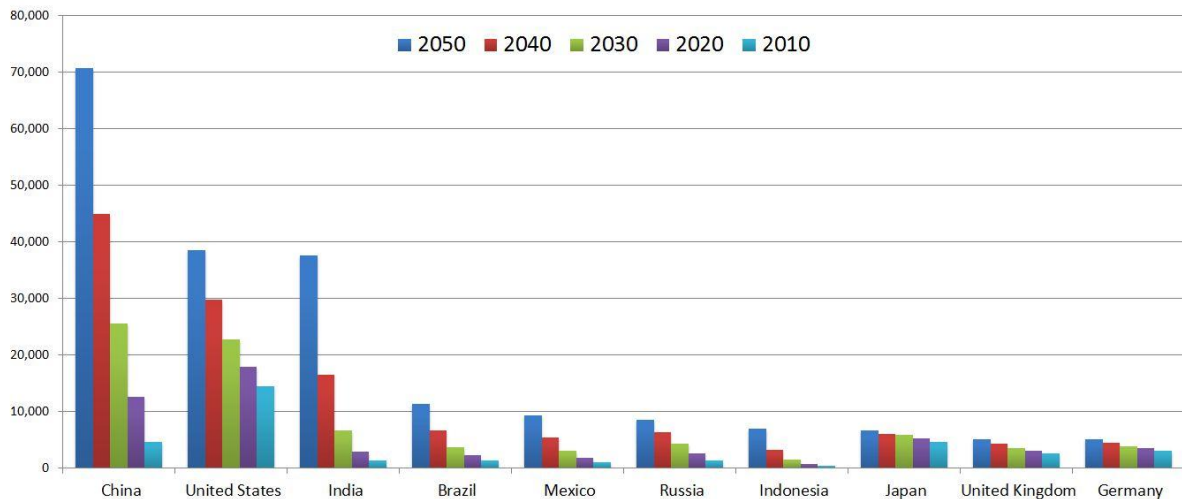


Figure 5. GDP projection for the largest economies (in 2006 \$US bn); after Goldman Sachs, 2007. BRICs and Beyond, Tushar Poddar and Eva Yi, January 22, 2007

PricewaterhouseCoopers reports

John Hawksworth and Gordon Cookson in the 2008 report *The World 2050, Beyond the BRICs: a broader look at emerging market growth prospects* update the former 2006 report of PricewaterhouseCoopers. The main conclusions of that report is that by 2050, the E7 emerging economies (i.e., the BRIC economies of Brazil, Russia, India and China, plus Mexico, Indonesia and Turkey) will be around 50% larger than the current G7 (US, Japan, Germany, UK, France, Italy and Canada); China is expected to overtake the US as the largest economy around 2025 and “India has the potential to nearly catch up with the US by 2050”. New countries enter the club of the fastest growing economies, namely the fastest growing economies in 2050 will be “headed by Vietnam, and the top 10 includes Nigeria, Philippines, Egypt and Bangladesh”. The projected by the 2008 report relative size of the four largest economies are presented in Figure 6.

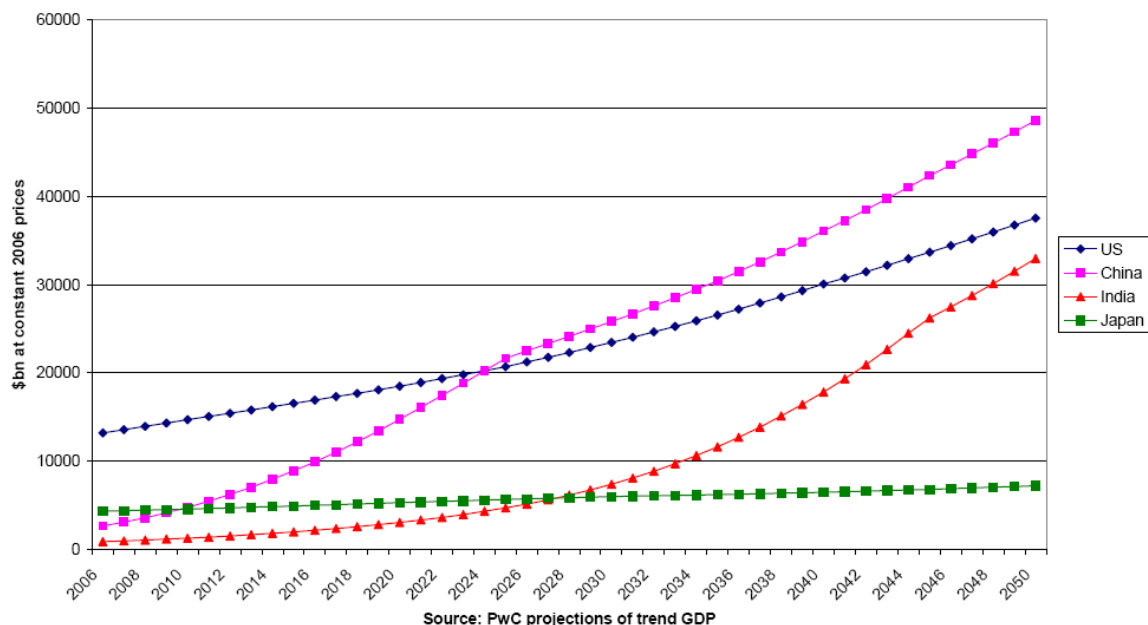


Figure 6. The projected relative size of the four major economies (PwC, 2008)

It is worth to note large differences in the projections made by the same authors in 2006 and 2008 PwC reports. These differences are summarized in Table 1. Let's note that even the estimates of 2005 GDP for China and India are significantly different.

Table 1. Key changes in results in 2006 and 2008 reports of PwC - relative size of Chinese and Indian economies compared to the US

Key results	China	India
1. GDP in 2005 at PPPs as % of US		
- March 2006 report	76	30
- March 2008 report	51	22
2. Real GDP growth: 2006-50 (% pa)		
- March 2006 report	3.9	5.2
- March 2008 report	4.7	5.8
3. GDP in 2050 at PPPs as % of US		
- March 2006 report	143	100
- March 2008 report	129	88
4. GDP in 2050 at MERs as % of US		
- March 2006 report	94	58
- March 2008 report	129	88

Source: World Bank for 2006 estimates; PwC projections for 2050

The main explanation for such big differences given by the authors are following: “Our projections for long-term average growth in the individual advanced economies have changed by no more than 0.1-0.2 percentage points per annum on average over the period to 2050, which is well within the margin of error for such long-term estimates. Projected growth rates in Brazil, Mexico, Russia and Turkey have similarly changed little since our original March 2006 report. Projected real GDP growth in Indonesia has been revised down slightly, but this country still ranks third in our E7 growth league table and so remains a relatively strong performer. Our projections for China and India have, however, changed more materially ... There are two main reasons for these changes. First, major new research led by the World Bank, which was published in December 2007, has for the first time produced official PPP estimates for China and has significantly revised earlier estimates for India. In both cases, the result is to raise estimates of relative price levels in these emerging economies and therefore to reduce significantly the estimated relative size of the Chinese and Indian economies in PPP terms (i.e. in terms of the volume rather than the value of goods and services produced). Thus ... China's economy in 2005 was only around half the size of the US based on these new PPP estimates, compared to a previous estimate of around three-quarters, while India's economy is now estimated at 22% of the size of the US in that year as compared to an earlier estimate of around 30%. Estimates of the relative value of the output of these economies at market exchange rates are not affected by these changes, so the initial gap between MER [Market Exchange Rate] and PPP estimates of GDP accordingly shrinks. Second, however, and offsetting this effect in terms of our long-term PPP projections, the Chinese and Indian economies have grown much more strongly over the past two years than our model estimates were originally suggesting and all the indications are that this more rapid rate of ‘catch up’ will be sustained for at least the next few years. The Chinese investment rate has also been significantly higher in 2006-7 than assumed in our original report and, although this is still expected to slow over time, this may not happen as fast as was originally assumed. Taking these more recent data (and other independent forecasts of Chinese and Indian growth) into account has caused us to revised up significantly our projections for the sustainable growth rate of these economies over the next 10 years, although these effects then fade away in later years (and indeed will be reversed eventually as catch up occurs earlier so the scope for further catch up is reduced in the long run). Furthermore, faster relative productivity growth also translates into faster expected real exchange rate appreciation over the next 15-20 years.

This further boosts projected real growth in the Chinese and Indian economies in dollar terms, although it does not affect projected real growth in domestic currency or PPP terms.”

So we see how cautiously it is necessary to read the published projections, when even seemingly hard historical data on current GDP are not reliable.

Other reports

There are numerous publication under the general theme ‘How the World will look like in the 2050’. Here we will shortly present only four of them. In the chronological order, let’s start from the Sandra Poncet (2006) study on ‘The Long Term Growth Prospects of the World Economy: Horizon 2050’.⁴ Sandra Poncet develops long-term forecasts for world economic growth, based on a simple production function, therefore it is assumed that an economy can grow by (1) deploying more inputs (i.e., labour and capital) to production and/or by (2) becoming more efficient, i.e. producing more output per unit of input. Similar as it was applied in the mentioned Goldman Sachs model, the analysis of past performance is carried out to describe the process by which physical capital accumulates over time and to estimate the parameters of a catch-up model of technology diffusion. Modification of real exchange rates against the US dollar is incorporated into the analysis. The main findings of the analysis are following: “in less than 50 years, China and India together could match the size of the US in current dollars (26.6 against 26.9% of the world GDP in 2050). China and India will stand out as an engine of new demand growth and spending, their GDP will grow at yearly average rate of 4.6 and 4.5%, respectively between 2005 and 2050. The largest economies in the world (by GDP) may no longer be the richest (in terms of income per capita).” In the conclusion Poncet states that “China’s GDP in 2050 could represent 22% of world GDP (at current US \$ and current relative prices). Between 2005 and 2050, China and India could experience a 13-fold and a 10-fold increase in GDP respectively at current real exchange rate. ... We do not, however, expect the US to lose the first rank in the world GDP hierarchy over the next 50 years. We anticipate that in 2050, China’s GDP could reach \$ 31 compared to \$ 38 trillion for the US, moving Japan down from second position to the benefit of China. South Korea is predicted to improve its rank from 10th in 2005 to fourth in 2050. A similar progression is expected for India - projected to jump from 13th to fifth position. India could become larger than France in 2025 and larger than Germany in 2039. In 2050 India’s GDP would, however, correspond only to 18% of the United States’ GDP. Of the current G7 (the United States, Japan, Germany, the United Kingdom, France, Italy and Canada) only the US, Japan, Germany and the United Kingdom may be among the seven largest economies in 2050. China, South Korea and India are expected to overtake France, Italy and Canada before that date.”

Celebrating its centennial anniversary, the Carnegie Endowment for International Peace has published in April 2010 the report on ‘The World order in 2050’.⁵ As in all former outlined reports, the authors envisage that “China remains on a path to overtake the United States as the world’s largest economic power within a generation, and India will join both as a global leader by mid-century. Traditional Western powers will remain the wealthiest nations in terms of per capita income, but will be overtaken as the predominant world economies by much poorer countries. ... Absolute poverty will be confined to small pockets in sub-Saharan Africa and India, though relative poverty will persist, and may even become more acute. Carbon emissions are also on a path toward climate catastrophe, and by mid-century may

⁴ Sandra Poncet (2006), The Long Term Growth Prospects of the World Economy: Horizon 2050 (<http://www.cepii.fr/anglaisgraph/workpap/summaries/2006/wp06-16.htm>)

⁵ Uri Dadush, Bennett Stancil, ‘The World order in 2050’, 2010, http://www.carnegieendowment.org/files/World_Order_in_2050.pdf

constitute a serious risk to the global growth forecast. International organizations such as the IMF will be compelled to reform their governance structures to become more representative of the new economic landscape. Those that fail to do so will become marginalized.”

Global Research, a division of HSBC Global Banking and Markets, published in January 2011 a report on ‘The World in 2050’.⁶ Once again the simple production function model (so called the Barro’s growth model) is applied in the report. The main findings of the model are more or less similar to the previously presented forecasts: in 2050 “19 of the 30 largest economies will be emerging economies; The emerging economies will collectively be bigger than the developed economies; Global growth will accelerate thanks to the contribution from the emerging economies; With the rapid growth of the emerging markets, the global economy is experiencing a seismic shift.”

In particular they predict that an average annual world growth will equal to 3%, compared with growth of just over 2% in the 2000s. Emerging-world growth will contribute twice as much as the developed world to global growth over this period. By 2050, the emerging world will have increased five-fold and will be larger than the developed world. China and India will be the largest and third-largest economies in the world, respectively. Substantial progress up the global league table will be made by a host of other emerging economies – most notably, Mexico, Turkey, Indonesia, Egypt, Malaysia, Thailand, Colombia and Venezuela.

HSBC predict that in 2050 China at \$24.6 trillion (constant 2000 dollars) and the US at \$22.3 trillion will together lead global economy. India at \$8.2 trillion will be far behind on the third position. The report envisages an eightfold jump in the per capita income of China and India but still they will not come to close to matching US living standards (Americans will be still three times richer than the Chinese in 2050).

It seems that like HBSC, Citygroup have been ‘jealous’ of the future reports issued by Goldman Sachs and therefore also published its own report (in February 2011) on ‘Global growth generators: Moving beyond emerging markets and BRICs’.⁷ They declare that they ” intend to systematically research the global generators of growth for the future”. What they expect about the future? It seems that City is very optimistic: they predict high growth of the World economy, with average real GDP growth rates of 4.6% until 2030 and 3.8% between 2030 and 2050 (the world GDP will rise in real PPP-adjusted terms from 72 trillion USD in 2010 to 380 trillion USD in 2050). Asia and Africa will be the fastest growing regions (Bangladesh, China, Egypt, India, Indonesia, Iraq, Mongolia, Nigeria, Philippines, Sri Lanka and Vietnam have the most promising (per capita) growth prospects), and “China should overtake the US to become the largest economy in the world by 2020, then be overtaken by India by 2050”. But growth will not be smooth, as usual with booms and busts. “Occasionally, there will be growth disasters, driven by poor policy, conflicts, or natural disasters.” In the conclusion they declare that “There’s never been a better time for humanity”. Astonishingly the prediction presented in the Citi report suggests that India will be the largest economy by 2050 (with the total GDP equal to 85.97 bn US\$) followed by China (80.02 bn) and US on the third position (39.07 bn). It means that the Indian and Chinese economies will be more than twice larger than the US economy. Personally I do not believe in such great GDP gap between China or India and US in 2050. This senario seems to be rather improbably.

⁶ Karen Ward ‘The World in 2050’, January 2011, <http://www.research.hsbc.com/midas/Res/RDV?p=pdf&key=ej73gSSJVj&n=282364.PDF>

⁷ Willem Buiter Ebrahim Rahbari, ‘Global growth generators: Moving beyond emerging markets and BRICs’, 21 February 2011; Citi Investment Research & Analysis, a division of Citigroup Global Markets Inc., <http://www.nber.org/~wbuiter/3G.pdf>

Let's end this short review of selected prognosis by the forecast made by The Economist in the end of January 2011 (see Figure 7). We see that Lombard Street Research and Economist Intelligence Unit envisage almost stagnation of Japanese economy, and very fast growth of China, accompanied by moderate (normal) growth of US Economy. Around 2020 Chinese GDP will be higher than that of USA.

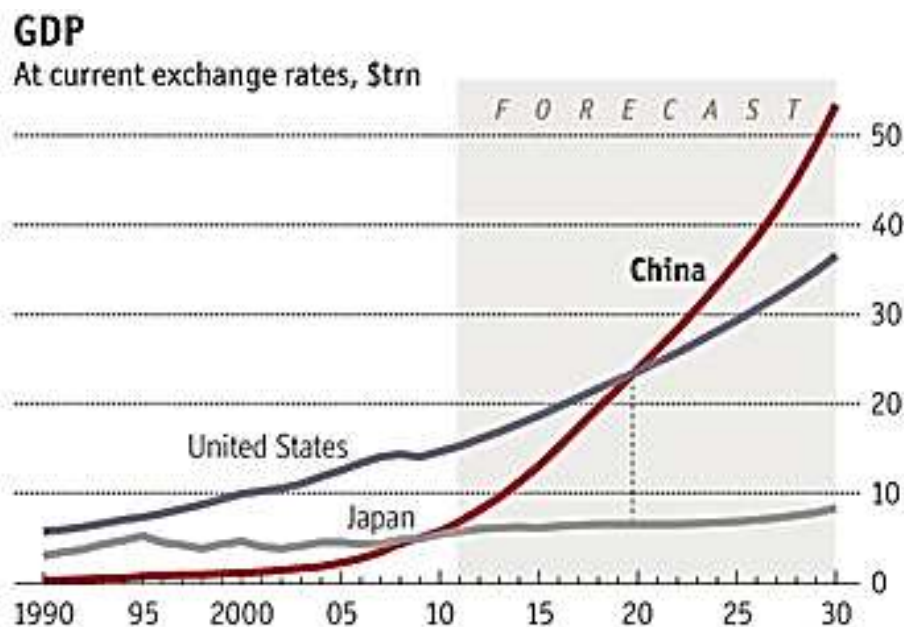


Figure 7. GDP projection for three leading economies. Lombard Street Research and Economist Intelligence Unit; After: 'Rising power, anxious state, The special report on China', *The Economist*, 23.01.2011, <http://www.economist.com/node/18829149>

Summary of the reports

There is one common feature of all reviewed reports, namely that China, USA and India will be the biggest economies in the World by 2050 (beside Poncet report, placing India on the 5th position). This is summarized in the Table 2.

The direct result of rapid economic growth of India and China is 'the global economy's shifting centre of gravity', as it is called by Danny Quah.⁸ Quah makes relevant calculations taking into account all the GDP produced on this planet, and describes the dynamics of the global economy's centre of gravity, the average location of economic activity across geographies on the Earth. In 1980 the global economy's centre of gravity was mid-Atlantic, but by 2008 the centre of gravity had drifted to a location east of Helsinki and Bucharest. By extrapolating growth in almost 700 locations across Earth, Quah projects the world's economic centre of gravity to locate by 2050 literally between India and China. This findings are presented in Figure 8.

The growing importance of the two major Asian economies inspires some thinkers to consider China and India as 'one big organism'. Indian Member of Parliament, Jairam Ramesh coined in 2005 the common term for that 'organism', namely Chindia. In his book *Making Sense of Chindia: Reflections on China and India*⁹ he argues that in spite of geopolitical, cultural, economic and political differences between China and India, it is justified to use common term Chindia, due to some complementarities between these two

⁸ Danny Quah, The Global Economy's Shifting Centre of Gravity, *Global Policy*, Volume 2, Issue 1, pages 3–9, January 2011; <http://onlinelibrary.wiley.com/doi/10.1111/j.1758-5899.2010.00066.x/full>

⁹ Jairam Ramesh, *Making Sense of Chindia: Reflections on China and India*, India Research Press, 2005.

countries (“China is perceived to be strong in manufacturing and infrastructure while India is perceived to be strong in services and information technology. China is stronger in hardware while India is stronger in software. China is stronger in physical markets while India is stronger in financial markets. The countries also share certain historical interactions - the spread of Buddhism from India to China and trade on the Silk route are famous examples”).

Antagonist of that idea claim that the Sino-Indian War of 1962 makes the relations between the countries hard, cautious and slowly improving. They also underline political differences (‘China can be characterized as a single party authoritarian state whereas India is a democracy of hundreds of political parties’) as well as different cultural backgrounds (‘India's culture can be characterized by a high degree of pluralism whereas China has a more ethnically homogeneous population.’).

Tabela 2. Ranking of the biggest economies in 2050 as proposed in different reports

Report	China	USA	India	4th position	5th position
Goldman Sachs 2003	1	2	3	Japan	Brazil
Goldman Sachs 2007	1	2	2	Brazil	Mexico
Goldman Sachs 2008	1	3	2	Brazil	Russia
Goldman Sachs 2009	1	2	3	Brazil	Russia
PwC 2006	1	2	2	Brazil	Japan
PwC 2008	1	2	3	Brazil	Japan- Indonesia- Mexico- Russia
PwC 2011	1	3	2	Brazil	Japan -Russia
Citigroup 2011	2	3	1	Indonesia	Brazil
HSBC 2011	1	2	3	Japan	Germany
Sandra Poncet 2006	2	1	5	Japan the 3 rd position	
Carnegie 2010	1	2	3	Japan	Brazil

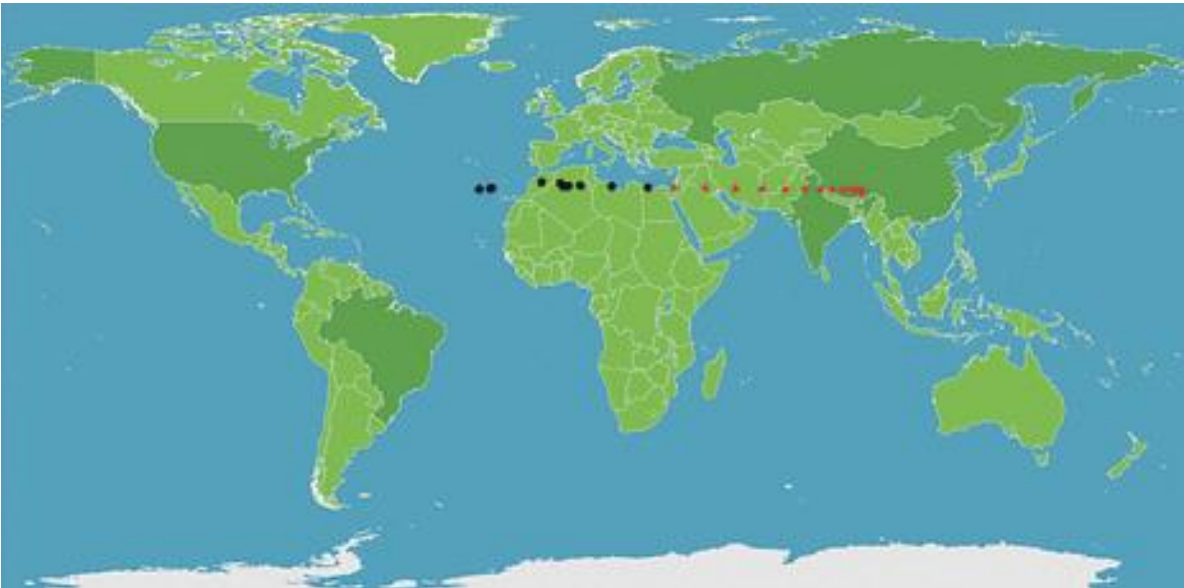


Figure 8. The world's economic centre of gravity, 1980–2007 (black) and extrapolated (in red), at three-year intervals.

Jairam Ramesh claims that the ‘rise’ of these countries might be understood ‘less as a new development and more as a re-emergence’. He points out that ‘at the beginning of the 18th century, China and India certainly dominated the world and not just demographically." Ramesh opinion seems to be justified on the basis of the historical process of distribution of world income. Angus Maddison in his *Chinese Economic Performance in the Long Run*¹⁰ divided the world into five regions, namely China, India, Europe, the United States, Japan, and Russia and presented the shares of the World GDP at the years 1700, 1820, 1952, 1978, 2003, and project it to 2030 (see Table 3). As we see China with 22,3% of the world income, and India with 24.4% in 1700 dominated the world global economy. Almost the same figures are in 1820 (total share of Chindia was 48.9%, compared to 46.7% in 1700). The Chindia share declined in the 19th and the 20th century to 8.2% in 1978 and since that year is steadily rising. In 2003 the share was equal to 20.6% and (as Maddison predicts) in 2030 it will equal to 33.5%.

Table 3. Shares of World GDP, 1700-2003 (per cent of World Total)

	1700	1820	1952	1978	2003	2030
China	22.3	32.9	5.2	4.9	15.1	23.1
India	24.4	16.0	4.0	3.3	5.5	10.4
Japan	4.1	3.0	3.4	7.6	6.6	3.6
Western Europe	21.9	23.0	25.9	24.2	19.2	13.0
United States	0.1	1.8	27.5	21.6	20.6	17.3
USSR	4.4	5.4	9.2	9.0	3.8	3.4

<http://dx.doi.org/10.1787/086785463850>

Source: Maddison (2007).

The on-going process of shifting the ‘centre of global economic activity’ has spurred the initiative to establish *The India China and America (ICA) Institute* as a non-profit organization, “to foster economic growth through Innovation, Entrepreneurship and Inclusiveness within India, China and America (ICA) and Trade and Investment between these three economies.”¹¹ It is claimed that “this is the new triad power (India, China and America) replacing the old triad power (Japan, Europe and USA). Unlike the old triad power, the new one is not likely to evolve as harmoniously because of the past ideologies of the countries involved (communist ideology of China, Socialist ideology of India and Capitalist ideology of America). Therefore, it needs an active catalyst like ICA Institute to create a harmonious relationship between business leaders, policy makers and the political processes to generate economic growth.”

China, India and the rest of the world form different perspective

In the middle of the 1990s we have proposed the evolutionary model of substitution-diffusion processes¹² which can be used to investigate international competition of countries and regions. The model and the procedure of its parameters identification is presented in our paper published in TF&SCh, here we will confine ourselves to describe only the model’s basic characteristics.

¹⁰ Angus Maddison, *Chinese Economic Performance in the Long Run. Second Edition, Revised and updated: 960-2030 AD*, OECD 2007, p. 103, Table 4.6.

¹¹ <http://www.icainstitute.org/>

¹² W. Kwasnicki, H. Kwasnicka, ‘Long-Term Diffusion Factors of Technological Development: An Evolutionary Model and Case Study’, *Technological Forecasting and Social Change* 52 (1996), 31-57.

Let's assume that we have n competing nations (or regions). The dynamics of the share $f_i(t)$ of a nation (region) i in the global GDP in year t can be described by so called replicator equation (or selection equation):

$$f_i(t) = f_i(t-1) \frac{c_i}{\bar{c}(t-1)} \quad (1)$$

where

$c_i(t)$ – competitiveness of the nation (region) I at time t ,

$\bar{c}(t)$ – the average competitiveness at time t :

$$\bar{c}(t) = \sum_{i=1}^n c_i f_i(t) \quad (2)$$

As we see from the replicator equation, the share of nation (region) i is growing if the competitiveness of that nation is greater than the average competitiveness and is declining for the competitiveness smaller than the average competitiveness.

Let's first assume that we divide the world into three regions, namely the Western countries, China, and the rest of the World¹³ and we identify the replicator equations parameters on the basis of historical data from years 1980 to 2006.¹⁴ We use the historical data available at *The Conference Board Total Economy Database* website.¹⁵ The data was downloaded on the 19th of November 2009.¹⁶ Identified competitiveness for three considered regions and the initial shares are presented in Table 4. We see that the China's competitiveness is much higher than the competitiveness of the West as well as of the Rest the World. The model fits quite well to the historical data (see Figure 9). According to our preliminary extrapolations, in 2050 the West and the Rest will have roughly the same shares in the global GDP (equal to 19%), and the share of China will be around 60%. China will surpass the West as well as the Rest around 2025. This scenario seems to be rather improbably and the discussion of reliability of those predictions will be presented in the following part of the paper.

Table 4. Values of the model's parameters: China, West and the Rest of the World – the identification period 1980-2006

	Competitiveness (c_i)	Initial share $f_i(t_0)$ in 1979
West	0.999152	0.486100
China	1.047807	0.053287
Rest of the World	1.000000	0.460613

¹³ the Western countries includes: Austria, Belgium, Cyprus, Denmark, Finland, France, Germany (West Germany from 1950-1988, united Germany from 1989-onwards), Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, Canada, United States, Australia, New Zealand, the China consists of People's Republic of China and Hong Kong.

¹⁴ In 1977 Deng Xiaoping became the new leader of China (after Mao Zedong's death) and has initiated pro free market economic reforms (based also on the economic policy encouraging foreign trade and foreign investments).

¹⁵ <http://www.conference-board.org/data/economydatabase/>

¹⁶ The global GDP is expressed in constant purchasing power dollar terms in 1990, called Geary-Khamis PPPs. This methodology is widely accepted (including the World Bank and the International Monetary Fund), as was proposed in 1958 by Roy C. Geary and modified by Salem Hanna Khamis in the early 1970s.

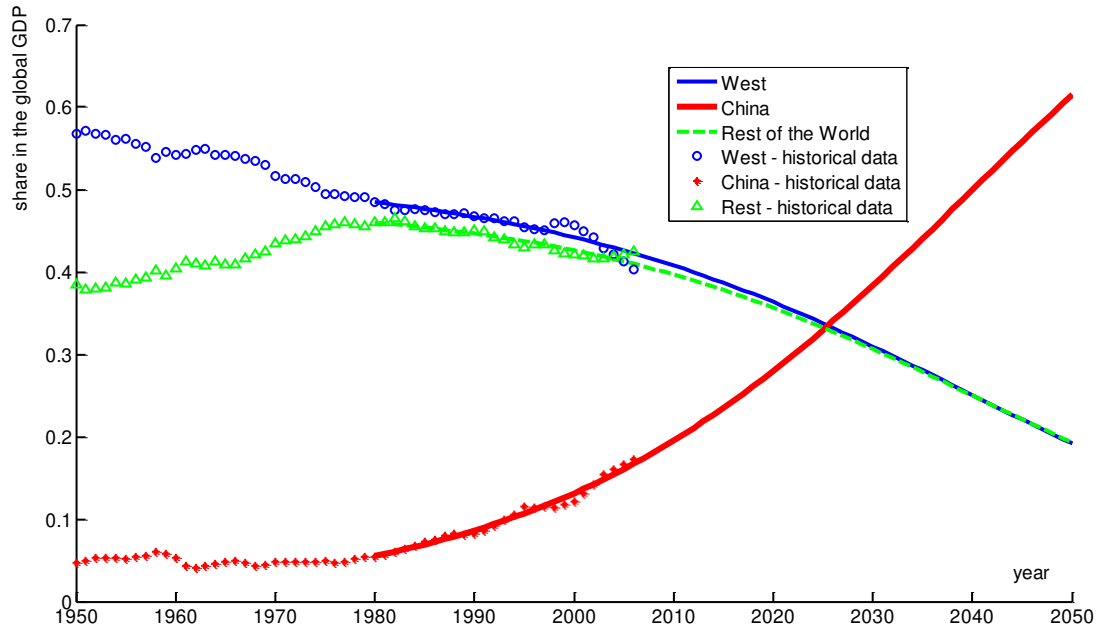


Figure 9. Evolution of the GDP shares of the three regions: China, West and the Rest of the World (the identification period 1980-2006)

We obtain slightly different results if we use the whole available historical date of the period 1950-2006 for the parameters' identification. The overall competitiveness of China is much lower (see Table 5) and in the middle of the 21st century the share of the China in the global GDP is almost the same as the share of the West (roughly 29%; see Figure 10). The share of the Rest is equal to 42%. Naturally we may complain that the fitting of the model to historical data is not good (Figure 10). It is understandable because the structure of Chinese economy of the post-war period up to the end of the 1970s was significantly different than that of post 1980 one.

We may expect that the competitiveness of those regions is far from being constant and fluctuates in the course of time. Our model allows identifying dynamics of those fluctuations. Namely we are able to assume much smaller identification period (e.g., 7 years window) and make the identification of the competitiveness starting from the period 1950-1956 and move the 7 years window up to the last year, that is to the period 2000-2006.¹⁷ In such a case we obtain a kind of a 'moving competitiveness'. The result of this experiment is presented in Figure 11.

Table 5. Values of the model's parameters: China, West and the Rest of the World – the identification period 1950-2006

	Competitiveness (c_i)	Initial share $f_i(t_0)$ in 1949
West	0.992706	0.568897
China	1.020249	0.035354
Rest of the World	1.000000	0.395749

¹⁷ this procedure is described in details in (Kwasnicki, Kwasnicka, 1996)

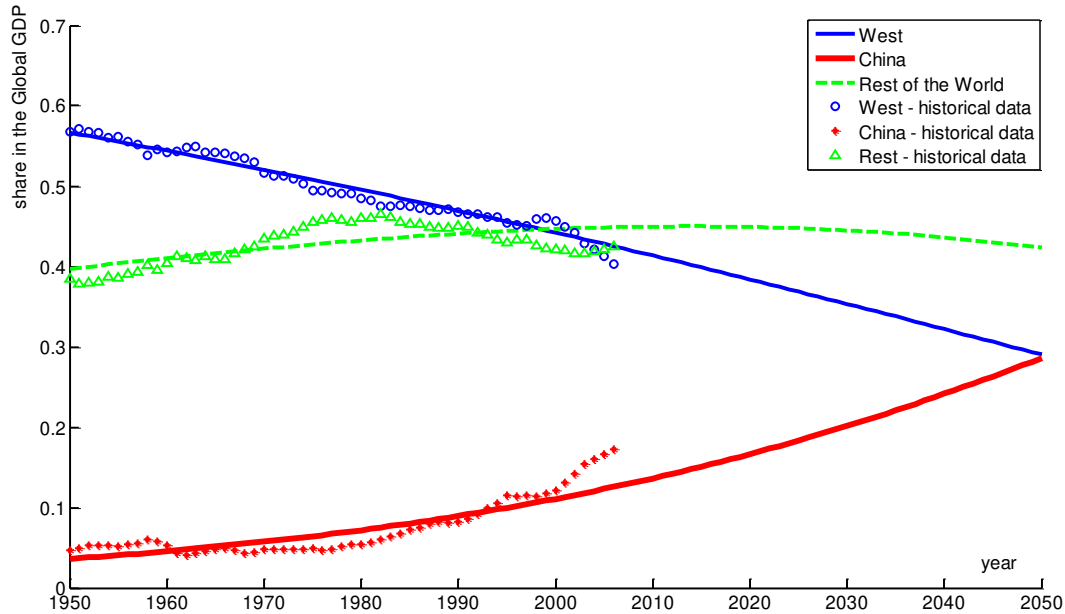


Figure 10. Evolution of the GDP shares of the three regions: China, West and the Rest of the World (the identification period 1950-2006)

As it is seen (Figure 11) the competitiveness is far from being constant. Up to the end of the 1980s the competitiveness of the West was below the competitiveness of the Rest of the World and usually below China competitiveness. The West economies were more competitive since the end of 1980s, but after the dot.com crises in the turn of the centuries, the West competitiveness is declining. It is clearly seen that the China competitiveness started to rise after the Deng Xiaoping reforms and (although fluctuating) was much higher than the West and the Rest competitiveness. It is hardly to predict the future of the Chinese economy competitiveness but we may expect that in near future advance of China will sustain. Lesson of Japan may give us a hint what may happen in longer perspective.

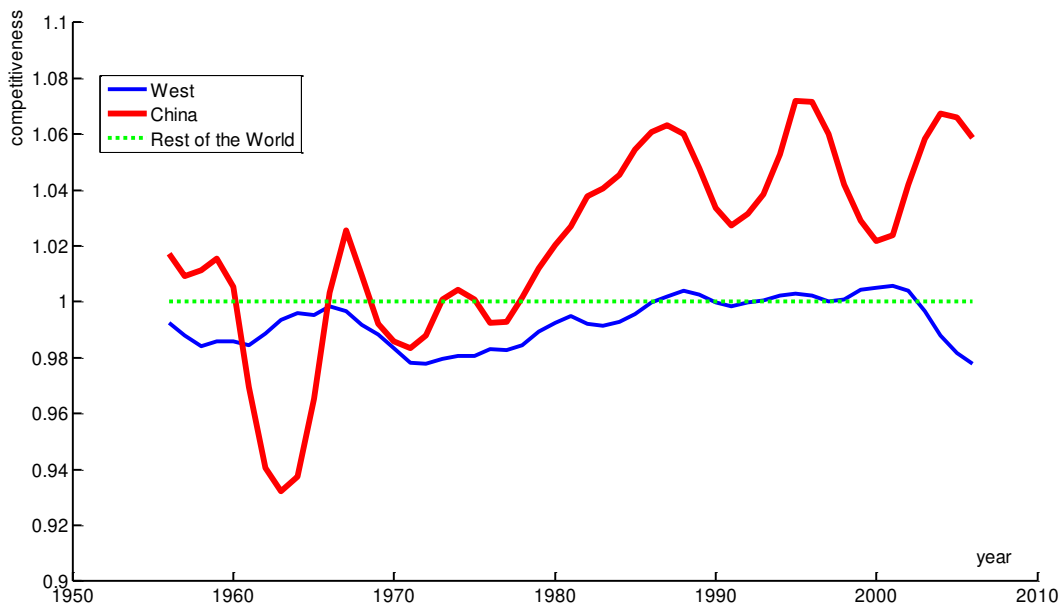


Figure 11. Dynamics of the competitiveness: China, West and the Rest of the World (identification is based on the 7 years moving window of historical data)

As it is known, Japan economy was treated as a pattern for growth in post-war period up to the beginning of the 1970s. Identified competitiveness of Japanese economy, based on the historical data from 1950 to 1970 is roughly similar as the China competitiveness for the period 1980-2006 (see Table 6) – the competitiveness was roughly 4% higher than the West and the Rest competitiveness. The share of Japan GDP in global production more than doubled in the period 1950-1970 (similar as it was in the period 1980-2000 for China).

The prediction of the shares in global GDP of Japan and two other regions are shown in Figure 12. We see that since the middle of the 1970s the discrepancy between the prediction and the real development is growing. Prediction based on the trend observed in 1950-1980 suggested that in 2030 the share of Japan economy will be above 50% (as in the case of China in 2050). According to that predictions we might expect that the share of Japan in the global production in 2006 ought to be 27%, in reality it declined to 6% (see Figure 12).

Table 6. Values of the model’s parameters: Japan, West and the Rest of the World – the identification period 1950-1970

	Competitiveness (c_i)	Initial share $f_i(t_0)$ in 1949
West	0.996064	0.569261
Japan	1.043551	0.028382
Rest of the World	1.000000	0.402356

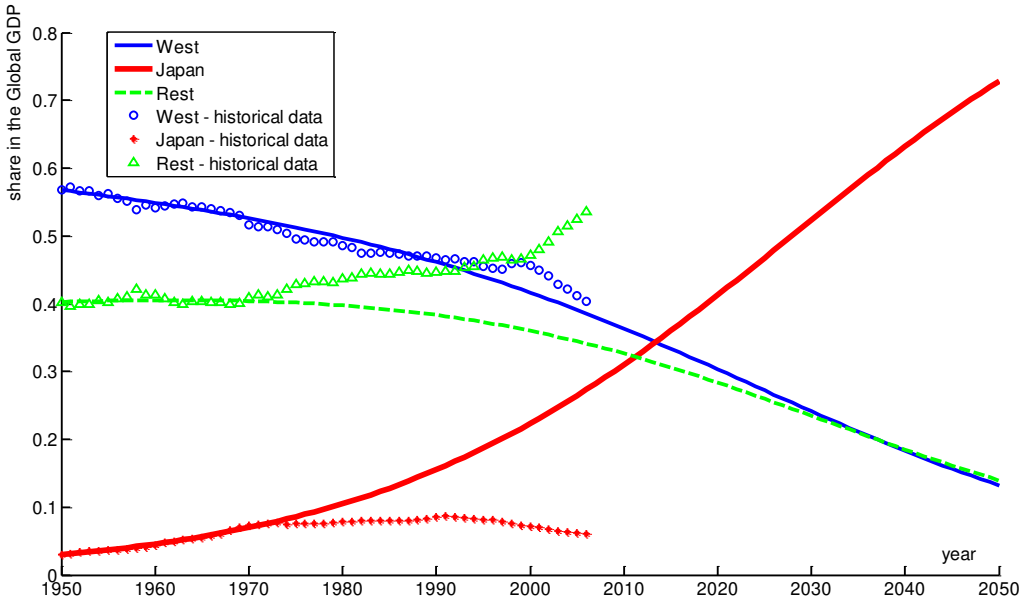


Figure 12. Evolution of the GDP shares of the three regions: Japan, West and the Rest of the World (the identification period 1950-1970)

Those results suggest that it would be good to look at the dynamics of the Japan competitiveness. Results of similar experiment with moving 7 years identification window (as in the case of China) are presented in Figure 13. We see that the pattern of changes of Japan competitiveness in the 1950-1970 is more or less similar to the pattern of changes of the China competitiveness in 1980-2000 (compare Figures 13 and 11), we see enormous superiority of Japan and China economies in the relevant periods. As we can notice (Figure 13) the sharp decline of the Japan competitiveness was observed in the 1970s, almost constant level of the competitiveness in the 1980s and beginning of the 1990s, and once more sharp decline in the turn of the 20th and the 21st centuries. We do not claim that the similar pattern

will be observed in the case of the China economy in the next few decades, but we would like to point that we ought to be very cautious in our evaluations of future of Chinese economy.

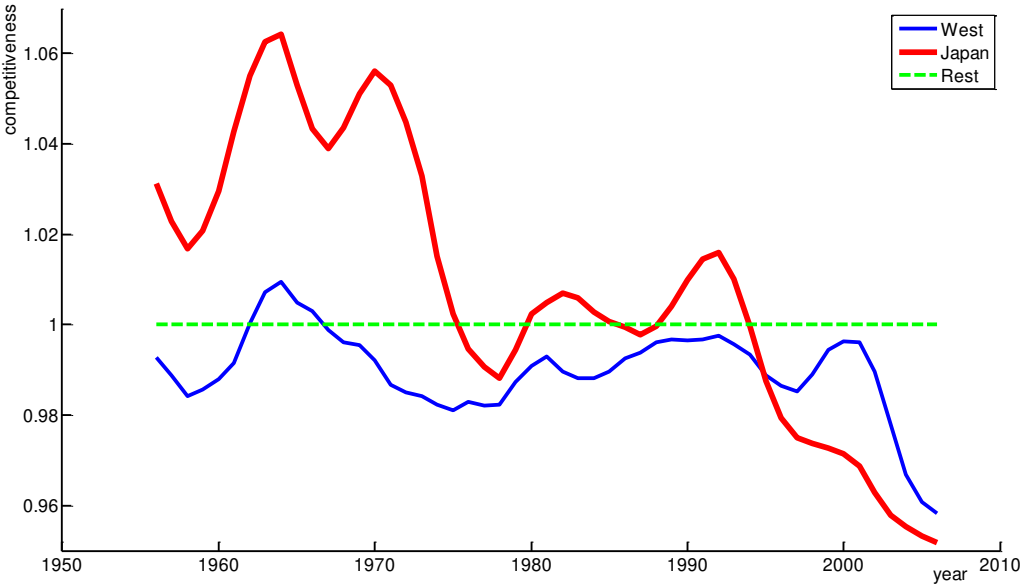


Figure 13. Dynamics of the competitiveness: Japan, West and the Rest of the World (identification is based on the 7 years moving window of historical data)

Table 7. Values of the model's parameters: USA, E12, Japan, China, India and the Rest of the World – the identification period 1950-2006

	Competitiveness (c_i)	Initial share $f_i(t_0)$ in 1949
USA	0.995710	0.253936
E12	0.992412	0.261623
Japan	1.014378	0.041473
China	1.022661	0.035302
India	1.006745	0.032042
Rest of the World	1.000000	0.375624

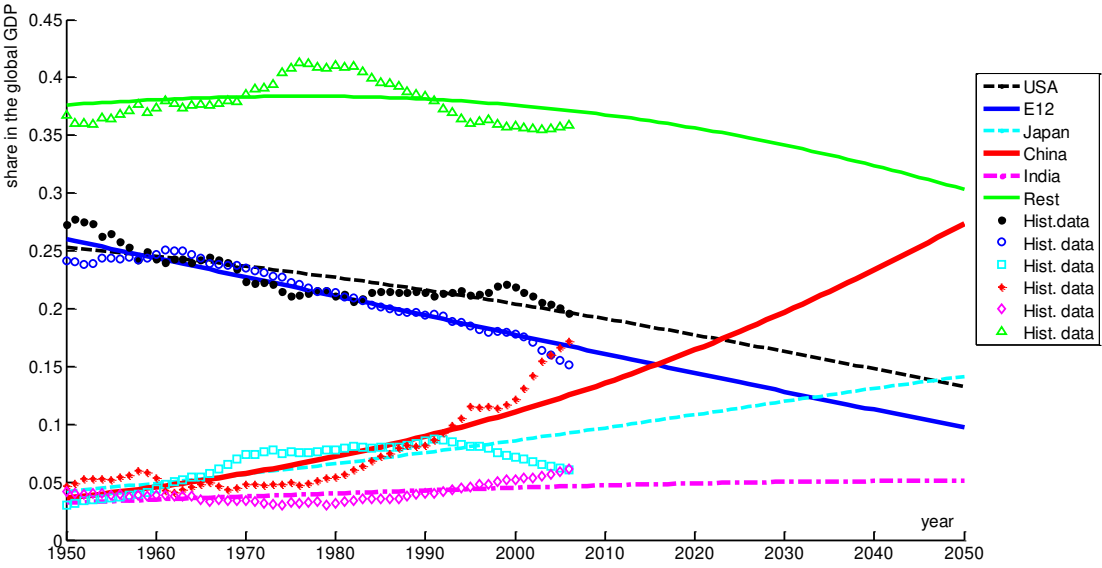


Figure 14. Evolution of the GDP shares of the six regions/countries: USA, E12, Japan, China, India and the Rest of the World (the identification period 1950-2006)

Our model allows to investigate the evolution of larger number of countries/regions. As the first experiment in that series, let us assume that the world is divided into six countries/regions, namely: USA, E12¹⁸, Japan, China, India and the Rest of the World. The overall competitiveness of those six countries/regions in the post-war period is presented in Table 7. We see that either USA or E12 economies lose their positions in the post-war period: their competitiveness is smaller than competitiveness of all other countries/regions. The fit of the model (see Figure 14) is rather poor and is clearly unsatisfactory. Significant differences between the model and the historical data are seen in almost all countries/regions, but especially visible in a case of China, Japan, and the Rest of the World. This is caused by significant differences in the mood of development of the World economy before and after 1980. It is clearly seen when we look at the dynamics of competitiveness in the post-war period (Figure 15). To identify the moving competitiveness we use the 14 years identification window.¹⁹ It is clearly visible that in all competitiveness the mood of changes up to 1980 is significantly different than that after 1980. It is worth to notice that in the last three decades the competitiveness of India economy is only slightly smaller than the China competitiveness, and that the USA competitiveness, although smaller than Chinese and Indian, is significantly greater than that of E12.

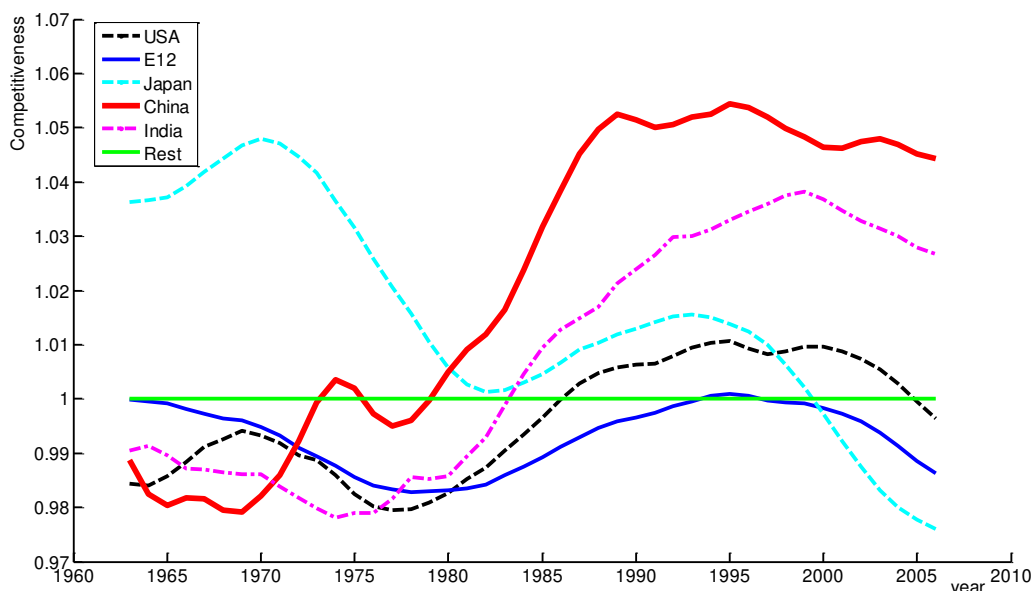


Figure 15. Dynamics of the competitiveness: USA, E12, Japan, China, India and the Rest of the World (identification is based on the 14 years moving window of historical data)

Therefore let's look more closely on the development of the world economy in the last three decades. The average competitiveness in the period 1980-2006 are presented in Table 8, and we see that it confirm general impression flowing from Figure 15; Japan and E12 economies lose their position, but USA economy tries to 'straggle' with China and India. Figure 16 shows the prognosis based on the trends observed in the period 1980-2006. It confirms the suggestions concerning the expected future of Chinese economy presented in

¹⁸ E12 consists of the twelve European countries, namely: Austria, Belgium, Denmark, Finland, France, Germany, Italy, Netherlands, Norway, Sweden, Switzerland, United Kingdom.

¹⁹ It is necessary to identify $2n-1$ parameters in our model (n is the number of countries/regions; namely $n-1$ competitiveness and n initial shares), therefore the number of historical data ought to be greater than $2n-1$ (in our case greater than 11, therefore we select 14 years identification window).

Figure 9 (the share of China GDP will be around 60% of the global GDP). According to that prediction, currently (in 2011) we ought to observe catching up of USA by Chinese economy (in GDP terms). India economy will exceed the E12 around 2030 and will be at the same level as USA in the middle of the 21st century.

Table 8. Values of the model's parameters: USA, E12, Japan, China, India and the Rest of the World – the identification period 1980-2006

	Competitiveness (c_i)	Initial share $f_i(t_0)$ in 1949
USA	1.005344	0.211215
E12	0.994965	0.215214
Japan	0.996753	0.086284
China	1.049823	0.053095
India	1.031486	0.030351
Rest of the World	1.000000	0.403841

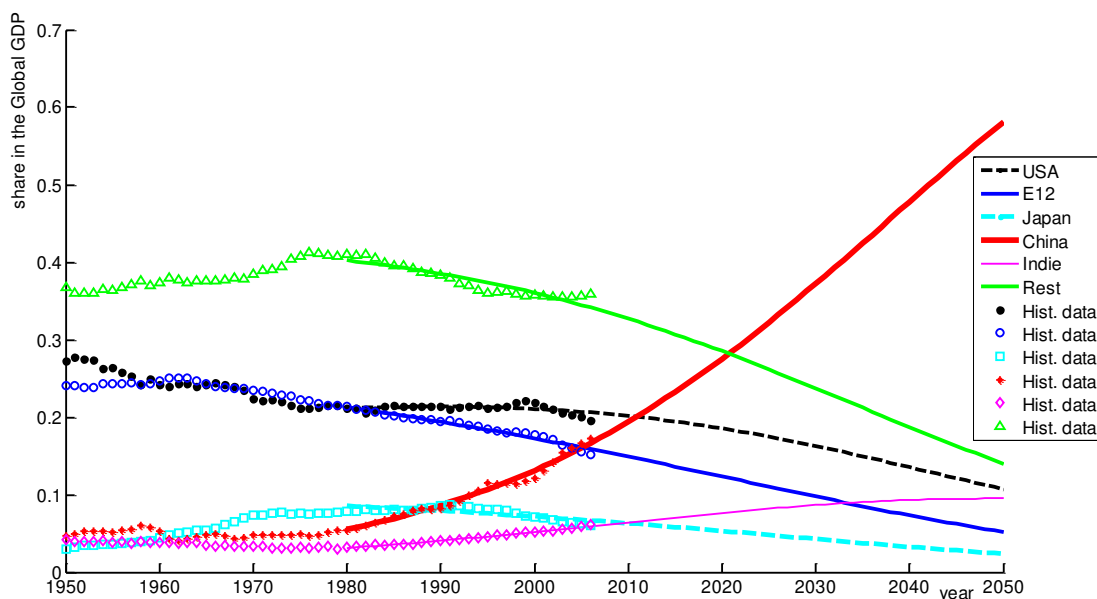


Figure 16. Evolution of the GDP shares of the six regions/countries: USA, E12, Japan, China, India and the Rest of the World (the identification period 1980-2006)

An idea of ranking the national economies according to their competitiveness index has come to us during the working on that paper. The problem is that if we would like to consider let's say 100 nations and calculate their competitiveness using our model we ought to have historical data on their GDP for roughly 200 years. Naturally it is not possible to collect such long historical data; therefore we propose a simplified approach. Let's assume that we consider each country separately as competing with the Rest of the World. To identify the competitiveness of that country (against the competitiveness of the Rest, all time assumed as equal to one²⁰) we ought to have historical data on at least four years (usually we assume longer period, e.g. 7 years for two types (countries)). Just to enquire the relevance of that approach we calculated moving competitiveness for the five considered countries/regions by making five simulation experiments: each country compete with the rest of the World. The results of those experiments are presented in Figure 17. The general tendency of the

²⁰ as we explain in (Kwasnicki, Kwasnicka, 1996) one country (type) ought to be treated as the reference country (type) and it is necessary to assume the reference value of the competitiveness of that country (type).

competitiveness changes is more or less similar to that observed in the experiment where all countries/nations competed altogether (see Figure 15). Just to show the level of the differences, the Figures 15 and 17 are collectively presented in Figure 18 (for all six countries/regions competing (solid lines) and calculated separately for each country competing with the Rest of The World (dashed lines)). The differences are clearly visible although there is general agreement concerning observed tendencies and far reaching similarities in the competitiveness rankings. In Table 9 the rankings of these five countries/regions for the years 1970, 1980, 1990, and 2000 are presented. The compatibility of rankings obtained for those two approaches is astonishingly good. The only difference is for the year 1970 where USA and E12 interchange their positions (but as we see in Figure 33 their competitiveness are very similar).

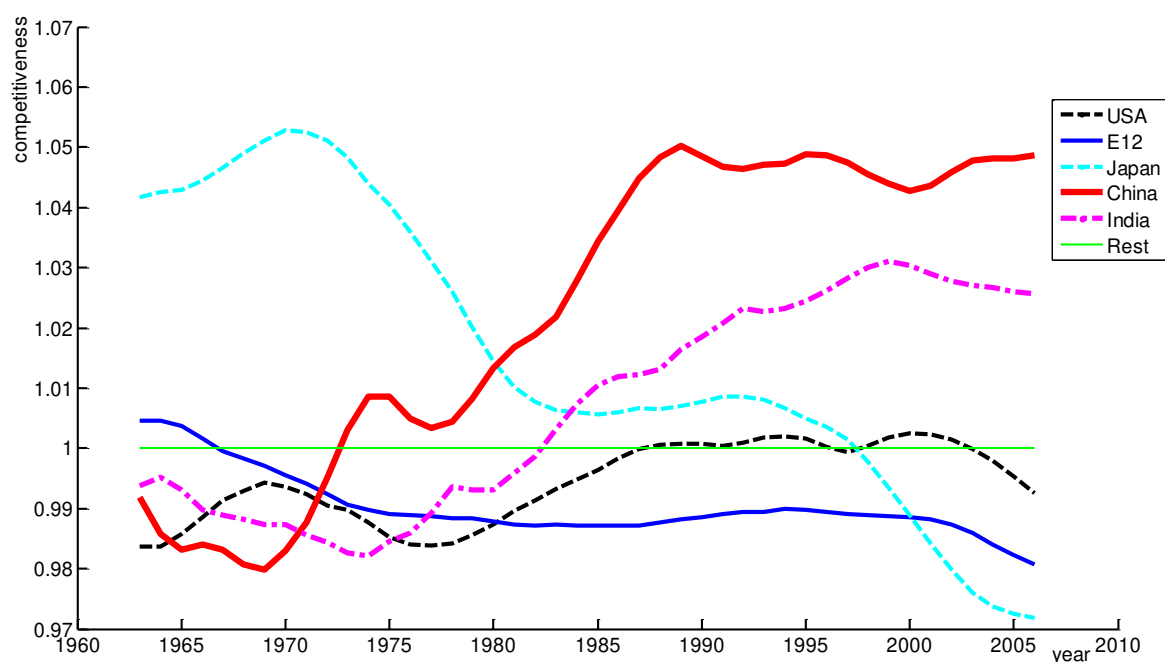


Figure 17. Dynamics of the competitiveness: USA, E12, Japan, China, India and the Rest of the World, calculated separately for each country competing with the Rest of The World (identification is based on the 14 years moving window of historical data)

Table 9. Rankings of competitiveness of different countries/regions for two approaches 'altogether competition' and 'separate competition'

	1970		1980		1990		2000	
	altogether competition	separate competition	altogether competition	separate competition	altogether competition	separate competition	altogether competition	separate competition
USA	3	2	4	4	4	4	3	3
E12	2	3	4	4	5	5	4	4
Japan	1	1	1	1	3	3	4	4
China	5	5	1	1	1	1	1	1
India	4	4	3	2	2	2	2	2

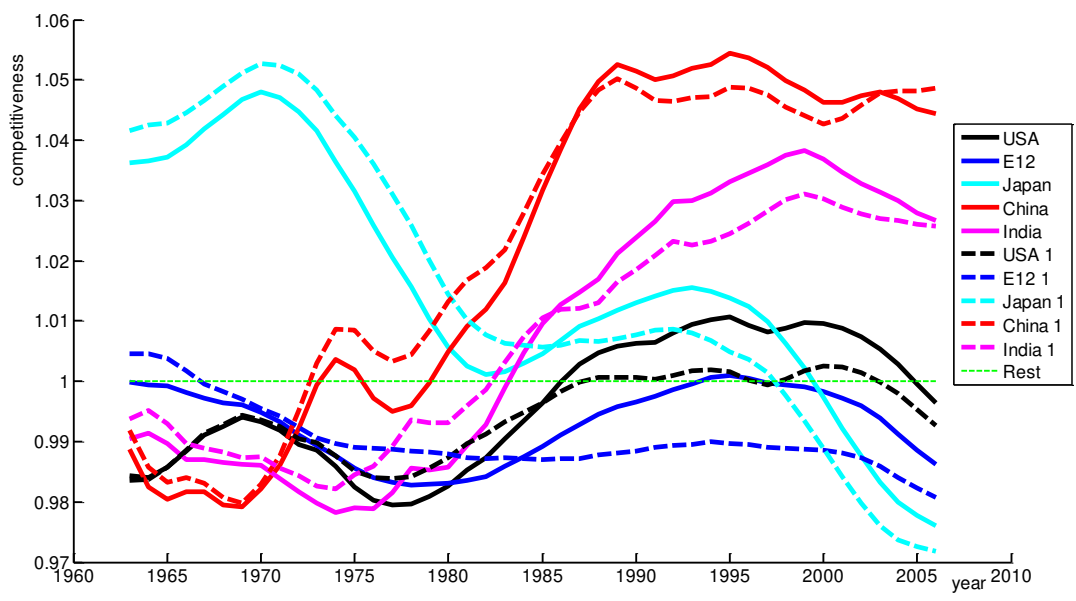


Figure 18. Comparison of the dynamics of the competitiveness: USA, E12, Japan, China, India and the Rest of the World, for all six countries/regions competing (solid lines) and calculated separately for each country competing with the Rest of The World (dashed lines); (identification is based on the 14 years moving window of historical data)

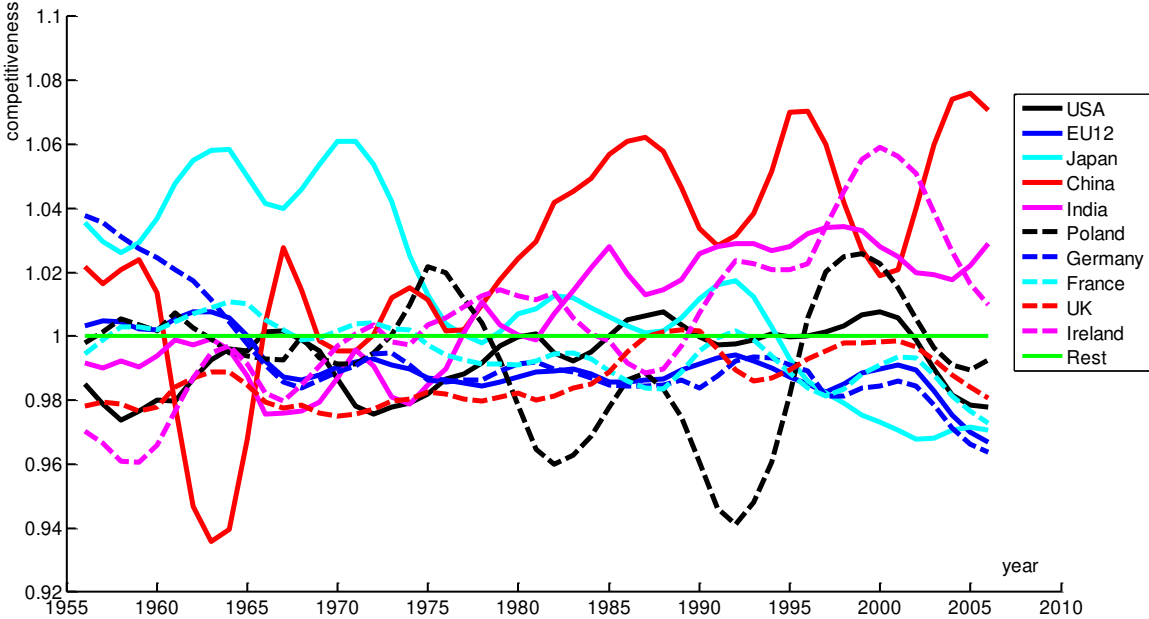


Figure 19. Dynamics of the competitiveness of nine countries and E12; calculated separately for each country competing with the Rest of The World (identification is based on the 7 years moving window of historical data)

There is no place present the rankings of competitiveness of all countries in the World but we plan to endeavour such project in near future. Here, as the first step toward that project we present the experiment for twenty nine selected countries and E12 (distinguished as a region competing especially with USA and China). Dynamics of the competitiveness of ten selected countries are presented in Figure 19 (for larger number of countries the figure would be

unreadable). Once more we see great variability of the competitiveness for almost all countries since the middle of the 20th century. In Table 15 we present the rankings of those 30 countries/region for selected years. We start from the middle 1950s, and as we see Israel, Germany and Japan were the most competitive countries at that time. Due to the market oriented reforms initiated in 1948 by Ludwig Erhard the German economy was one of the most competitive in the 1950s, but in a course of time Germany become more and more welfare state and became less and less competitive, in 1980 was ranked 19th, in 1990 25th, and in the last years was placed in the bottom of ranking. The same tendency of losing the competitiveness is observed for whole twelve European countries (E12). Growing competitiveness in the last 20-30 years is observed for such economies as: Chile, Ireland, India, and China. Poland, and to some extend also Hungary, are good examples of competitiveness advance due to the market oriented transformations. In 1990 these two counters was at the bottom of the ranking and now, after 20 years of transformation are placed in the top ten positions.

In the last column of the Table 15 the competitiveness indices for the last available historical data (2006) are presented. It is worth to notice high superiority of China and India over all advanced economies. The index for China is roughly 10% higher than these of USA, France, Japan and Germany. Even small differences in the values of the competitive indices result in enormous advantage/disadvantage of the economy in the long perspectives. For example nearly 3% difference between competitiveness of China and the West in period 1950-2006 (see Table 5) resulted in increase of China's share in global GDP from 11% in 2000 to 28% in 2050 and decrease of the share of the West from 44% to 29% (see Figure 10).

Table 10. Ranking of the competitiveness of selected economies (30 countries and regions)

ranking	1956	1960	1970	1980	1990	1995	2000	2006	2006
1	Israel	Israel	Singapore	Hong Kong	South Korea	China	Ireland	China	1.0707
2	Germany	Japan	Japan	South Korea	Hong Kong	Singapore	India	India	1.0291
3	Japan	Hong Kong	South Korea	Singapore	Singapore	Chile	Singapore	Ireland	1.0098
4	South Korea	Brazil	Israel	Brazil	China	South Korea	Poland	Hong Kong	1.0053
5	Hong Kong	Germany	Spain	Mexico	Chile	Israel	China	Singapore	1.0029
6	China	Mexico	Brazil	China	India	Hong Kong	Finland	South Korea	1.0015
7	Austria	Austria	China	Chile	Japan	India	Chile	Chile	1.0011
8	Italy	China	Hong Kong	Ireland	Spain	Ireland	South Korea	Hungary	0.9992
9	Singapore	Italy	Italy	Norway	Ireland	Norway	Israel	Poland	0.9927
10	Mexico	France	Australia	Japan	Israel	Australia	Netherlands	Spain	0.9893
11	Spain	E12	Netherlands	India	Australia	N. Zealand	Australia	N. Zealand	0.9893
12	Netherlands	Poland	France	Italy	Finland	Mexico	USA	Australia	0.9881
13	Brazil	Hungary	Canada	USA	UK	USA	Mexico	Israel	0.9860
14	E12	Canada	Austria	Canada	USA	Austria	Canada	Sweden	0.9853
15	Canada	South Korea	Ireland	Israel	Canada	Netherlands	Spain	Finland	0.9847
16	Switzerland	Finland	China	Spain	France	Brazil	Hungary	Canada	0.9830
17	Finland	Australia	Finland	Australia	Italy	Denmark	Norway	UK	0.9808
18	Poland	Singapore	Chile	Austria	Brazil	Japan	Sweden	Brazil	0.9799
19	N. Zealand	Switzerland	Poland	Germany	Netherlands	Spain	UK	Norway	0.9793
20	France	Denmark	Norway	France	Austria	Germany	Denmark	Mexico	0.9790
21	Norway	N. Zealand	E12	Netherlands	Switzerland	Canada	Hong Kong	USA	0.9777
22	India	Chile	Denmark	E12	E12	UK	Austria	Austria	0.9742
23	Australia	India	Switzerland	Finland	Sweden	France	N. Zealand	Denmark	0.9733
24	Hungary	Netherlands	Sweden	Denmark	Norway	E12	France	France	0.9730
25	USA	Spain	Germany	Hungary	Germany	Italy	Brazil	Switzerland	0.9719
26	Chile	Norway	India	UK	Denmark	Poland	E12	Netherlands	0.9707
27	Sweden	Sweden	USA	Poland	Mexico	Switzerland	Italy	Japan	0.9707
28	UK	USA	Hungary	Sweden	N. Zealand	Sweden	Switzerland	E12	0.9670
29	Denmark	UK	UK	Switzerland	Hungary	Finland	Germany	Italy	0.9648
30	Ireland	Ireland	N. Zealand	N. Zealand	Poland	Hungary	Japan	Germany	0.9638

Possible scenario of development

The extrapolation of future development of structure of the global GDP as presented in Figure 16 seems to be improbable, mainly because it is hardly possible that the competitiveness of distinguished six countries/regions will be constant in the next 40 years. Let's make an experiment and assume future development of competitiveness of the six regions. The initial

competitiveness of those six regions are as presented in Table 8 (i.e., based on the identification period 1980-2006). Future competitiveness (up to 2050) is assumed to changes as follows (what is illustrated in Figure 20): US competitiveness will be stable (and equal to 1.005344) up to 2020 and since that year will growth steadily (in linear form) in the next 30 years, to reach 1.02 in 2050; the E12 competitiveness will remain constant (and equal to 0.994965) up to 2030, since that year it will growth steadily to reach 1.01 in 2050; the same pattern is assumed for Japan, although it is assumed that the reform will start earlier then in Europe, and the steady growth of Japanese economy competitiveness will start in 2020, to reach the same value 1.01 in 2050; Chinese economy competitiveness will be the highest one (and equal to 1.49823) up to 2015, and next will drop heavily to reach 1.0 in 2030, since that year became stable and equal 1.0 (so it is assumed that the pattern is similar to that of Japan in 1970s and 1980s); India competitiveness will growth from the initial 1.031486 to 1.04 in 2025 and since that year will diminish steadily to 1.01 in 2050; the competitiveness of the Rest of the Worlds, as the reference competitiveness is assumed to be constant for the whole period, and equal to 1.0.

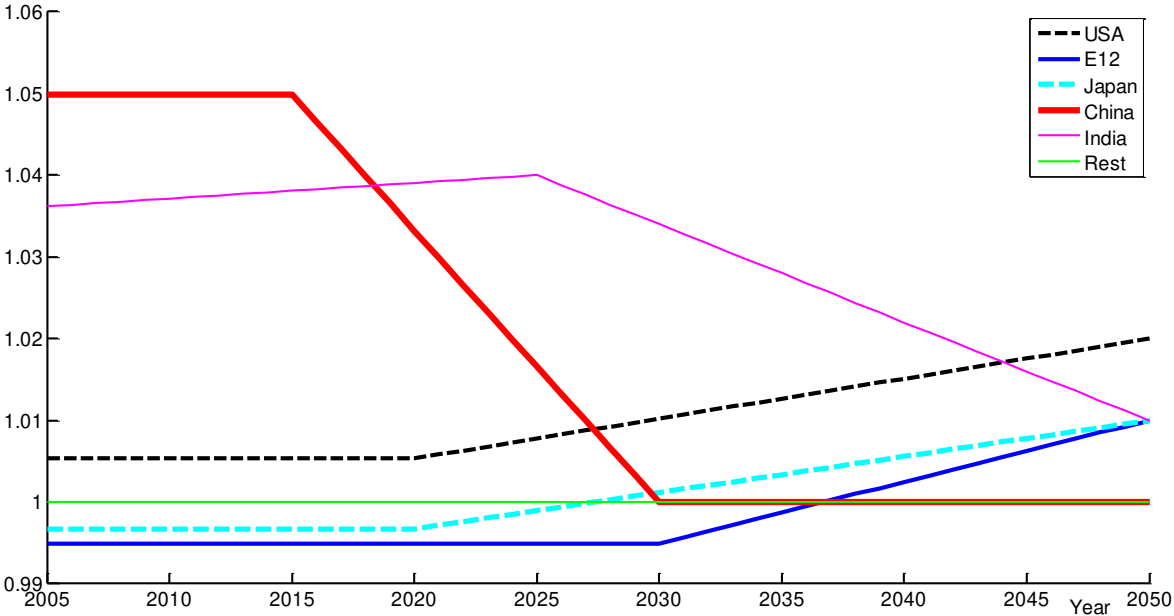


Figure 20. Assumed evolution of the competitiveness of the six countries/regions in the proposed scenario

In short we assume that US economy will be able to revive in the next ten years and will return to its relatively high competitiveness after 2020, the European countries (mainly due to bureaucratic burden of EU) will start necessary reforms ten years later, and will slowly revive after 2030, Japan will follow the same pattern of reforms as US, although their results will be not so impressive (therefore the end competitiveness in 2050 of Japan is slightly smaller than US in 2050); China will be able to be the most competitive economy in the next decade, but mainly due to the lack of the political reform the economy will lose its vigorousness after 2020; thanks to the democratic system and openness of Indian economy the India will became the most competitive economy since 2019 to 2044.

In Figure 21 the evolution of the structure of the global GDP (under the above assumptions) is presented. The Chinese economy overcome the US in 2011 (with roughly 20% shares of global GDP by both economies) and will still growth to reach the maximum share equal to 28% in 2027, in the next two decades (still being the largest global economy) its share is dropping to reach 24.5% in 2050. The second largest economy will be US, but its

share will still decline to reach the minimum 18.3% in 2027. Since that year the share US economy will rise to reach 22% in 2050 (roughly the same as China). The share of Indian economy will growth steadily to reach almost 16% in 2050 (and being the 3rd Word economy). Total share of twelve European countries (E12) will keep the past tendency to decline, but, due to the reform initiated in 2030s, in middle of the century will reach a plateau with the share equal to 10%. The same pattern of development will experience Japan, but the plateau (roughly 5% share) is reached by Japanese economy in the beginning of 2030s.

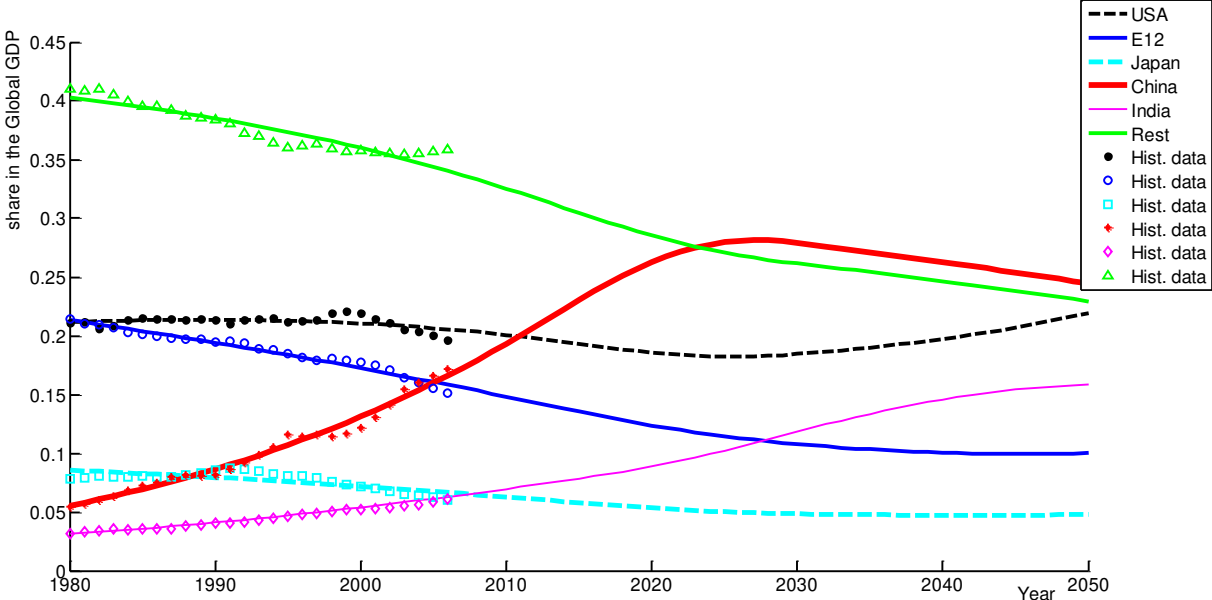


Figure 21. Scenario of development of future structure of the global GDP – the six regions/countries: USA, E12, Japan, China, India and the Rest of the World

Conclusions

All roads lead to Rome. We have outlined and presented findings of different forecasts on future of global economy made by different teams, in different institutions and under different assumptions. Most of them treat the year 2050 as the reference horizon of the prognosis. We have presented also our prediction concerning the future structure of the global economy based on the evolutionary model. Naturally there are large differences between the forecasts especially when we go into details, but from some point of view there is one common conclusion of all future studies, namely that in the middle of the 21st century the global economy will be dominated by three counties, namely USA, China and India. Additionally it can be said that the ‘old powers’, Europe and Japan are on the slippery slope. The center of economic activity are moving toward the east and probably in the end of the 21st century will be placed somewhere in the middle of the North Pacific Ocean (within a triangle USA-China-India).

How to find our own way of development in this new shape of the World? It’s great challenge to Poles and to Poland. In all reviewed forecasts Poland is hardly mentioned. What is the reason of that? What kind of conclusions we ought to draw from this phenomenon? We have made great economic progress in the last 22 years, to some extend we have opened new possibilities for further socio-economic development for many European and non-European societies. Why it is not noticed by the authors of these future studies?

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Chiny, Indie i przyszłość gospodarki globalnej

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Streszczenie

W pierwszej części artykułu przedstawiono przegląd prognoz globalnego rozwoju gospodarczego do 2050 roku (np. prognozy Uri Dadush and Bennett Stancil z *Carnegie Endowment for International Peace*, raport *HSBC*, raport *CitiGroup*, raport *PricewaterhouseCoopers*, prognozy *Banku Światowego* i *Międzynarodowego Funduszu Walutowego*). W tym kontekście opisano różnorodne poglądy i opinie dotyczące przyszłego rozwoju gospodarczego Chin i Indii (uznawanych obecnie za najszybciej rozwijające się wielkie gospodarki na świecie). Cechą wspólną niemalże wszystkich opracowań odnośnie długofalowej przyszłości gospodarczej świata jest to, że ich autorzy dochodzą do wniosku, że gospodarki Chin i Indii zdominują gospodarkę globalną i w pierwszej połowie XXI wieku będą dwiema największymi gospodarkami na świecie. Pytanie na ile to przekonanie jest uzasadnione jest przedmiotem rozważań w drugiej części artykułu, gdzie przedstawiona zostanie ekstrapolacyjna prognoza rozwoju globalnego PKB i oszacowanie udziału gospodarek Chin i Indii w produkcji globalnej do roku 2050 na podstawie tzw. ewolucyjnego modelu konkurencji.

Wykorzystany ewolucyjny model konkurencji umożliwia oszacowanie konkurencyjności gospodarek narodowych, dlatego w dalszej części artykułu przedstawiono wyniki badania konkurencyjności gospodarek Indii i Chin w okresie po drugiej wojnie światowej. Dokonano także porównania konkurencyjności Chin i Indii z liderami rozwoju gospodarczego w XX wieku, jakimi były Stany Zjednoczone, Wielka Brytania, Niemcy, Japonia oraz Unia Europejska. Podsumowaniem tych rozważań są prawdopodobne (choć bardzo subiektywne) prognozy udziału PKB Chin i Indii w produkcie globalnym na podstawie scenariuszy zmian konkurencyjności tych gospodarek w następnych 40 latach.

Słowa kluczowe: prognozowanie, studia nad przyszłością, globalizacja, rozwój gospodarczy.

China, India and the future of the global economy

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Abstract

In the first part of the paper an overview of the long-term global economic growth forecasts is presented (e.g., forecasts of Uri Dadush and Bennett Stancil of the Carnegie Endowment for International Peace, a report by HSBC, CitiGroup report, reports of PricewaterhouseCoopers, or Goldman Sachs reports). In this context, the diversified views and opinions on future economic development of China and India (currently considered as the fastest-growing major economies in the world) are presented. In the second part of the article, an extrapolative forecast of global GDP and an estimation of the economies of China and India in global production by 2050 based on the so-called evolutionary model of competition is outlined.

The evolutionary model of competition enables to estimate the competitiveness of national economies, therefore in the second part of the paper we present also the results of estimation of the competitiveness of the economies of India and China after World War II. One aim of that research is to compare the competitiveness of China and India with the leaders of economic development in the twentieth century, namely the United States, Great Britain, Germany, Japan and the European Union. The summary of these considerations are estimations the shares of GDP of China and India in the global product based on global scenarios of the competitiveness changes of these economies over the next 40 years.

Key words: future studies, forecasting, globalization, economic growth.