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**CHINA, INDIA, AND THE FUTURE  
OF THE GLOBAL ECONOMY**

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**Summary:** In the first part of the paper, an overview of the long-term global economic growth forecasts is presented. Next an extrapolative forecast of global GDP and an estimation of the shares of China and India in the global production by 2050 are presented. The evolutionary model of competition allows estimating 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. A possible scenario of development for the next 40 years is presented in the end of the paper.

**Key words:** future studies, forecasting, globalization, economic development.

## **1. Introduction**

Globalization is a subject of common discussion in the last two decades and probably this is the main reason that there is growing interest in 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., published by the Carnegie Endowment for International Peace, HSBC, Citi Group, PricewaterhouseCoopers, and Goldman Sachs). 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 shares of China and India in global production by 2050. The estimations are based on the so-called evolutionary model of competition.

The evolutionary model of competition allows estimating the competitiveness of national economies; therefore, in the second part of the paper we present 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. A possible scenario of development for the next 40 years is presented in the end of the paper.

## 2. An overview of the global forecasts

A kind of “reference year” of future studies is 2050. Numerous conferences and a great number of publications are undertaken with the general theme “the world in 2050”. One of the latest big, worldwide conferences in that mood was that held in Berkeley, 23-24 of January 2009, *The World in 2050: A Scientific Investigation of the Impact of Global Population Changes on a Divided Planet*.<sup>1</sup> To give as an example of the latest book on that subject, let us mention the important one, namely Laurence C. Smith, in *the World in 2050: Four Forces Shaping Civilization’s Northern Future* [2010]. The four global forces which will shape the future of the next 40 years are (in the opinion of Smith) are the following: (1) population demographics, (2) resource demand, (3) globalization, and (4) climate change. In the first part of the book, Smith identifies key world tensions and trends (among others urbanization, 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.

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 summary let us present a list of that publications.

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

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

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<sup>1</sup> For details see: <http://bixby.berkeley.edu/research/population/world-in-2050/presentations/>; and <http://www.prb.org/Journalists/Webcasts/worldin2050/worldin2050-overview.aspx>.

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 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 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.

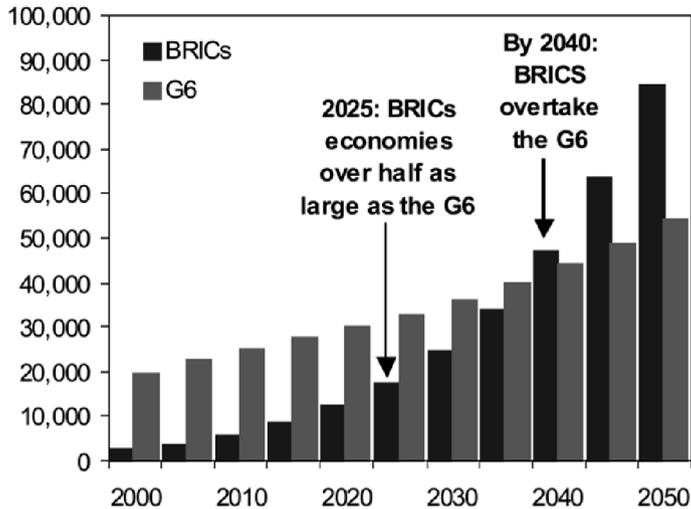
### 3. Goldman Sachs future reports

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).<sup>2</sup>As we see in Figure 1, according to that report, in 2025 the BRICs countries will reach 50% GDP of the G6, and around 2040 their GDP will be greater than the total GDP of G6.

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

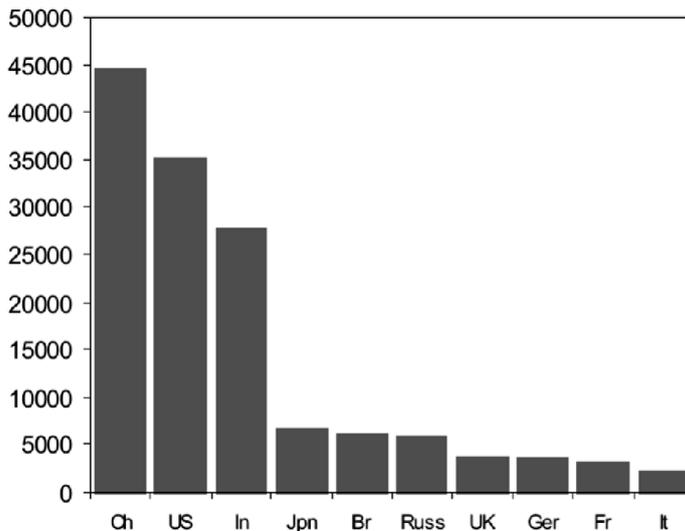
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<sup>2</sup> As the authors of the report comment: "In focusing on the G6 (rather than the G7 or a broader grouping), we decided to limit our focus to those developed economies with GDP currently over US\$1 trillion. This means that Canada and some of the other larger developed economies are not included. Adding these economies to the analysis would not materially change the conclusions" [*Dreaming...* 2003, p. 3].



**Figure 1.** Projection of GDP (in 2003, billion USD) of BRICs and G6 countries

Source: *Dreaming...* [2003].

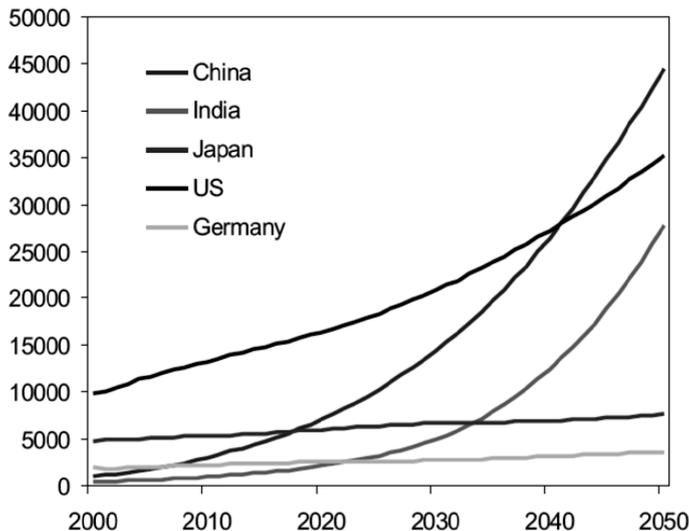


**Figure 2.** The largest economies in 2050 (in 2003, billion USD);

Source: *Dreaming...* [2003].

The projection of development of the five biggest economies, as envisaged by Goldman Sachs [*Dreaming...* 2003] is presented in Figure 3. According to that prediction, the Chinese economy will be greater than that of the US by around 2040,

but what is really interesting is that India will experience impressive economic growth in the next decades and will be very close behind China and the US in the middle of the 21st century; by around 2033 the Indian economy will overtake 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 grow from 1316 million in 2005 to 1418 million in 2050, but at the same period the population of India will grow 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 five times greater in 2050 compared to that in 2005. In 2005 the GDP *per capita* in India was equal to 3344 USD and in 2050 will be 17366 USD, but still more than twice smaller the current GDP *per capita* in the US. In the period 2005-2050, the GDP *per capita* in China will grow from 7204 USD do 31357 USD (i.e., more than four times), while the US *per capita* only doubles (from 41399 to 83710 USD). 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. Western Europe will experience stagnation in terms of demographic process in the first half of the 21st century (in fact a slight decline of population from 397 million in 2005 to 391 million in 2050, while at the same time US population will grow from 297 million to 420 million) and much slower growth in terms of economic welfare (GDP *per capita* will grow from 29227 USD in 2005 to 49154 USD in 2050, i.e., less than double).



**Figure 3.** Projection of GDP growth (in 2003, billion USD) of five largest economies

Source: *Dreaming...* [2003].

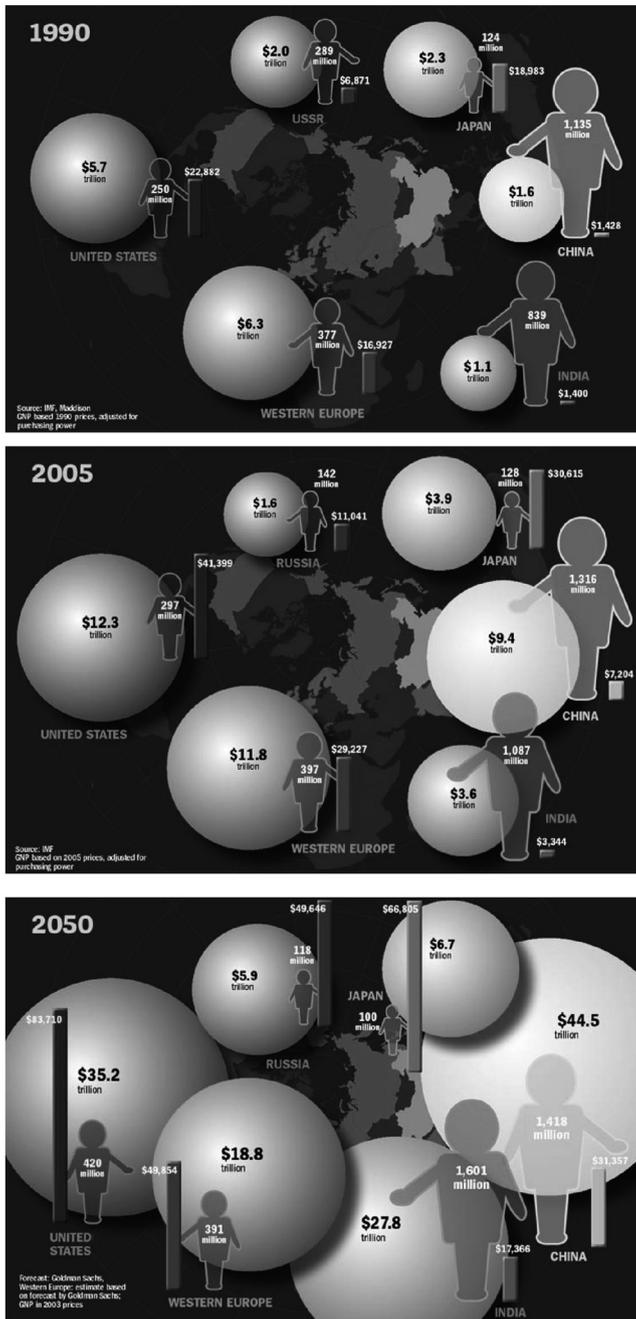


Figure 4. Illustrations of economic and demographic growth of six countries/regions up to 2050  
Source: *Dreaming...* [2003].

**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 very much depend on subjective assumptions made by the researchers. Let us mention the model presented in the Goldman Sachs report published in 2003, but all other reports and forecast are using a 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” ( $A$ ; Total Factor Productivity, TFP):

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

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 investment rate (investment as a share of GDP) together with assumed depreciation rate ( $\delta$ ) the capital stock is calculated as:

$$K_{t+1} = K_t(1-\delta) + \left(\frac{I_t}{Y_t}\right) \cdot Y_t \quad (2)$$

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” [*Dreaming...* 2003, p. 18]. To calculate  $A$  the following formula is applied:

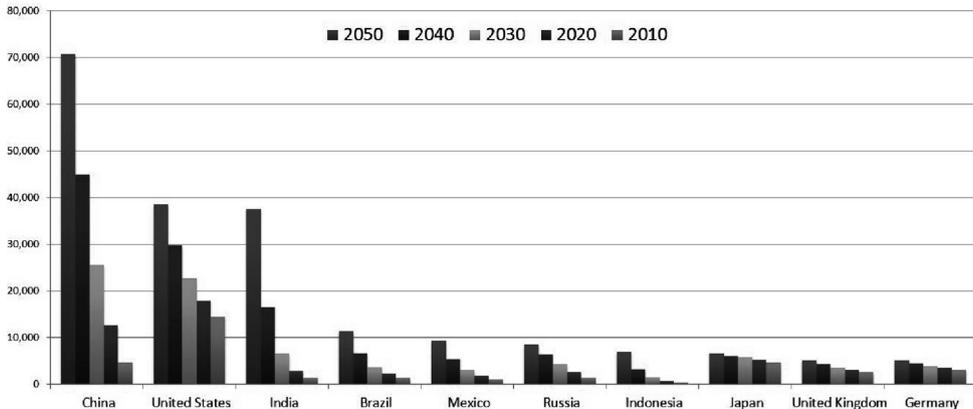
$$\frac{A_t}{A_{t-1}} = 1.3\% - \beta \ln\left(\frac{Incomepercapita_{DC}}{Incomepercapita_{US}}\right) \quad (3)$$

where  $\beta$  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 ( $\delta$ ) 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 ( $\alpha$ ) 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 ( $\beta$ ) assumed to be 1.5%, within the range of estimates from academic research” [*Dreaming...* 2003, p. 18].

So we see that a large number of assumptions are quite arbitrary; therefore, it is not a surprise that sometimes large differences in the forecasts are observed. For

example the Goldman Sachs report published four years later (in 2007) contains an essentially different projection (see Figure 5). China in 2050 is almost twice ahead of the US, and US and India economies are comparable in 2050. Also Japan is far behind Brazil, Mexico, and Russia.



Comment: the order of columns in the figure is 2050, 2040, 2030, 2020, and 2010.

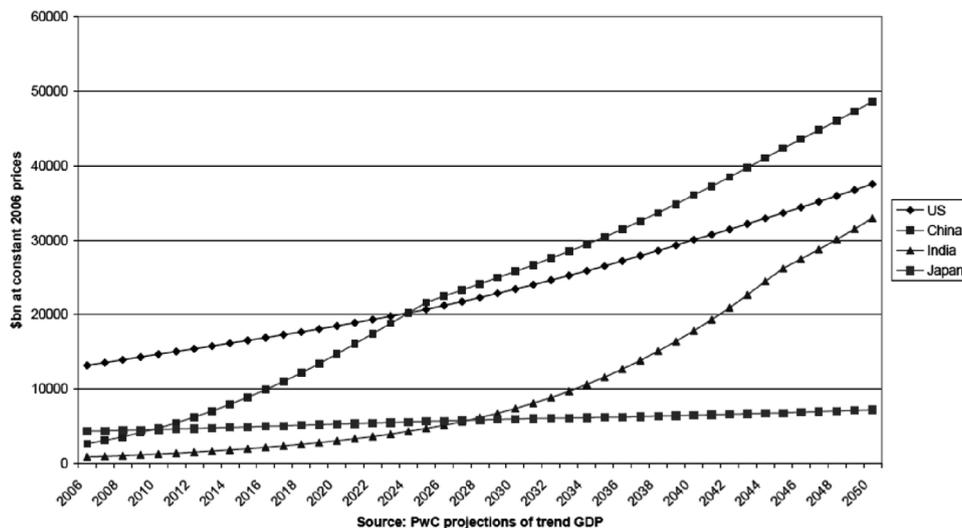
**Figure 5.** GDP projection for the largest economies (in 2006, billion USD)

Source: Goldman Sachs, from 2007; Poddar, Yi [2007].

#### 4. 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 (the US, Japan, Germany, the 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” [Hawksworth, Cookson 2008, p. 19]. The relative size projected by the 2008 report of the four largest economies are presented in Figure 6.

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



**Figure 6.** The projected relative size of the four major economies

Source: PwC, from 2008.

**Table 1.** Key changes in the results of 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: 2006-2050 (% pa)		
March 2006 report	3.9.	5.2
March 2008 report	4.7	5.8
3. GDP in 2050 at PPPs as percent of US		
March 2006 report	143	100
March 2008 report	129	88
4. GDP in 2050 at MERs as percent of US		
March 2006 report	94	58
March 2008 report	129	88

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

The main explanation for such big differences given by the authors is the 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" [Hawksworth, Cookson 2008, p. 16]. Therefore, we see how cautiously it is necessary to read the published projections, when even seemingly hard historical data on current GDP are not reliable.

## 5. Other reports

There are numerous publications under the general theme of "how the world will look like in 2050". Here we will shortly present only four of them. In chronological

order, let us start from Sandra Poncet's [2006] study entitled *The Long Term Growth Prospects of the World Economy: Horizon 2050*. 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. Similarly as 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 the 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)" [Poncet 2006, p. 5] 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" [Poncet 2006, p. 5].

Celebrating its centennial anniversary, the Carnegie Endowment for International Peace published in April 2010 the report entitled "*The World Order in 2050*" [Dadush, Stancil 2010]. 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 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” [Dadush, Stancil 2010, p. 1]

Global Research, a division of HSBC Global Banking and Markets, published in January 2011 a report entitled *The World in 2050* [Ward 2011]. Once again the simple production function model (the so-called 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” [Ward 2011, p. 2].

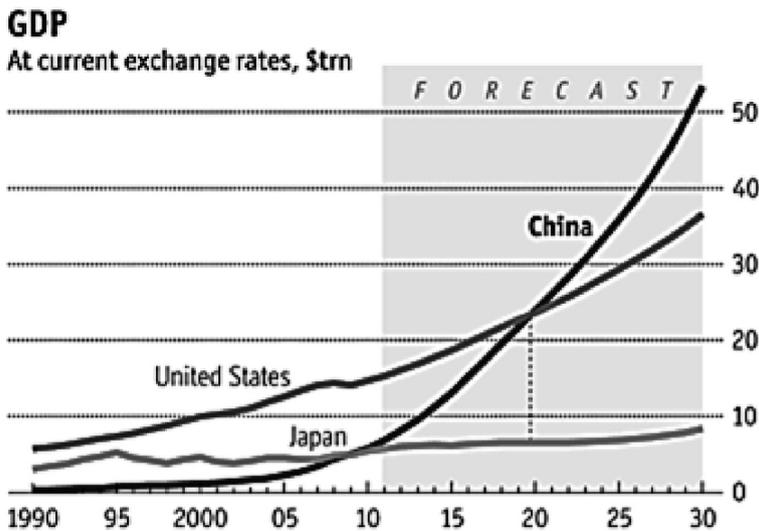
In particular, they predict that an average annual world growth will equal to 3%, compared with growth of just over 2% in the 2000s. Emerging-world growth will contribute twice as much as the developed world to global growth over this period. By 2050, the emerging world will have increased five-fold 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 predicts that in 2050 China at 24.6 trillion USD (constant 2000 year dollars) and the US at 22.3 trillion USD will together lead the global economy. India at 8.2 trillion USD will be far behind in 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, City group have been “jealous” of the future reports issued by Goldman Sachs and therefore also published its own report (in February 2011) entitled *Global growth generators: Moving beyond emerging markets and BRICs* [Buitter, Rahbari 2011]. They declare that they “intend to systematically research the global generators of growth for the future” [Buitter, Rahbari 2011, p. 3]. What do they expect from 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” [Buitter, Rahbari 2011, p. 3]. 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” [Buitter, Rahbari 2011, p. 3]. In the conclusion, they declare that “there’s never been a better time for humanity” [Buitter, Rahbari 2011,

p. 80]. Astonishingly the prediction presented in the Citi report suggests that India will be the largest economy by 2050 (with total GDP equal to 85.97 billion USD) followed by China (80.02 billion USD) and the US in third position (39.07 billion USD). This means that the Indian and Chinese economies will be more than twice larger than the US economy. Personally, I do not believe in such a great GDP gap between China or India and US in 2050. This scenario seems to be rather improbable.

Let us 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 the stagnation of the Japanese economy and the very fast growth of China, accompanied by moderate (normal) growth of the US economy. By 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;

Source: [*Rising power...* 2011].

## 6. Summary of the reports

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

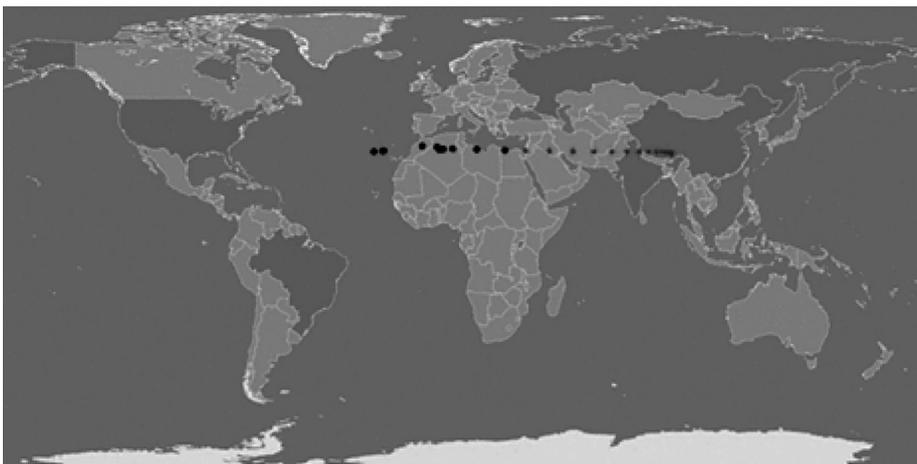
The direct result of the rapid economic growth of India and China is "the global economy's shifting centre of gravity", as it is called by Danny Quah [2011]. Quah makes relevant calculations taking into account all the GDP produced on this planet,

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 the earth, Quah projects the world's economic centre of gravity to be located by 2050 literally between India and China. These findings are presented in Figure 8.

**Table 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
Citigroup2011	2	3	1	Indonesia	Brazil
HSBC 2011	1	2	3	Japan	Germany
Sandra Poncet 2006	2	1	5	Japan the 3rd position	
Carnegie 2010	1	2	3	Japan	Brazil

Source: author's own work.



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

Source: Quah [2011].

The growing importance of the two major Asian economies inspires some thinkers to consider China and India as “one big organism”. An Indian Member of Parliament, Jairam Ramesh, coined in 2005 the common term for that “organism”, namely “Chindia”. In his book entitled *Making Sense of Chindia: Reflections on China and India* [2005], he argues that in spite of geopolitical, cultural, economic, and political differences between China and India, it is justified to use the common term Chindia, due to some complementarities between these two 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” [Ramesh 2005, p. 14].

Antagonists 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” [Chindia 2012] 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” [Chindia 2012]).

Jairam Ramesh [2005, p. 15] 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 18<sup>th</sup> century, China and India certainly dominated the world and not just demographically” [Ramesh 2005, p. 16]. Ramesh’s opinion seems to be justified on the basis of the historical process of distribution of world income. Agnus Maddison [2007, p. 103] in his *Chinese Economic Performance in the Long Run* divided the world into five regions, namely China, India, Europe, the United States, Japan, and Russia and presented the shares of the World GDP in the years 1700, 1820, 1952, 1978, 2003, and project it to 2030 (see Table 3). As we can 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 19<sup>th</sup> and the 20<sup>th</sup> century to 8.2% in 1978 and since that year has steadily risen. In 2003 the share was equal to 20.6% and (as Maddison predicts) in 2030 it will equal 33.5%.

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” [ICA Institute 2012]. 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

**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

Source: Maddison [2007].

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” [ICA Institute 2012].

## 7. China, India, and the rest of the world from a different perspective

In the middle of the 1990s, Kwaśnicki, Kwaśnicka [1996] proposed the evolutionary model of substitution-diffusion processes, which can be used to investigate international competition of countries and regions. The model and the procedure of its parameters identification is presented in their paper, here we will confine ourselves to describe only the model’s basic characteristics.

Let us 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):

$$f_i(t) = f_i(t-1) = \frac{c_i}{\bar{c}(t-1)} \quad (4)$$

where:  $c_i(t)$  – competitiveness of the nation (region)  $i$  at time  $t$ ,

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

$$\bar{c}(t) = \sum_{i=1}^n c_i f_i(t) \quad (5)$$

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 us first assume that we divide the world into three regions, namely the Western countries, China, and the rest of the world<sup>3</sup> and we identify the replicator

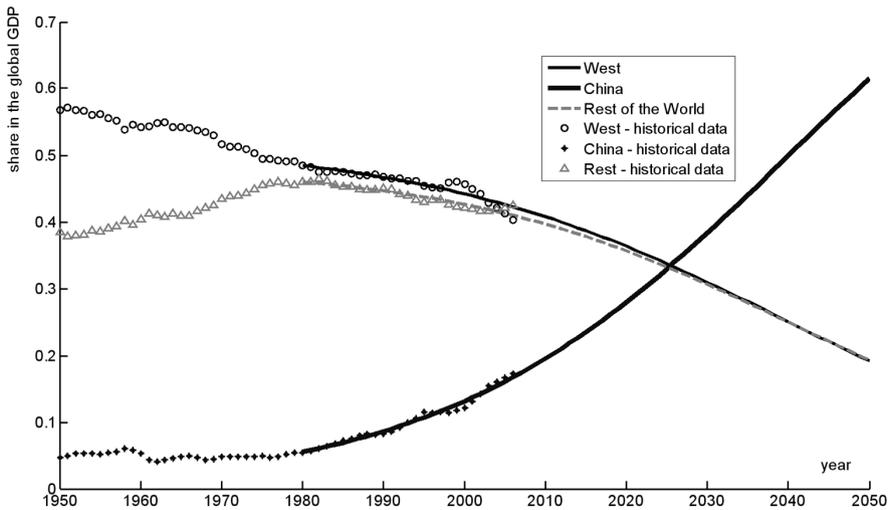
<sup>3</sup> The Western countries include: Austria, Belgium, Cyprus, Denmark, Finland, France, Germany (West Germany from 1950-1988, united Germany from 1989-onwards), Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom,

equations parameters on the basis of historical data from 1980 to 2006.<sup>4</sup> We use the historical data available at The Conference Board Total Economy Database website.<sup>5</sup> The data was downloaded on the 19 of November 2009.<sup>6</sup> Identified competitiveness for three considered regions and the initial shares are presented in Table 4. We see

**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
The rest of the world	1.000000	0.460613

Source: author’s own calculations.



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

Source: author’s own calculations.

Canada, United States, Australia, New Zealand, the China consists of People’s Republic of China and Hong Kong.

<sup>4</sup> 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).

<sup>5</sup> Available at <http://www.conference-board.org/data/economydatabase/>.

<sup>6</sup> 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.

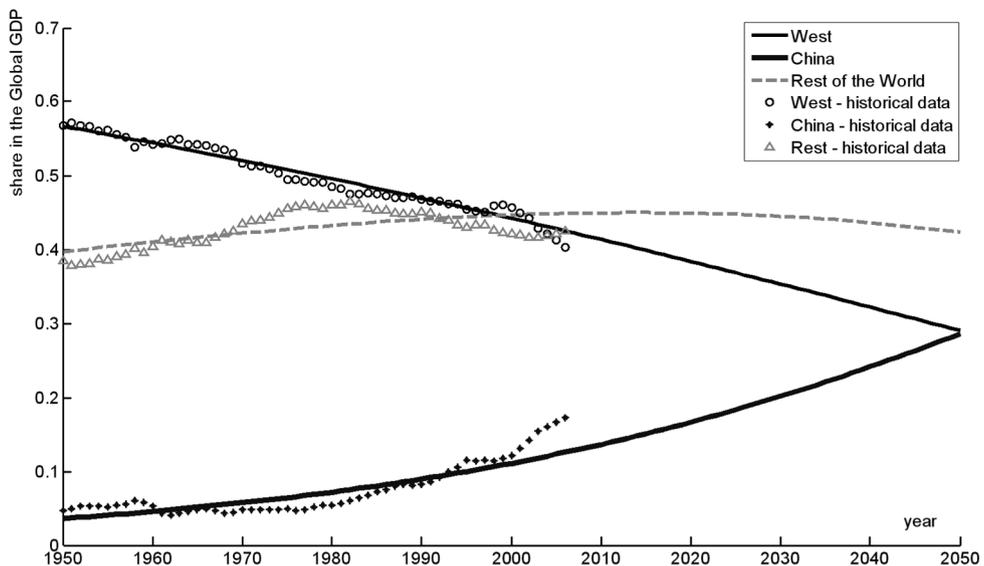
that China's competitiveness is much higher than the competitiveness of the West as well as of the rest the world. The model fits quite well with the historical data (see Figure 9). According to our preliminary extrapolations, in 2050 the West and "the rest" will have roughly the same shares in the global GDP (equal to 19%), and the share of China will be around 60%. China will surpass the West as well as "the rest" by around 2025. This scenario seems to be rather improbable and the discussion of reliability of those predictions will be presented in the following part of the paper.

We obtain slightly different results if we use the whole available historical data 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

**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

Source: author's own calculations.

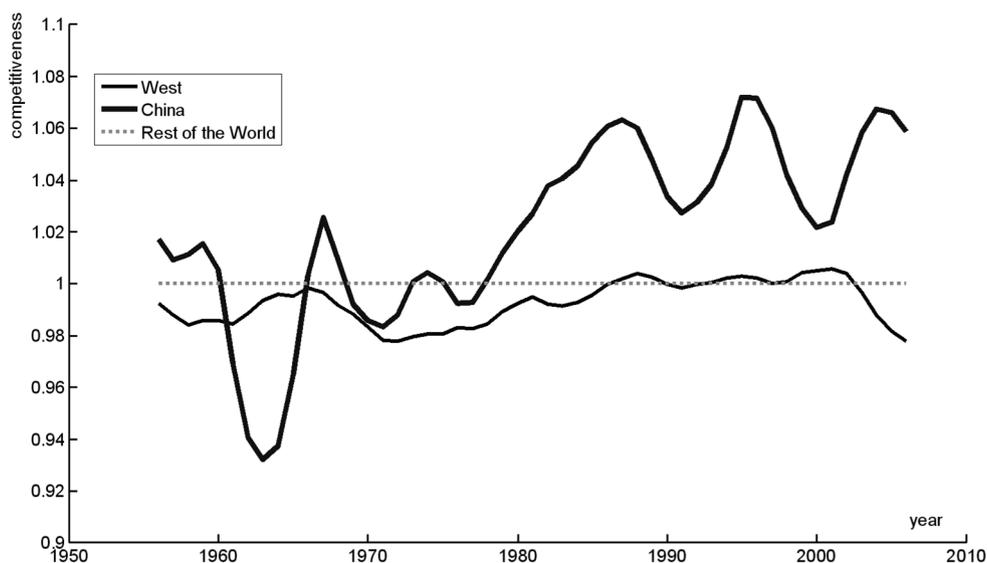


**Figure 10.** Evolution of the GDP shares of the three regions: China, West, and the rest of the world (the identification period 1950-2006)

Source: author's own calculations.

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). This 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 the 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 a 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.<sup>7</sup> In such a case we obtain a kind of a “moving competitiveness”. The result of this experiment is presented in Figure 11.



**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)

Source: author’s own calculations.

As seen in 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’s competitiveness. The Western economies were more competitive since the end of the 1980s, but after the dot.com crises at the turn of the century, Western competitiveness is in decline. It is clearly

<sup>7</sup> This procedure is described in details in [Kwaśnicki, Kwaśnicka 1996]

seen that the China's competitiveness started to rise after the Deng Xiaoping reforms and (although fluctuating) was much higher than the competitiveness of the West and the rest. It is hard to predict the future of the Chinese economy's competitiveness, but we may expect that in the near future advance of China will be sustained. The lesson of Japan may give us a hint as to what may happen in the longer perspective.

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

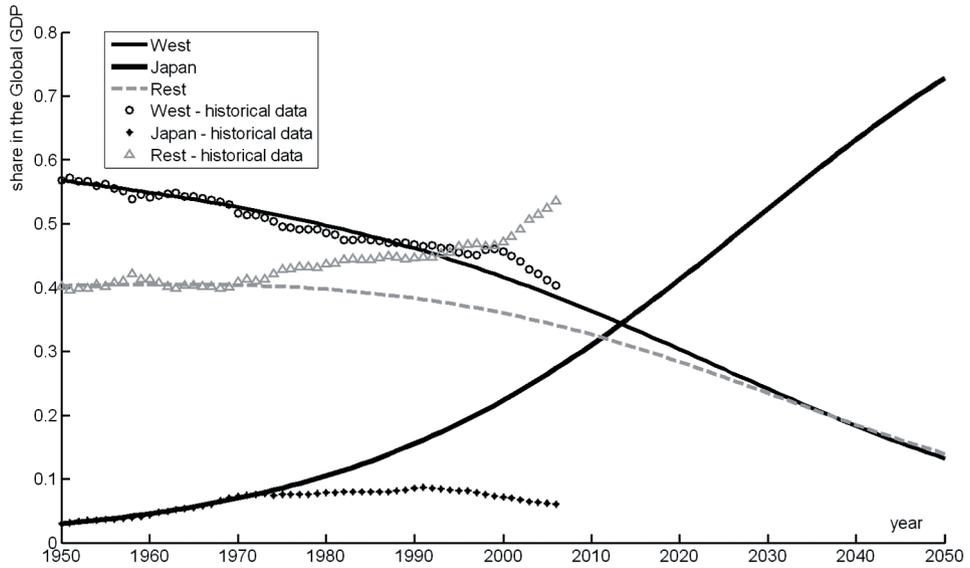
The prediction of the shares in global GDP of Japan and two other regions are shown in Figure 12. We see that since the middle of the 1970s, the discrepancy between the prediction and the real development is growing. The prediction based on the trend observed in 1950-1980 suggested that in 2030 the share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

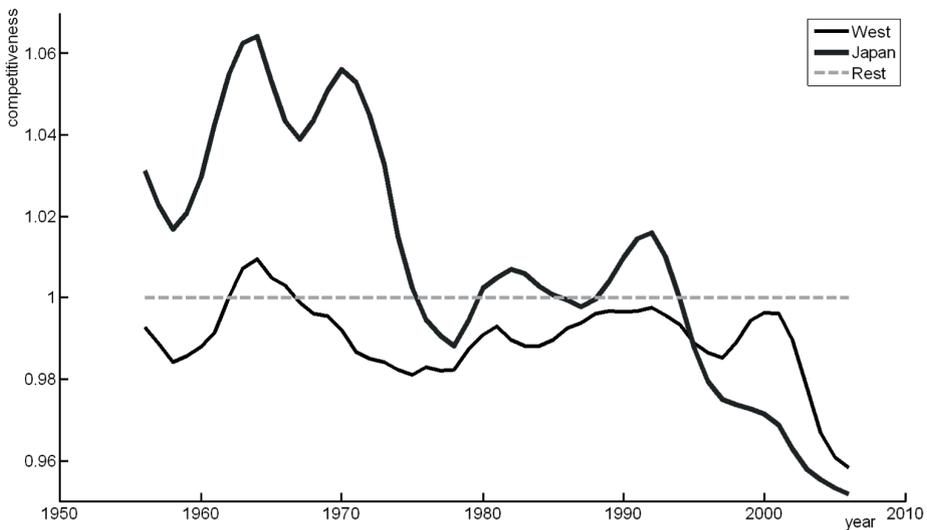
Source: author's own calculations.

Those results suggest that it would be good to look at the dynamics of Japan's competitiveness. The results of a 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's competitiveness in 1950-1970 is more or less similar to the pattern of changes of China's competitiveness in 1980-2000 (compare Figures 11 and 13), we see the enormous superiority of Japan's and China's economies in the relevant periods. As we can notice in Figure 13, the sharp decline of Japan's competitiveness was observed in the 1970s, an almost constant level of competitiveness in the 1980s and beginning of the 1990s, and once more a sharp decline at the turn of the 20th and the 21st century. We do not claim that a similar pattern will be observed in the case of China's economy in the next few decades, but we would like to point out that we ought to be very cautious in our evaluations of the future of the Chinese economy.



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

Source: author’s own calculations.



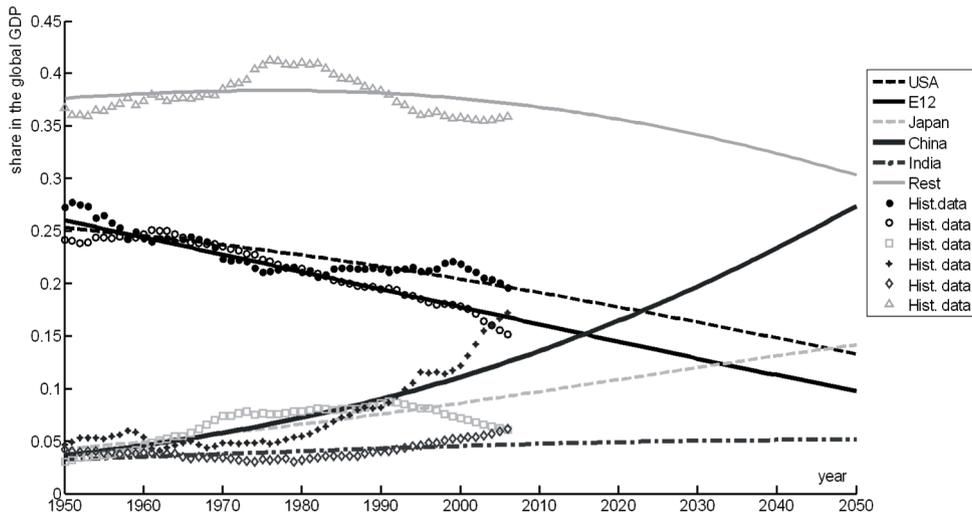
**Figure 13.** Dynamics of the competitiveness: Japan, West, and the rest of the world (identification is based on the 7 years moving window of historical data)

Source: author’s own calculations.

**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

Source: author’s own calculations.



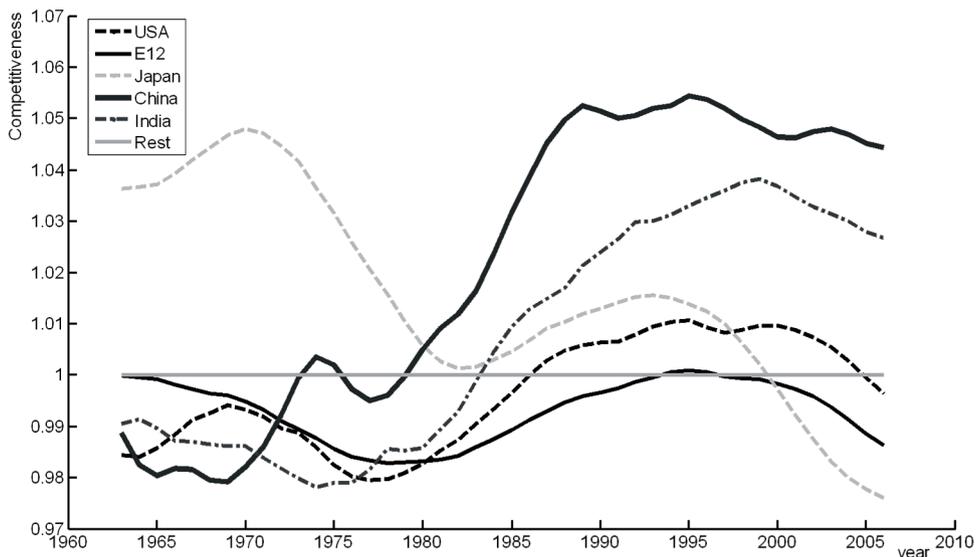
**Figure 14.** Evolution of the GDP shares of the six regions/countries: USA, E12, Japan, China, India, and the rest of the world (the identification period 1950-2006)

Source: author’s own calculations.

Our model allows investigating 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, E12<sup>8</sup>, 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 the E12 economies

<sup>8</sup> E12 consists of the twelve European countries, namely: Austria, Belgium, Denmark, Finland, France, Germany, Italy, Netherlands, Norway, Sweden, Switzerland, and the United Kingdom.

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 the 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. This is clearly seen when we look at the dynamics of competitiveness in the post-war period (see Figure 15). To identify the moving competitiveness we use the 14 years identification window.<sup>9</sup> 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 noting that in the last three decades the competitiveness of India's economy is only slightly smaller than China's competitiveness, and that USA's competitiveness, although smaller than Chinese and Indian, is significantly greater than that of the 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)

Source: author's own calculations.

Therefore, let us look more closely at the development of the world economy in the last three decades. The average competitiveness in the period 1980-2006 is

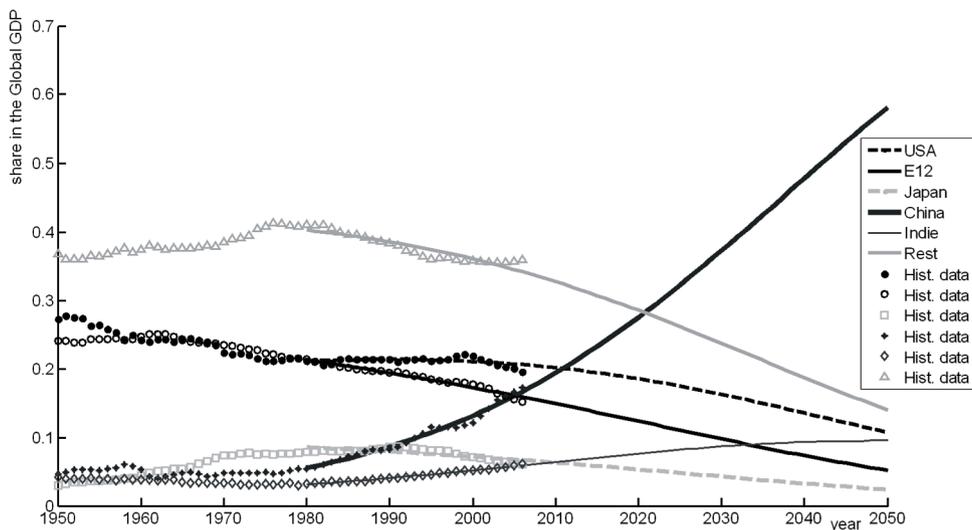
<sup>9</sup> It is necessary to identify  $2n - 1$  parameters in our model ( $n$  is the number of countries/regions; namely  $n - 1$  competitiveness and  $n$  initial shares), therefore the number of historical data ought to be greater than  $2n - 1$  (in our case greater than 11, therefore we select 14 years identification window).

presented in Table 8, and we see that it confirms the general impression stemming from Figure 15. Japan and the E12 economies lose their position, but the USA economy tries to “struggle” 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 the Chinese economy presented in 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 with the USA by the Chinese economy (in GDP terms). India’s economy will overtake the E12 by around 2030 and will be at the same level as the 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 $f(t_0)$ 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

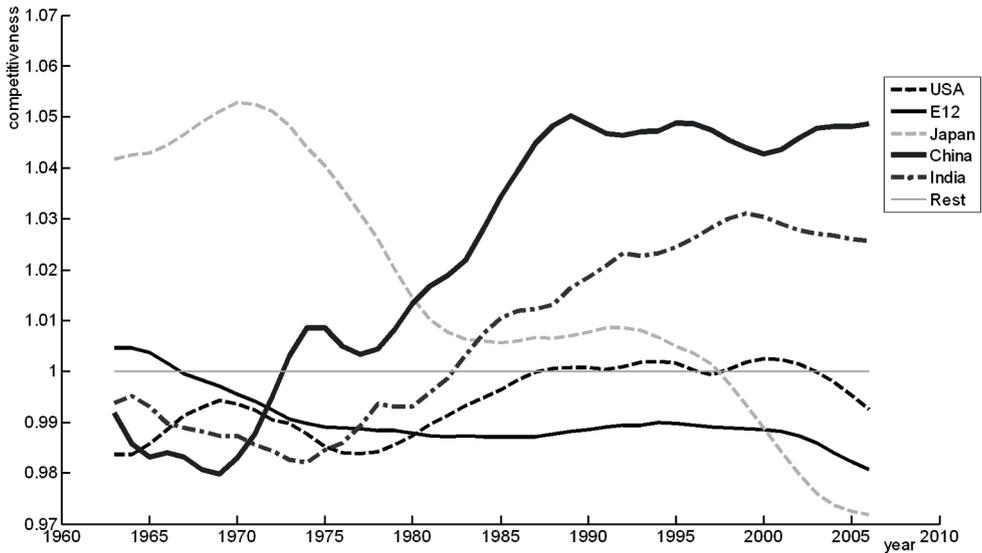
Source: author’s own calculations.



**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)

Source: author’s own calculations.

An idea of ranking the national economies according to their competitiveness index has come to us during working on that paper. The problem is that if we like to consider for example 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 us 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  $1.0^{10}$ ), we ought to have historical data on at least four years (usually we assume a 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



**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)

Source: author’s own calculations.

tendency of the competitiveness changes is more or less similar to that observed in the experiment where all countries/nations competed altogether (see Figure 15). Just

<sup>10</sup> As explained in Kwaśnicki, Kwaśnicka [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).

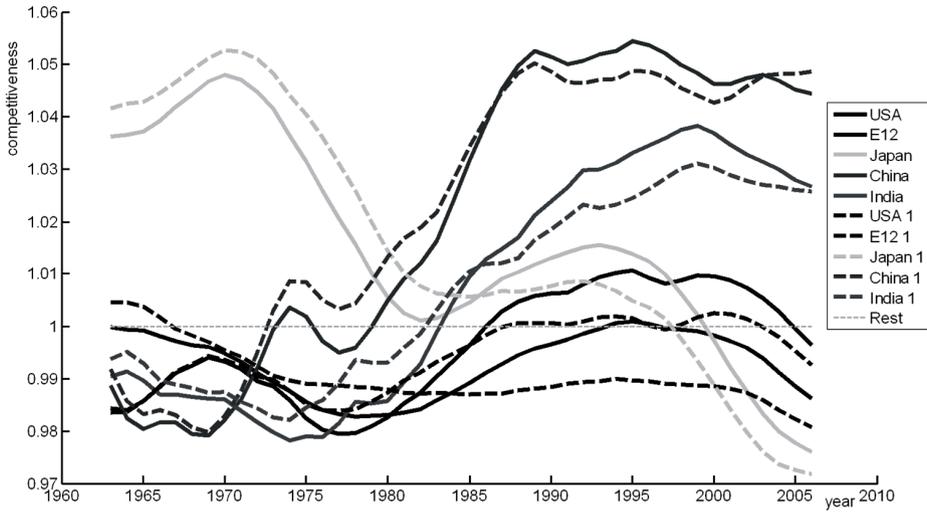
to show the level of the differences, Figures 15 and 17 are collectively presented in Figure 18 (for all six countries/regions competing (solid lines) and calculated separately for each country competing with the Rest of The World (dashed lines)). The differences are clearly visible although there is 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 the USA and the E12 interchange their positions (but as we see in Figure 18 their competitiveness is very similar).

**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						
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

Source: author’s own calculations.

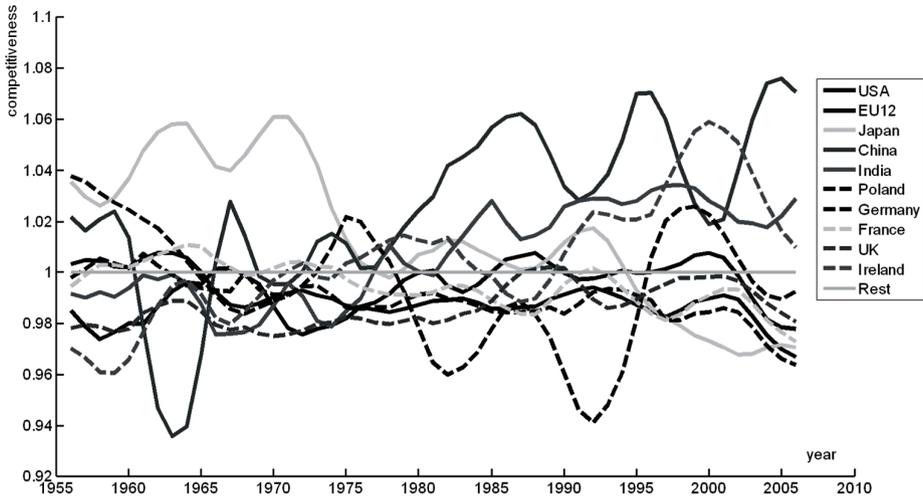
There is no space to present the rankings of competitiveness of all the countries in the world, but we plan to endeavour such a project in the near future. Here, as the first step toward that project, we present the experiment for twenty nine selected countries and the E12 (distinguished as a region competing especially with USA and China). The dynamics of the competitiveness of ten selected countries are presented in Figure 19 (for a larger number of countries the figure would be unreadable). Once more we see the 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/regions for selected years. We start from the middle 1950s, and as we see that 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 the course of time Germany become more and more a welfare state and became less and less competitive, in 1980 Germany was ranked 19th, in 1990 25th, and in the recent years was placed in the bottom of the ranking. The same tendency of losing competitiveness is observed for all of the 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 extent also Hungary, are good examples of the advance of competitiveness due to market oriented transformations. In 1990 these two countries



Comment: identification is based on the 14 years moving window of historical data.

**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)

Source: author’s own calculations.



Comment: identification is based on the 7 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

Source: author’s own calculations.

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

Source: author's own work.

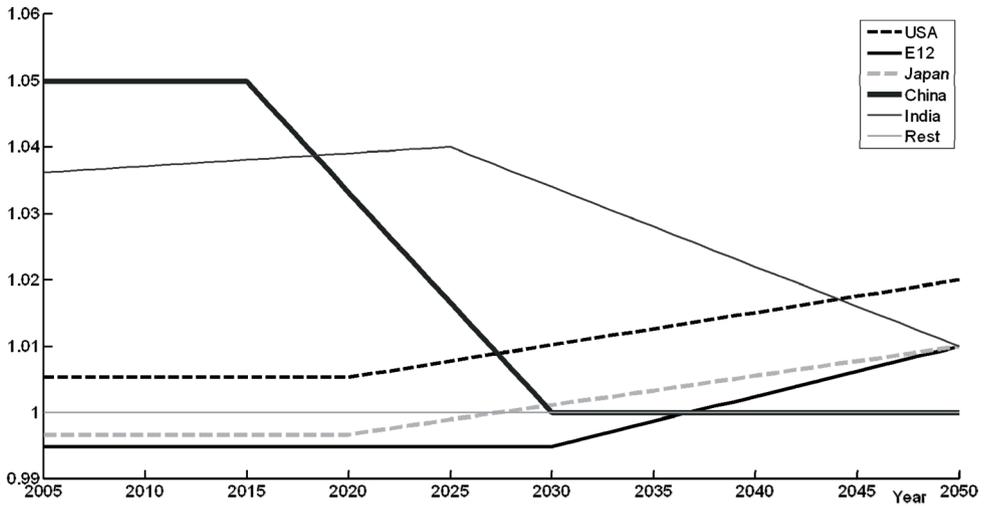
were at the bottom of the ranking and now, after 20 years of transformation, they are placed in the top ten .

In the last column of Table 10 the competitiveness indices for the last available historical data (2006) are presented. The great superiority of China and India over all the advanced economies is clearly seen. 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 perspective. For example, the nearly 3% difference between competitiveness of China and the West between 1950 and 2006 (see Table 5) resulted in the increase of China's share in global GDP from 11% in 2000 to 28% in 2050 and the decrease of the share of the West from 44% to 29% (see Figure 10).

## 8. Possible scenario of development

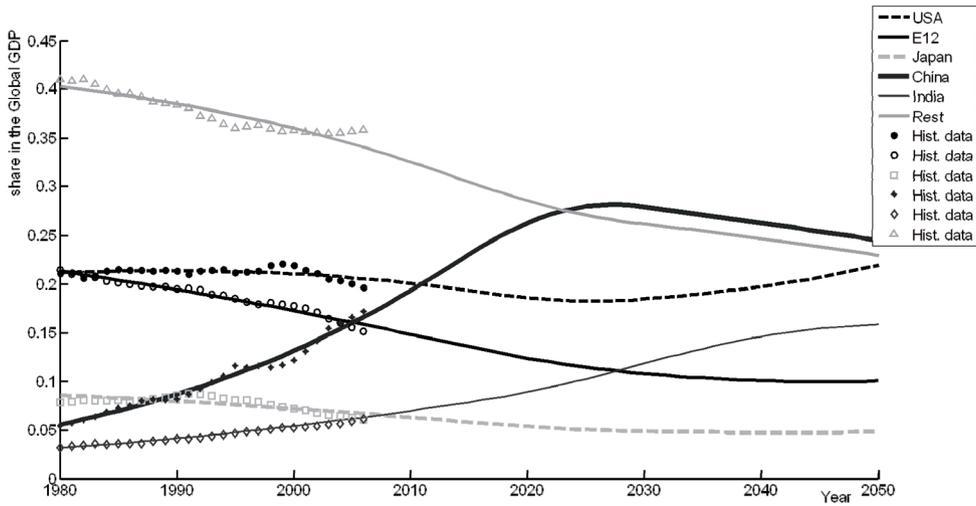
The extrapolation of future development of structure of the global GDP, as presented in Figure 16, seems to be rather improbable, mainly because it is hardly possible that the competitiveness of the selected six countries/regions will be constant over the next 40 years. Let us make an experiment and assume the 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 change as follows (as illustrated in Figure 20): US competitiveness will be stable (and equal to 1.005344) up to 2020 and from that year will grow steadily (in a 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, from that year it will grow steadily to reach 1.01 in 2050; the same pattern is assumed for Japan, although it is assumed that the reform will start earlier than in Europe, and the steady growth of Japanese economy's competitiveness will start in 2020, to reach the same value 1.01 in 2050; Chinese economy's competitiveness will be the highest (and equal to 1.49823) up to 2015, and next will drop heavily to reach 1.0 in 2030, from that year it will be constant and equal 1.0 (so it is assumed that the pattern is similar to that of Japan in the 1970s and 1980s); India's competitiveness will grow from the initial 1.031486 to 1.04 in 2025 and from that year will diminish steadily to 1.01 in 2050; the competitiveness of the rest of the world, as the reference competitiveness is assumed to be constant for the whole period, and equal to 1.0.

In short, we assume that the US economy will be able to recover in the next ten years and will return to its relatively high competitiveness after 2020, the European countries (mainly due to the bureaucratic burden of the EU) will start necessary reforms ten years later and will slowly revive after 2030. Japan will follow the same pattern of reforms as the US, although their results will be not so impressive (therefore the final competitiveness in 2050 of Japan is slightly lower than the 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



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

Source: author’s own work.



**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

Source: author’s own work.

after 2020. Thanks to the democratic system and openness of the Indian economy, India will be the most competitive economy from 2019 to 2044.

In Figure 21 the evolution of the structure of the global GDP (under the above assumptions) is presented. The Chinese economy should overtake the US in 2011 (with roughly 20% shares of global GDP by both economies) and will still grow to reach the maximum share equal to 28% in 2027, in the next two decades (still being the largest global economy) its share will be dropping to reach 24.5% in 2050. The second largest economy will be the US, but its share will still decline to reach the minimum 18.3% in 2027. From that year the share of the US economy will rise to reach 22% in 2050 (roughly the same as China). The share of the Indian economy will grow steadily to reach almost 16% in 2050 (and becoming the third economy in the world). The total share of twelve European countries (E12) will keep the past tendency to decline, but, due to the reform initiated in 2030s, in the middle of the century will reach a plateau with a share equal to 10%. The same pattern of development will be experienced by Japan, but the plateau (roughly 5% share) will be reached by the Japanese economy in the beginning of the 2030s.

## 9. Conclusions

“All roads lead to Rome.” We have outlined and presented the findings of different forecasts on the future of the global economy made by different teams, in different institutions, and under different assumptions. Most of them treat 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 detail, 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 countries, namely the 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 is 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 the triangle USA-China-India).

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

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## CHINY, INDIE I PRZYSZŁOŚĆ GOSPODARKI GLOBALNEJ

**Streszczenie:** W pierwszej części artykułu przedstawiono przegląd prognoz globalnego rozwoju gospodarczego do 2050 roku. Następnie przedstawiona została 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. Dokonano 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 jest prawdopodobny (choć bardzo subiektywny) scenariusz zmian konkurencyjności tych gospodarek w następnych 40 latach.

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