

The Lewis Turning Point in China and its Impacts on the World Economy

Andong Zhu and Wanhuan Cai

Associate Professor and Post-Doc Fellow, School of Marxism, Tsinghua University, Beijing

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***Abstract:** On the basis of perusing Lewis's own writings and his followers' works on the Lewis economic growth model, this paper adjusts the meaning of the Lewis turning point (LTP) according to China's specific institutional system and economic reality: the Lewis turning point is a period of time rather than a time point; and undergoing the LTP is considered as a trend or process of development, during which the supply of labor decreases and the cost of labor increases. With the passing of the LTP, China will not promote its economic growth with a cheap and unlimited labor force; the labor-intensive export oriented economy should be altered, independent technology innovation should be promoted, and industry structure should be adjusted. Changes and transitions in China's economy will have great significance to the world economy, and the impacts are estimated in the paper with Cambridge-Alphametrics Model (CAM) initially developed by the University of Cambridge. The arrival of the LTP also means China needs to make serious policy efforts to realize the transformation of its economic development pattern, and to avoid the so-called "middle-income trap".*

***Keywords:** Lewis turning point, world economy, Cambridge-Alphametrics Model, transformation of economic development pattern*

1. Introduction

With a 1.3 billion population, China is known as a labor-abundant country. It is argued that the cheap and unlimited labor supply from the agricultural sector with low productivity to the industrial sector with high productivity has contributed a lot to China's rapid economic growth in the process of its export-oriented industrialization. As Fang Cai and Dewen Wang (2005) estimate, demographic dividend¹ contributed 26.8% to per capita GDP growth during 1982-2000.² However, there are some significant phenomena which should be paid close attention to since the start of the new millennium, especially the waves of labor shortage that hit the country in 2002, 2004 and 2009; for a time employers in southeastern coastal areas experienced difficulties in recruiting enough migrant workers.

The phenomenon of the shortage of migrant workers has become a hot topic and inspires debate among scholars on whether China has reached the Lewis turning point (LTP). Some

¹ Demographic dividend means output and other economic gains from having a large proportion of working-age group in the total population. See Cai and Wang, 2005.

² Cai, Fang & Wang, Dewen. 2005. China's demographic transition: Implications for growth. In *The China boom and its discontents*, Ross Garnaut and Ligang Song (eds.), pp.34-52. Canberra: Asia Pacific Press.

asserted that it's just a short-term phenomenon which happened occasionally; others argued that labor shortage is an inevitable result lead by China's more than 30 years rapid economic growth, with the surplus labor supply in rural areas all being absorbed by the industrial sector, which signifies the arrival of the Lewis turning point, and that China will need to make serious policy efforts to maintain its economic development and social stability. People have conflicting opinions about the reality, and explain the same phenomenon in different ways, to judge whether China has reached, is passing, or is close to the Lewis turning point, and to realize China's economic reality exactly, we need to understand the Lewis model correctly, including Lewis's own writings and those of other researchers' to clarify the assumptions and predictions of the Lewis model.

From a general point of view, most of the existing documents treat the Lewis turning point as a specific point in time; in this paper, as Ryoshin Minami (1968) pointed out, the turning point is a time of period rather than a time point, which may extend over a number of years¹. And if the Lewis turning point is an inevitable development phase in the course of a country's economic development, and if China has not yet passed the turning point,, it will be approaching or passing it sooner or later; it's only a matter of time. The coming of the LTP will have a great influence on China's economy, such as on the growth rate of the urban resident wage, the income of rural residents, GDP growth rate, inflation, the economic structure and the mode of economic development, and so on. As the global manufacturing center, the significance of the changes in China's economy will extend far beyond China and have a great impact on the world economy, the higher wage of labor and the appreciation of RMB making Chinese goods less competitive in the global market, which may lead to the labor-intensive industry transfer to other economies with cheap labor. A higher inflation rate in China may promote the inflation rate in other countries, and the large volume of exchange reserve in China may be reduced. Few scholars pay attention to the impacts of the Lewis turning point on the world economy, which may be of great significance to the development trend of world economy and which will be discussed in this paper.

In this paper, we apply a Cambridge-Alphametrics Model (CAM) to assess world-wide economic impacts of Lewis turning point in China, which is quite different from Computable General Equilibrium Model (CGE Model) constructed under the principles of neoclassical economic theory. The CAM is a derivative of a model originally developed at the Department of Applied Economics of the University of Cambridge (UK) in the late 1970s. Since the 1970s the model has been modified various times in significant ways, taking advantage of the improved availability of statistics and reflecting more recent historical experience.²

This paper is organized as follows. In the next section we summarize Lewis's theory on the dual economy and the turning point. The third section introduces debate on whether China has reached the Lewis turning point and our point of views. The fourth section introduces the CAM model and explains the results turned out by the model, and the impacts of the LTP on China and world economy. And the last section concludes the paper by giving some policy implications in the process of passing the Lewis turning point on how to transfer China's mode of economic

¹ Minami, Ryoshin. 1968. The turning point in the Japanese economy. *The Quarterly Journal of Economics*, Vol.82, No. 3, pp. 380-402.

² Cripps, Francis, & Alex Izurieta & Ajit Singh. Global imbalances, under-consumption and overborrowing: The state of the world economy and future policies. Centre for Business Research, University of Cambridge. Working Paper No. 419.

development and to avoid the “middle-income trap”.

2. Brief review of the Lewis model

The Lewis model, put forward by Arthur Lewis (1954)¹ and implemented by Ranis and Fei (1961)² and Lewis³ himself in 1972, is also known as Lewis-Ranis-Fei model. It provides a significant contribution to economic development theories for economies with surplus labor and scarce resources.

According to the Lewis model, an economy at the starting point of economic development is characterized by a dual economy, which means there are two economic structures in the economy; one is “subsistence”, “traditional” or agricultural sector and the other “capitalist”, “modern” or industrial sector. The “traditional” or agricultural sector is assumed to have surplus labor and the marginal productivity of labor (MPL) is much lower than that of the “modern” or industrial sector, which can be formalized as $MPL^T < MPL^M$; here the superscript of T denotes the traditional sector and M denotes the Modern sector. The definition of “surplus labor”, as Lewis pointed out, is labor with extremely low, even close to zero, marginal productivity, and the transfer of which has no effect to the total output of this sector while enabling the expansion of the other sector without any impact on wages.

The wage rate of the traditional sector, w^T , is determined by the subsistence level before the Lewis turning point, known as subsistence wage or institutional wage, and is higher than its marginal productivity of labor (MPL^T), thus $w^T > MPL^T$; after the LTP, wage rate in the traditional sector is determined by the marginal productivity of labor of this sector. And distribution in the modern sector follows the “marginal product rule” of distribution, so $w^M = MPL^M$, where w^M denotes wage rate in modern sector. Wage rate in the modern sector is higher than that of the traditional sector, i.e. $w^M > w^T$, according to Lewis, wage rate in the modern sector is higher than the traditional sector’s institutional wage by about 30 percent (Lewis, 1954)⁴. Due to the higher wage provided by the modern sector, surplus labor can be drawn out of the traditional sector into the modern sector. The expansion of the modern sector takes advantage of the infinitely elastic supply of labor from the traditional sector until the surplus labor is exhausted. This can be concluded as the so-called “Lewis turning point I”, during which the modern or industrial sector expands and workers migrate from rural areas into urban areas; this can also be depicted as the process of industrialization or urbanization.

Nazrul Islam and Kazuhiko Yokota (2008) point out that the differences between the two sectors analyzed by Lewis, i.e. $MPL^T < MPL^M$, $w^T > MPL^T$ and $w^M = MPL^M$ manifest some departures from neoclassical paradigm. Firstly, the inequality between MPL^T and MPL^M signifies a departure from neoclassical paradigm of perfect mobility and equalization of factor returns. Secondly, the difference in distribution of the two sectors signifies another departure from the neoclassical model, according to which the same “marginal product rule” of distribution applies

¹ Lewis, W. Arthur. 1954. Economic development with unlimited supplies of labour. *Manchester School of Economic and Social Studies*. Vol.22, No. 2, pp. 139-191.

² Ranis, G., & Fei, J. 1961. A theory of economic development. *The American Economic Review*, Vol. 51, No. 4, pp. 533-565.

³ Lewis, W. Arthur. 1972. Reflections on unlimited labour. In *International economics and development*, ed. L. Di Marco, pp.75-96. New York: Academic Press.

⁴ Lewis, W. Arthur. 1954. Economic development with unlimited supplies of labour. *Manchester School of Economic and Social Studies*. Vol.22, No. 2, pp. 139-191.

to the entire economy.¹

Ranis and Fei (1961), and Lewis (1972) refined the theory by revising Lewis's two-stage economic development into three stages, demarcated by when the marginal productivity of labor of one sector equals the other. After the passing of "Lewis turning point I", though surplus labor in traditional sector runs out, labor in the sector still transfers into the modern sector because of its higher marginal productivity of labor thus higher wage rate. However, with the law of diminishing marginal returns, the outflow of labor from the former sector will lead to the increase in its marginal productivity of labor until the point when the marginal productivity of labor in both sectors is equalized. As Lewis depicts, the turning point is attained when the marginal productivity of labor in the traditional sector is equal to that of the modern sector. Therefore, this turning point can be called "Lewis turning point II". With the increase of marginal productivity of labor in the traditional or agricultural sector, wage, i.e. cost of labor rises, and more capital would be input into agricultural production, the capital-labor ratio goes up, the imbalance and inequality of development between the two sectors be changed, thus the dual economic structure disappears, and the economic development enters into its third phase, the phase of economic integration.

Hitherto, we have already had two turning points, "Lewis turning point I" and "Lewis turning point II". When referring to the Lewis turning point of China's economic development, it's Lewis turning point I². If we confuse "Lewis turning point I" with "Lewis turning point II", there will be some misunderstanding with the Lewis model and may probably lead to errors in explaining what's happening in China. Accordingly, except for special illustration, the Lewis turning point mentioned in this paper is Lewis turning point I.

Because the definition of surplus labor defined by Lewis is not explicit enough to some extent and changes in marginal productivity of labor is difficult to calculate, there are some difficulties in applying the model to a specific case. For this reason, some scholars make reflections on amending or revising the Lewis model according to the realities in developing countries. For example, the standards of identifying the Lewis turning point in the course of a country's economic development are concretized as five criteria by Ryoshin Minami (1973) as follows: comparison between wage and the marginal productivity of labor in the traditional sector, the correlation ship between wage and the marginal productivity of labor in the traditional sector, the moving direction of real wage of the traditional sector, changes in wage differentials, and the traditional sector's supply elasticity of labor to the modern sector.³ And Minami summarizes the applicability of the Lewis model in the following ways. First, unlimited supply of labor is applicable only to the unskilled labor force because skilled workers are limited in supply. Second, the theory is not applicable to the modern sector because it depends on the existence of a dual economic structure. Third, the turning point is a period of time rather than a specific point in time, which may extend over several years. Fourth, the turning point is a long-term and trend-related economic phenomenon.⁴

John Knight et al. argue that the Lewis model requires several qualifications and amendments

¹ Islam, Nazrul & Kazuhiko Yokota. 2008. Lewis growth model and China's industrialization. *Asian Economic Journal*. Vol.22, No. 4, pp. 359-396.

² Wang, Dewen. 2008. Lewis turning point and China's experiences. In *Reports on China's population and labor* No. 9. ed. Fang Cai. p. 90. Beijing: Social Sciences Academic Press (China).

³ Minami, Ryoshin. 1973. The turning point in economic development: Japan's experience, *Economic Research Series No. 14*. The Institute of Economic Research, Hitotsubashi University, Kinokuniya Bookstore, Tokyo.

⁴ Ibid.

as a description of the development process of currently poor economies, such as there is unlikely to be a clear-cut distinction between the classical and the neoclassical stages, there can be capital accumulation and technical progress in the rural sector, which raises the average and marginal product and hence the supply price of rural labor before the labor outflow itself has its effect on the supply curve, and so on.¹

3. Debates on whether China has reached the Lewis turning point

The phenomenon of a shortage of migrant workers in the 2000s become a hot topic and inspires debate among scholars on whether China has reached Lewis turning point. From a general point of view, the scholars' opinions can be classified into two main kinds: one asserts that China has already reached or has passed the Lewis turning point, surplus labor runs out and the demographic dividend disappears; while the other argues that it's too early to mention the LTP in China's economic development, and they believe they have mastered some significant evidence backing their viewpoints. The scholars discuss the topic thoroughly and comprehensively from the aspects of China's age structure, structure of labor market, demand and supply of the labor market, wage growth of ordinary workers, the *Hukou* system, and rural-urban migration and so on, and issues at the forefront of discussions are as follows.

First, the volume of surplus labor in China's rural areas. More and more people have noticed such an interesting phenomenon: on the one hand, there are reports of migrant labor shortages; on the other hand, estimates suggest that a considerable volume of relatively unskilled labor is still available in the agricultural sector, which is called "a China paradox"² and needs to be paid more attention to. As the Lewis turning point is defined by the time when surplus labor runs out, the volume of surplus labor becomes the key to be discussed as it's the criterion of identifying the LTP. With migrant workers' average wage as reference standard, Xianzhou Zhao (2010) argues that the surplus labor isn't decreasing but has continued to rise in recent years, and the amount hit approximately 190 million in 2003-2005. Zhao analyzes the reason why there's a large amount of surplus labor on the one hand while there's a shortage of migrant labor on the other hand; he attributes it to the increase in mobility costs of labor such as job search costs and the cost of losing jobs.³ By estimating the agricultural production function using time-series (annual) data and cross-sectional statistics and comparing marginal productivity of labor with two indices, per capita net income of rural households and per capita consumption expenditure of rural households, for the subsistence wage of agricultural sector, Ryoshin Minami and Xinxin Ma (2010) calculate the surplus labor to be between 159 million and 297 million.⁴ However, Fang Cai and other scholars insist that surplus agricultural labor in China is so small that it's negligible. Fang Cai (2010) points out that some confusion exists in the Chinese statistics; one is that the official survey on the utilization of agricultural workforce is unable to reflect the fast-changing reality of agricultural production - some scholars are unaware of the changed situation, while others who have tried to understand the statistics are actually trapped in "the tyranny of

¹ Knight, J., et al. 2011. The puzzle of migrant labour shortage and rural labour surplus in China, *China Economic Review*, doi:10.1016/j.chieco.2011.01.006

² Kam Wing Chan. 2010. A China paradox: migrant labor shortage amidst rural labor supply abundance. *Eurasian Geography and Economics*. Vol. 51, No. 4, pp. 513-530

³ Xianzhou Zhao. 2010. Some theoretical issues on Lewis turning point. *Economist*, No. 5, pp. 75-80.

⁴ Minami, Ryoshin & Xinxin Ma. 2010. The Lewis turning point of Chinese economy: Comparison with Japanese experience. *China Economic Journal*. Vol. 3, No. 2, pp. 163-179.

numbers". Therefore, the declaration that the marginal productivity of labor in agriculture is still very low (Minami and Ma 2009), which is based on the aggregated dataset, tends to overestimate the degree of labor surplus in agriculture and concludes that the Lewis turning point has not come to China.¹ Cai (2007) believes that among the 485 million working-age population in rural China, 2005, about 200 million have already been transferred into the non-agricultural sector, thus there remain 2.85 million in the agricultural sector. According to the current agricultural productivity, the agricultural sector still needs about 170 million labor forces, so the surplus labor is 115 million, which is not accurate yet. When taking the age structure of the 120 million labor forces into consideration, of which 50% are over 40 years old, accordingly, the real surplus labor in rural China is 58 million at most, the percentage is 11.7%. Comparing this with the rapid development of China's economy, the volume of surplus labor is negligible.² The similar analysis method is also applied by some other scholars. By calculating the gap between the volume of workers in the agricultural sector and the necessary volume for agricultural production, Xiaohe Ma and Jianlei Ma (2007) estimate that the surplus labor in rural China is 110 million, of which 50% over 40 years old, 55.37% female and 42.96% below primary education. Therefore, they conclude that the surplus labor in rural China cannot meet the needs of the rapid development of the non-agricultural industry.³ By means of the classical estimation method, the neoclassical estimation method and standard structural comparison, Jianguo Wang and Shouhai (2005) Ding re-estimate, compare and analyze China's current surplus of agricultural labor and suggest that the classical estimation method is the best in terms of both credibility and explanatory power, thus they conclude that China's surplus agricultural labor amounts to 46 million,⁴ the result of which is very close to that of Yang Du and Meiyang Wang's (2010).⁵

We can have a general view of the volume of agricultural surplus labor estimated by different studies in the table below.

Table 1. Estimations on the volume of agricultural surplus labor (ASL)

Year	Volume of ASL	Researcher(s)
2007	100 million	Jiadong Tong etc. ⁶
2003	46 million	Jianguo Wang etc.
2007	58 million	Fang Cai
2007	55 million	Xiaohe Ma etc.
2001-2005	159 million-297 million	Ryoshin Minami etc.

Second, demand and supply of the labor market and unemployment rate. According to the Lewis model, when approaching the Lewis turning point labor demand will increase and the labor market will become tightened by the rapid growth of the industrial sector, which also means that the unemployment rate will fall after the LTP. Ryoshin Minami et al. (2010) hold the opinion that

¹ Cai, Fang. 2010. Demographic transition, demographic dividend, and Lewis turning point in China. *China Economic Journal*. Vol. 3, No. 2, pp. 107-119.

² Cai, Fang. 2007. The myth of surplus labor force in rural China. *Chinese Journal of Population Science*. No. 2, pp. 27.

³ Ma, Xiaohe & Jianlei Ma. 2007. How much surplus labor in rural China on earth? *Chinese Rural Economy*. Vol.12, pp. 4-9,34.

⁴ Wang, Jianguo & Shouhai Ding. 2005. How much surplus agricultural labor is there in China? *Social Sciences in China*, No.5, pp. 27-35.

⁵ Du, Yang & Meiyang Wang. 2010. New estimate of surplus rural labor force and its implications. *Journal of Guangzhou University (Social Science Edition)*. Vol.9, No. 4, pp. 17-24.

⁶ Tong, Jiadong & Zhou Yan. 2011. Dual economy, Lewisian turning point and the foreign trade development strategy of China. *Economic Theory and Management*. No. 1, pp. 18-26.

there are some problems in the unemployment statistics compiled by the Bureau of Statistics in China: it does not include the unemployment of migrant workers and laid-off urban workers, who are in fact in unemployment status. They estimate a said to be more appropriate series of the unemployment rate, from 2.8% in 1985 to 12% in the first half of 2000s. Thus Ryoshin Minami et al. argue that the existence of large unemployed labors in urban China should be one of the counter evidences to the phenomenon of the shortage of migrant workers.¹ Fang Cai (2010) points out that as a result of sectoral changes and the increasing diversification of ownership, especially after the labor market shock in the late 1990s, multifaceted sectors have appeared to absorb labor into urban areas, contrary to the pre-reform period when state and collective sectors dominated employment absorption. And he views the difference between the number of total employment based on the unit reporting system and the number of employment based on the household survey as a proxy for urban informal employment, which amounts to 95.1 million and accounts for 31.5% of total urban employment in 2008.² Using World Bank cross national parallel data to estimate the economic development level that corresponds to the Lewis turning point, Jin Wang and Xiaohan Zhong (2011) find that as GDP per capita increases, the proportion of rural labor to the total labor force tends to decrease first at an accelerated rate and then, after passing the Lewis turning point, at a reduced rate. Regression analysis of cross- national parallel data shows that the Lewis turning point emerges when GDP per capita reaches somewhere between 3,000 and 4,000 dollars (PPP, constant international US dollars for the year 2000). GDP per capita in China has exceeded this level, but the proportion of rural labor remains much higher than the average for countries at the same level of economic development. This strongly implies great potential for rural labor transfer in China.³

Third, wage increase in both sectors. The Lewis model suggests that the turning point may be identified by a sharp increase in wages in both the agricultural and industrial sectors. Jane Golley and Xin Meng (2011) claim that despite some evidence of rising nominal urban unskilled wages between 2000 and 2009, there is little in the data to suggest that this wage increase has been caused by unskilled labor shortages. The increase between 2005 and 2006 may be considered as being close to 'abnormal' growth in that it is the first (and only) time that the annual earnings growth of migrant workers is almost equal to that for urban workers.⁴ Tianyong Zhou (2011) argues that the migrant workers' wage increase definitely exists, but it's the subsistence wage increase, which is due to the country's agricultural policy, the higher inflation rate, and the strengthening of workers' bargaining power.⁵ Fang Cai (2010) believes that the wage rate will increase when the demand for labor exceeds labor supply. For example, the growth rate of migrant workers' wage was 2-3 % in 2002 and 5-6% in 2003, while there's nearly no growth before. From the aspect of the growth rate of real wage, the growth rate was always above 7% in 2004-2007 and it reached 19.6% in 2008 when the financial crisis has already broke out. Though there may be some short-term fluctuation, the law of the Lewis turning point is clear and obvious

¹ Minami, Ryoshin & Xinxin Ma. 2010. The Lewis turning point of Chinese economy: Comparison with Japanese experience. *China Economic Journal*. Vol. 3, No. 2, pp. 163-179.

² Cai, Fang. 2010. Demographic transition, demographic dividend, and Lewis turning point in China. *China Economic Journal*. Vol. 3, No. 2, pp. 107-119.

³ Wang, Jin & Xiaohan Zhong. 2011. Whether the Lewis turning point has arrived in China: Theoretical studies and international experiences. *Social Sciences in China*. Vol. 5, pp. 22-37.

⁴ Golley, Jane & Xin Meng. 2011. Has China run out of surplus labour? *China Economic Review*, doi:10.1016/j.chieco.2011.07.006

⁵ Zhou Tianyong. 2010. Whether the labor surplus in China. *Shanghai Economy*. Vol.11, pp. 17-19.

in the long run.¹ Xiaobo Zhang et al. (2011) take the view that there's a clear rising trend of the real wages rate since 2003. The acceleration of real wages even in slack seasons indicates that the era of surplus labor is over.²

Fourth, income gap and Gini coefficient. When the LTP hits an economy, the surplus labor is exhausted, the demand for labor increases in industrial sector, marginal productivity of labor boosts, thus wage rates in both agricultural sector and industrial sector increase, and the income gap between rural and urban residents is narrowed visibly. Ryoshin Minami (1973) has the viewpoint that China's income distribution condition is deteriorating, income gap becomes wider and wider and the Gini coefficient mounted from 0.382 in 1988 to 0.445 in 2002. The inequality in income reflects the existence of large amount of surplus labor.³ Besides, in accordance with Ryoshin's estimation, wage differentials of agriculture to urban industries were increasing even in the 2000s.⁴ By using data from the China Statistical Yearbook and Rural Survey, Anders Reutersward, Vincent Koen and Richard Herd (2010) discover that for most of the 2000s, migrant workers' wages have risen by around 6% per year. This is markedly less than the growth of wages of all urban workers, whose growth rate of wages were between 10.7%-16.2% from 2002 to 2007, with migrant workers' earnings dropping from 71% to 49% of salaried urban workers between 2001 and 2007.⁵ Fang Cai and Meiyang Wang (2007) argue that the income gap between rural and urban areas can be expressed by Kuznets curve, the gap is narrow initially and then is widened, and finally it is narrowed again. Assertions that the income gap between rural and urban China is wider than that of the beginning of China's economic reform is unilateral, because they didn't take price index differentials between rural and urban areas into consideration. If adjusted by the price index, the income gap between rural and urban areas in 2006 is on the same level as in 1978, the ratio is of rural residents income to urban residents income is 1:2.57, not 1:3.28.⁶

The precise understanding of Lewis model is the basis of our analysis, but it's not far enough. Persuading theoretical analysis requires us to recognize the specific economic reality and institutional system in China correctly, which may also ask for some necessary modification and adjustment to the theory according to particular conditions. When talking about the Lewis turning point, most scholars take it as a specific time point, as Fang Cai (2010), 2004 is the turning point in China's economy⁷. In this paper we agree with Ryoshin Minami (1968), the turning point is a time of period rather than a time point, which may extend over a number of years⁸, which means the economic development including the passing of the LTP is a gradually changing

¹ Cai, Fang. 2010. On the challenges of and the path for China's development of the Lewis turning point of large country's economy. *Journal of Guangdong University of Business Studies*. Vol. 1, pp. 4-12.

² Zhang Xiaobo, Jin Yang & Shenglin Wang. 2011. China has reached the Lewis turning point. *China Economic Review*, doi:10.1016/j.chieco.2011.07.002

³ Minami, Ryoshin. 1973. The turning point in economic development: Japan's experience, *Economic Research Series No. 14*. The Institute of Economic Research, Hitotsubashi University, Kinokuniya Bookstore, Tokyo.

⁴ Minami, Ryoshin & Xinxin Ma. 2010. The Lewis turning point of Chinese economy: Comparison with Japanese experience. *China Economic Journal*. Vol. 3, No. 2, pp. 163-179.

⁵ Reutersward, Anders, Vincent Koen & Richard Herd. 2010. China's labour market in transition: Job creation, migration and regulation. *OECD Economics Department Working Papers*, No. 749, OECD Publishing. doi: 10.1787/5kmlh5010gg7-en

⁶ Cai, Fang & Meiyang Wang. 2007. Re-assessment of rural surplus labor and some correlated facts. *Chinese Rural Economy*. Vol. 10, pp.4-12.

⁷ Cai, Fang. 2010. The Lewis turning point and the reorientation of public policies: some stylized facts of social protection in China. *Social Science in China*. No. 6, pp. 125-137.

⁸ Minami, Ryoshin. 1968. The turning point in the Japanese economy. *The Quarterly Journal of Economics*, Vol.82, No. 3, pp. 380-402.

process. As for the criterion or standards identifying the turning point, we tend to believe that the Lewis turning point – more accurately the Lewis turning period – is such a kind of economic development tendency or state, during which an economy will be less and less reliant on its cheap and abundant labor force, the labor-intensive industrial structure should be adjusted, independent technology innovation should be prompted to develop capital and technology intensive industry, income polarization should be modified to promote domestic consumption, and the dependence of China's economic growth on exports and investment should be altered to transform China's economic development mode. And since the industrial structure adjustment and economic development mode transformation cannot be done in one day, all these should be accomplished in the process of passing the Lewis turning point or period.

According our viewpoint, the Lewis turning point is a certain phenomenon under a certain economic system and a certain economic development stage. It is the process of primitive accumulation of capital as Karl Marx had already pointed out and analyzed in detail in his work of *Das Kapital*. And there are some factors or changes which may lead to China experiencing the Lewis turning point. First, with the development of globalization, the connections between countries become closer and closer, and the capitalist mode of production has spread all around the world, as the member of world economy, China has been irresistibly involved into the global system of capitalism. Second, since the implementation of the Opening up and Reform policy, diverse forms of ownership as private ownership are developing prosperously in China, taking more and more share in China's GDP. Moreover, private ownership has also influenced China's rural land tenure system. As the rural land circulation law passed, rural land can be transacted in China, which will result in a large amount of land deprived peasants. The land deprived peasants can only live by working as employees or salary earners. This is just what was depicted in Lewis' dual economy theory. In this sense, and in its appearance, the Lewis turning point can also be depicted as the process of industrialization and urbanization, during which the peasants are separated from their land and their home in rural area and have to work in factories in cities. And since China is such a big country, if East China such as Shanghai or Zhejiang has already passed the Lewis turning point, West China as Gansu or Guizhou may still have a long way to go. In a word, because of the existence of factors promoting the capitalist mode of production in China and China's specific situation, we can come to the conclusion that China is experiencing the Lewis turning period.

4. The CAM model and simulation scenarios

From a general view of the current studies on the Lewis turning point, most are concerned with the time point and impacts of the Lewis turning point on China, which can be summarized as whether inequality in income gap will be narrowed and industrial structure will be adjusted, whether growth rate will slow down after the LTP and if it's a new phase of development for China's economy (Ligang Song and Yongsheng Zhang, 2010)¹, and China's transition from an abnormal economy to a normal economy with somewhat lower growth but higher inflation². Few pay attention to the impacts of China's LTP on the world economy.

¹ Song, Ligang & Yongsheng Zhang. 2010. Will Chinese growth slow after the Lewis turning point? *China Economic Journal*. Vol. 3, No. 2, pp. 209–219.

² Huang, Yiping & Tingsong Jiang. 2010. What does the Lewis turning point mean for China? A computable general equilibrium analysis. *China Economic Journal*. Vol. 3, No. 2, pp. 191-207.

After the rapid development for over three decades since the Reform and Opening-up, China is now an indispensable member of global economy interactions, and has become the world's manufacturing center, called "the world's factory". Changes in China's economy will have seminal effects to the world economy through the exchange rate of RMB, the price index of exports, and foreign exchange reserve and so on. For instance, if China has already passed the Lewis turning point, which means the unlimited supply of surplus labor force in rural China will no longer exist, the salary of migrant workers will definitely rise, so many labor-intensive industries such as the textile industry and stationery manufacturing industry will be transferred to other countries with cheap labor, for example, India or Vietnam. And because of the adjustment of the industrial structure in China since the approach of the Lewis turning point, technology intensive industry will be highly developed, and more and more machines will be brought into production, the demand for petroleum and oil will increase considerably, making the oil price much higher in the world market and thus affecting the world economy.

Following the above ideas, we will assess these impacts with the CAM model by constructing several simulation scenarios and comparing them with the baselines in this section.

The Cambridge-Alphametrics Model (CAM) is a derivative of a model originally developed at the Department of Applied Economics of the University of Cambridge (UK) in the late 1970s (Cripps et al., 1979)¹. Since the 1970s the model has been modified various times in significant ways taking advantage of the improved availability of statistics and reflecting more recent historical experience.² With an integrated databank and modeling framework that can bring together analysis in different fields, the CAM model is aimed at clarifying the potential impact of current global trends and evolving public policies on the global economic situation in the medium to long term.

The model uses official data from over 130 countries plus residuals for each continent (thus including the entire world economy). And it represents the world economy as a collection of 19 blocs, each of which comprises one or more countries or country group. The hypothesis of aggregating these blocs or country groups is that each bloc is different from one another in terms of their economic development level or income level, such as the US, Japan, Central Europe and North Europe etc. represent developed countries, China and India are taken individually as developing and emerging economies, Central America and North Africa are another two blocs as underdeveloped and low-income countries. The 19 blocs are as follows: North Europe, Central Europe, UK, South Europe, East Europe, USA, Japan, Other Developed Countries (such as Canada, Australia, New Zealand and so on), East Asia High Income (such as Hong Kong SAR of China, Singapore, Taiwan and Republic of Korea), CIS, West Asia, South America, Central America, China, Other East Asia, India, Other South Asia, North Africa, and Other Africa. Different blocs may react differently to China's LTP, i.e. transformation of economic development mode. For instance, with the upgrading of China's industrial structure, India, Vietnam and Indonesia may benefit a lot from industry relocation from China, while Japan probably has to face fiercer competition in the global market with China.

There are more than 190 variables in the model, associated with each other by approximately

¹ Cripps, F., G. Gudgin & J. Rhodes. 1979. Technical Manual of the CEPG Model of World Trade', Cambridge Economic Policy Review 3 (June).

² Cripps, Francis, & Alex Izurieta & Ajit Singh. Global imbalances, under-consumption and overborrowing: The state of the world economy and future policies. Centre for Business Research, University of Cambridge. Working Paper No. 419.

40 constant equations and over 150 behavioral equations. As the Lewis turning point in China's economy is such an economic transition period, it requires some imperative policies to stabilize the economy and to realize the transformation of economic development mode, among which the most significant ones are as follows.

First, fiscal policy of expanding government expenditure. In traditional national income accounts, the gross domestic product (GDP) is represented as $Y = C + I + G + NX$, where $Y =$ GDP, $C =$ private consumption, $I =$ gross investment, $G =$ government expenditures, and $NX =$ net export, and increase in each single part is positively related to Y . After the turning point, agricultural surplus labor runs out and the wage, i.e. the cost of labor will have a significant rise, China will not promote its growth by taking advantage of low-cost and unlimited labor force any longer, labor-intensive industry which contributes a lot to China's growth rate may be transferred to other countries with an abundant and cheap labor force. Technology-intensive industry should be highly encouraged, which requires the country's investment in developing independent technologies. Independent technology innovation is a systematic project including government's investment in education to improve the quality of human resource, in R&D, and basic science to strengthen the foundation of the applied technology progress, infrastructure construction and so on. Furthermore, the government should invest in perfecting China's social security system to promote Chinese people's domestic consumption, which will be discussed below.

Second, monetary policy stimulating increase in domestic private consumption expenditure. According to the accounting formula of GDP, rising private consumption expenditure also plays a very important role in GDP. In the past 30 years since China's economic reform, the export of labor-intensive products contributes highly to China's growth rate - in other words, foreign consumption and demand for Chinese goods is an important factor promoting China's growth. On the other hand, domestic consumption has long been neglected. China has the largest population in the world and the market potential is huge, which may be more reliable to her development. The key of expanding domestic consumption is to improve people's income, and the income distribution gap should also be narrowed to realize social equality. According to Keynesian theory, the amount of private savings equal to that of private investment, the reduction in interest rate leads to the decline of private savings and the rise of private investment, which will definitely result in the increase of income, thus domestic consumption. Therefore, in this paper, instrument used by the policy maker to improve income is the interest rate.

Third, exchange rate policy of reduction in exports of manufactures and services. Many scholars focus on the growing role played by exports and investment in China's rapid economic growth since 1978. Andong Zhu and David M. Kotz point out that China's high degree growth dependence on exports and foreign investment poses a serious problem and is probably not sustainable for very long,¹ which makes China in a disadvantaged position in its international economic relationship and vulnerable, extremely sensitive and lack of internal support when a world economic crisis breaks out. In accordance with Chinese statistics, the ratio of total export-import volume to GDP is 49.17%, 2010.² In order to cut down export volume to lower China's excessively high degree of dependence upon foreign trade, the exchange rate of RMB is appreciated in this paper.

¹ Zhu, Andong & David M. Kotz. 2011. The dependence of China's economic growth on exports and investment. *Review of Radical Political Economics*. Vol.43, No.1, pp. 9-32.

² resource: <http://edu.macrochina.com.cn/skins/1/stat/index.shtml?ny=1>

The policies suggested above also have certain interrelationships to some extent. For instance, government investment in construction and the perfection of China's social security system has the effect of stimulating domestic consumption; the reduction in interest rate used to increase income has significant impact on reducing foreign capital, which helps to cut down China's degree of dependence on foreign trade and investment.

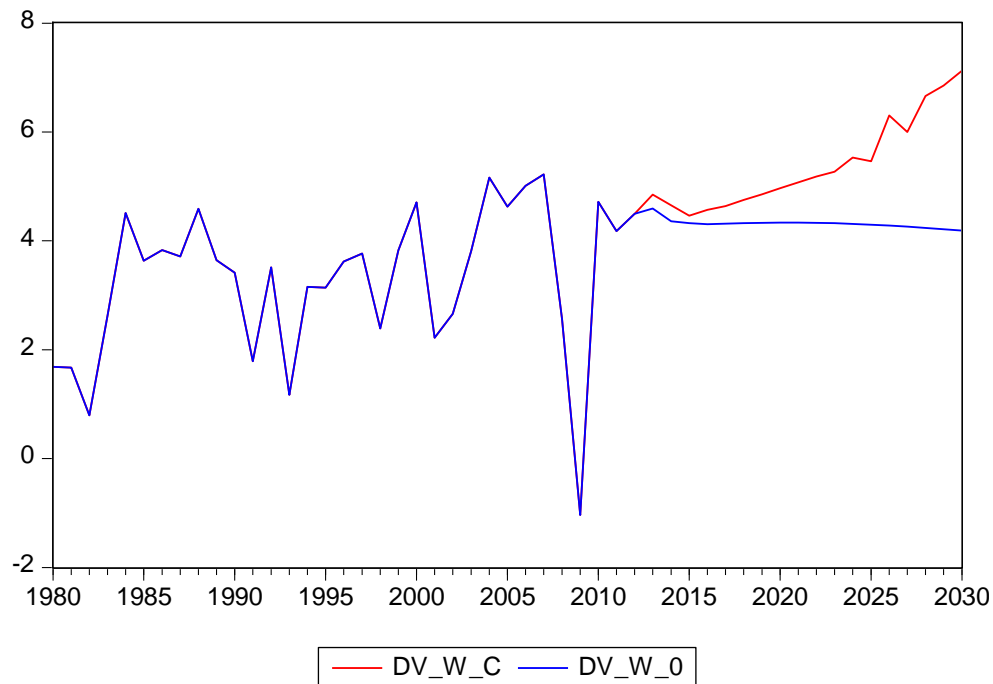
In this section, in order to cope with the arrival of the Lewis turning point and to transform China's economic development mode, a package of policies is assumed to be implemented, including the ratio of government expenditure to GDP to rise from about 22% in 2010 to 30%, the ratio of private consumption to GDP to rise from approximately 32.3% in 2010 to 40%, and the ratio of export volume of manufactures and services to GDP to fall from 25.4% to 15%. We will assess the impacts of these policies on China's economy and more significantly, the effects or influences on the world economy with the CAM model.

4.1 Impacts on GDP growth rate

China is considered to be one of the most important engines driving the growth of the world economy in the last three decades. In 2010, GDP growth rate in China was above 10%, while the world's total GDP growth rate is 4.7%, much higher than -1.0% in 2009. After the implementation of the policy package when passing the Lewis turning point in China, what will happen to the world GDP growth rate? Graph 1 below is the simulation scenarios produced by the CAM model which shows us the growth rate of the world total GDP at PPP (Purchasing Power Parity) rate from 1980-2030. The blue line is the baseline ($_0$) describing the continuation of existing global arrangements, and the red line is the scenario ($_C$), which retains the same basic model and instruments specified for the baseline, with variations in policies and other behavior specified by alternative values of add factors and policy rules.

Graph 1. World total GDP at PPP rate

GDP at ppp rates



In Graph 1 we see that if China's policy package mentioned above is not implemented, the growth rate of world GDP at PPP rates will be around 4% (baseline, DV_W_0). Ceteris paribus, the scenario (DV_W_C) shows that the policy package makes the world GDP growth rate higher than baseline since 2012, reaching 6.3% in 2026, though maybe it will decline a little in 2027 to 6.0%; it goes up to 7.1% in 2030.

Specifically, China's policy package influences different blocs to different degrees. By comparing the baseline with the scenario, Graph 2 shows us that there are significant rises in growth rate of Japan, East Asia High Income, UK, North Europe, Central Europe, South Europe and East Europe, and a relatively slight rise in US, Other Developed and the rest of the world.

The reason for the different impacts is due to the different economic dependencies between the countries. China has become EU's second largest (next to the US) international trade partner since 2004, and China has exceeded US to be Japan's largest trade partner from 2007, China's growth rate and economy situation affect that of EU and Japan to a great degree. When it comes to East Asia High Income, including Hong Kong SAR of China, Taiwan, Singapore and Republic of Korea and so on, these economies all have close connections with China.

When it comes to the US, according to Galina Hale and Bart Hobijn (2011), goods and services from China accounted for only 2.7% of U.S. personal consumption expenditures in 2010, of which less than half reflected the actual costs of Chinese imports. The rest went to U.S. businesses and workers transporting, selling, and marketing goods carrying the "Made in China" label. Although the fraction is higher when the imported content of goods made in the United States is considered, Chinese imports still make up only a small share of total U.S. consumer spending.¹ Besides, there may be another two reasons. First, with China's government investment in R&D and independent technology innovation, technology progress will be achieved and China will

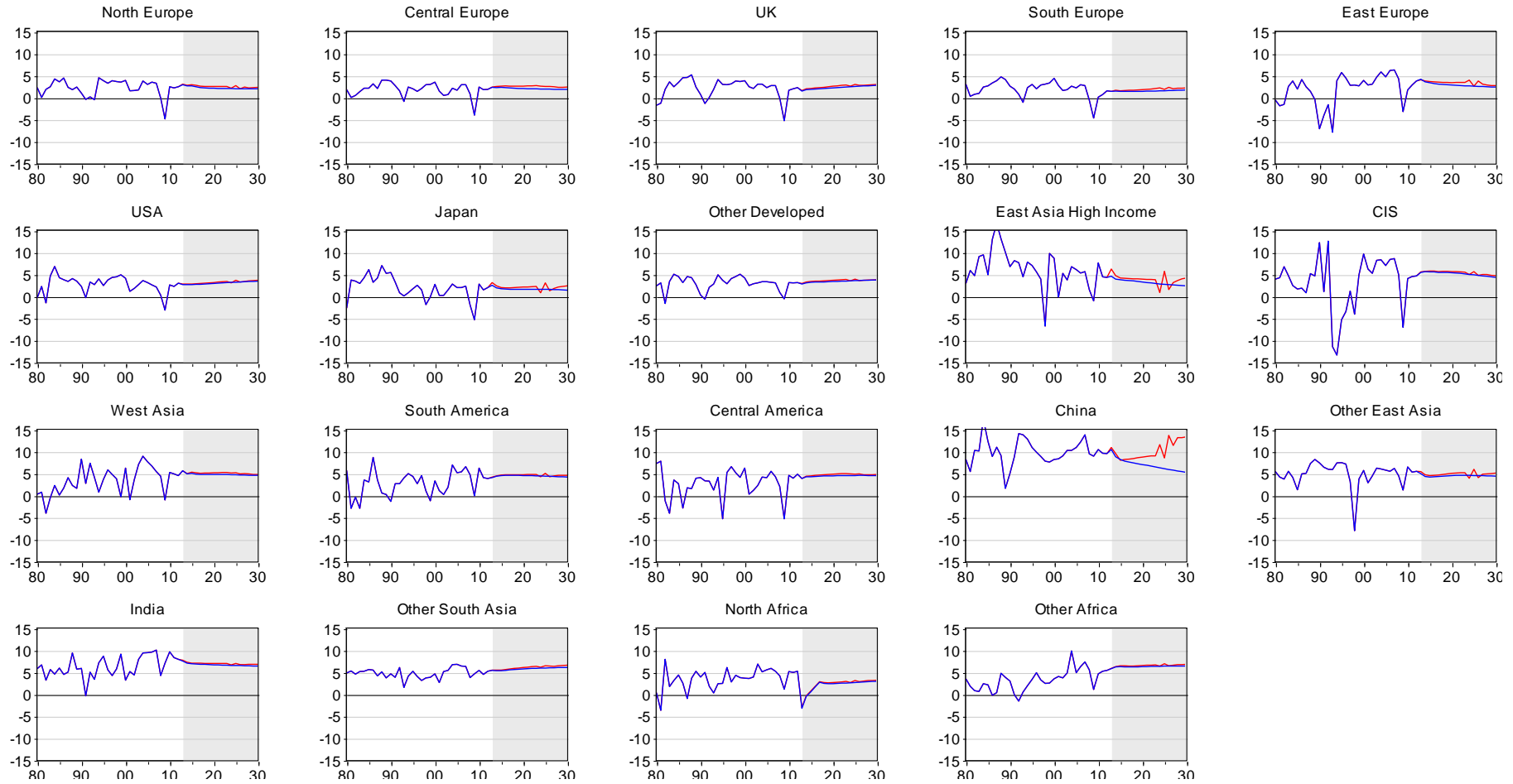
¹ Hale, Galina and Bart Hobijn. 2011. The U.S. content of "Made in China". See <http://www.frbsf.org/publications/economics/letter/2011/el2011-25.html>

produce more facilities or equipments by itself and thus cut down on imports from the US and other developed countries with high and advanced technologies. Second, due to the great differences in industry structure, the development level of financial market and the composition of export products, the effect of China's growth is milder to US GDP growth.

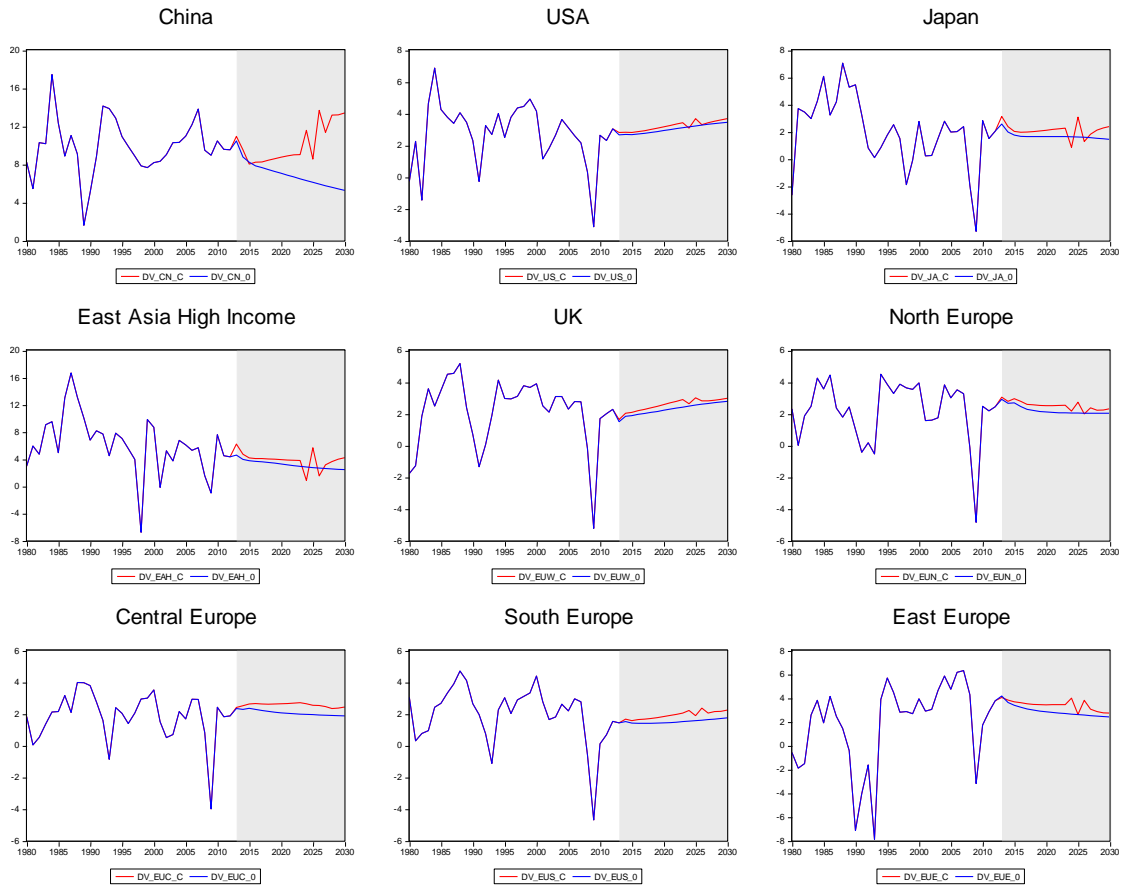
Graph 2. Growth rate of GDP of each bloc

Growth rate of GDP

baseline (blue), Increased consumption (red) Units: % per year



Graph 3. GDP growth rate of the world's major blocs



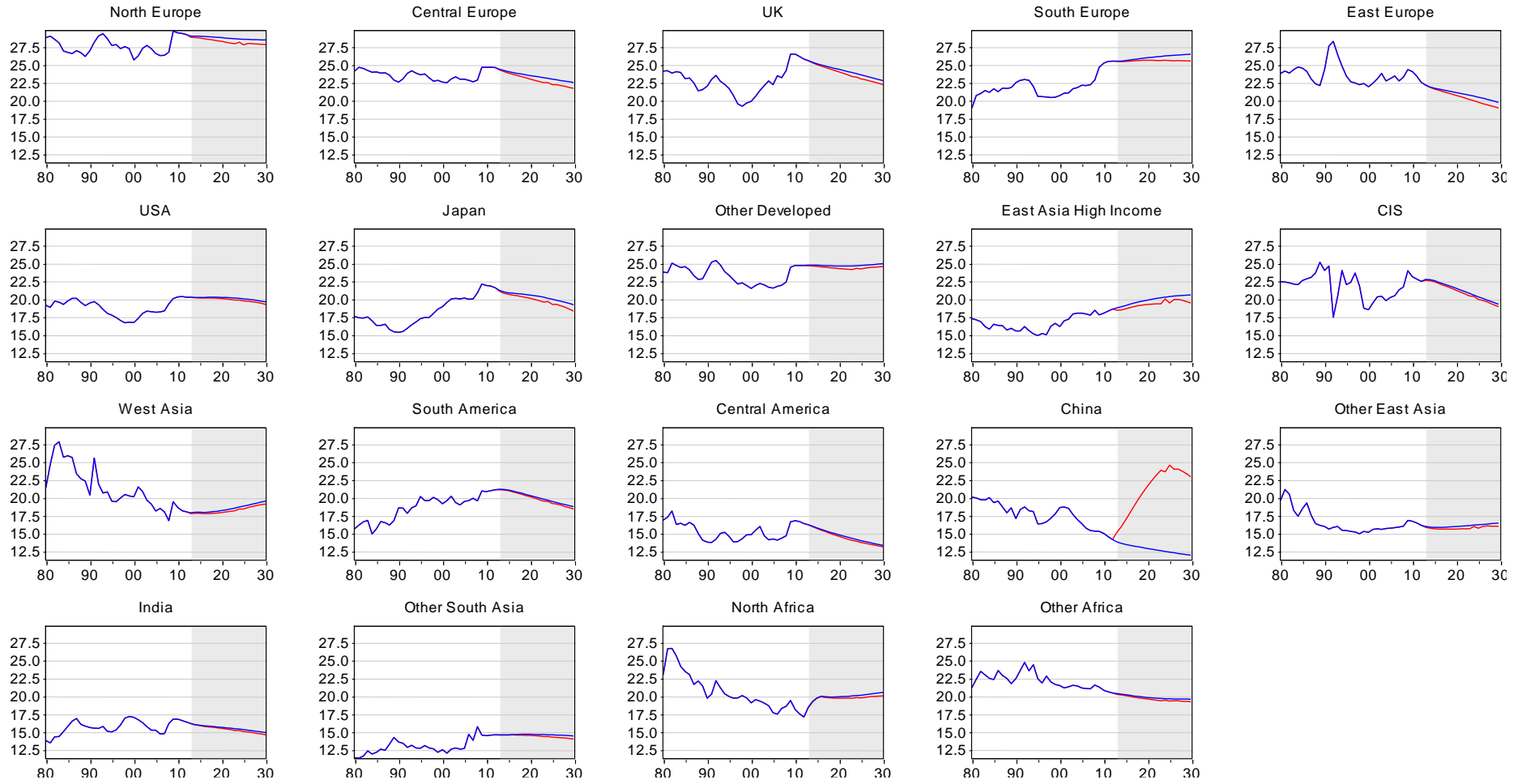
4.2 Impacts on government expenditure

One of the major instruments in the policy package is fiscal policy, specifically the expansion of government expenditure on R&D, education and the social security system, and so on. The government expenditure as a percentage of GDP in China is 14.5% in 2010 as manifested in baseline (the blue line, GV_CN_0) in Graph 4, and it slides slowly from then to 12% in 2030. As the scenario (the red line, GV_CN_C) depicts, the ratio of government expenditure to GDP soars drastically from 14.2% in 2012 to over 20% during mid 2020s, with 2025 as its peak, then falls from 24.5% in 2025 to 22.8% in 2030, which is still a very high proportion. In Graph 4, we may find that by contrast to rapid government expenditure growth in China, the ratio of government spending to GDP in USA, UK, Japan and EU all declines by 0.5 to 1.0 percent. For instance, by comparing the scenario with the baseline of Central Europe and Japan, government expenditure shares fall by approximately 1%. The reason for this is the rise of income per capita at PPP rates, which will bring down the government spending on welfare, as poverty relief and other measures stabilize the society.

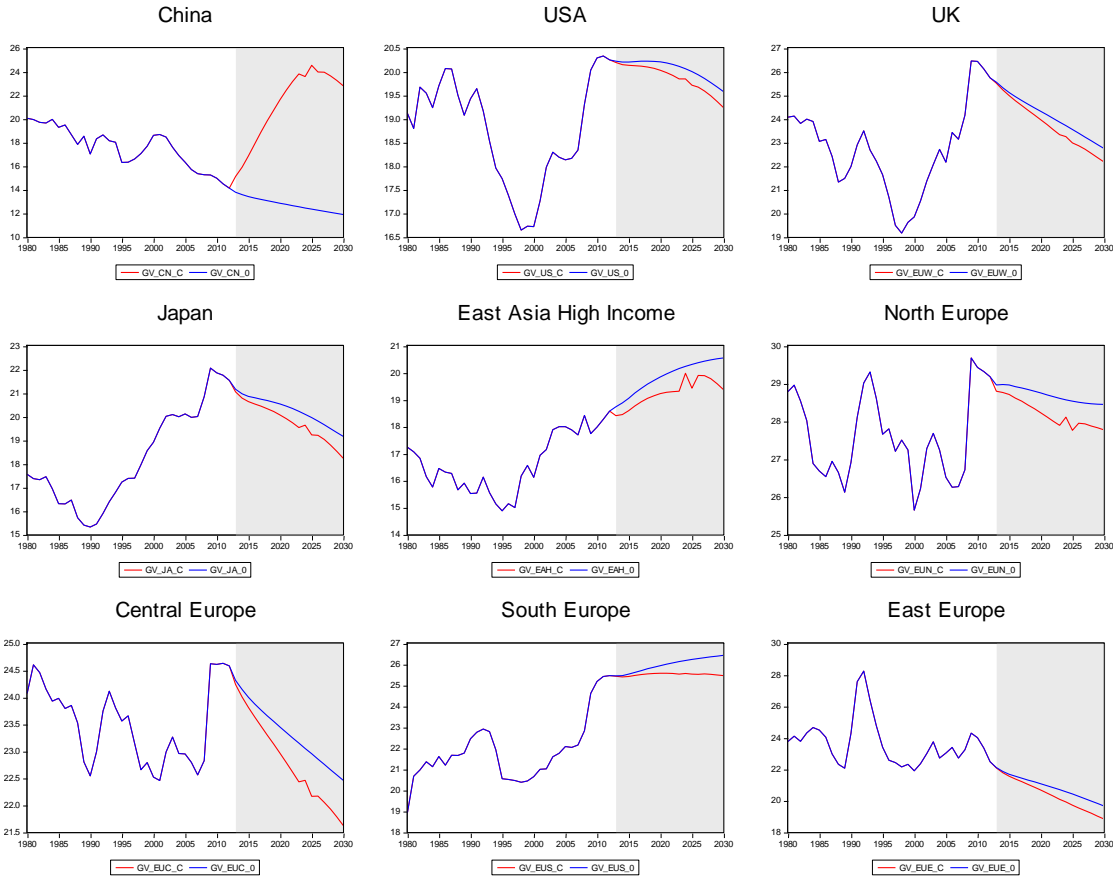
Graph 4. Government expenditure as percentage of GDP

Government expenditure as % of GDP

baseline (blue), Increased consumption (red) Units: %



**Graph 5. Government expenditure as percentage of GDP
of the world's major blocs**



4.3 Impacts on income per capita at PPP rates

The policy package designed in this section influences income in many ways. First, government investment in economic construction, infrastructure construction and national defense improves the employment rate, and stimulates economic growth; therefore it can promote the increase of resident income. Second, government expenditure in education and R&D can improve productivity in the long term. Third, monetary policy in the policy package leads to the decline of private savings and the rise of private investment, which will definitely result in the increase of income. Let's check the baseline (the blue ones) first. In 2010, income per capita at PPP rates is just above 7000 US dollars in China, 42100 USD in the USA, 30800 USD in Japan, 28300 USD in East Asia High Income, 32300 USD in UK, 37000 USD in North Europe, 33300 USD in Central Europe, 25500 USD in South Europe and 14300 USD in East Europe. In 2030, if the world economy moves forward under the current arrangements, income per capita at PPP rates is 25500 USD in China, 63400 USD in the USA, 46500 USD in Japan, 50000 USD in East Asia High Income, 44200 USD in UK, 51800 USD in North Europe, 46800 USD in Central Europe, 30200 USD in South Europe and 25900 USD in East Europe. If the policy package in China is implemented, what will happen to the income of people all around the world? The results are as follows. In 2030, income per capita at PPP rates is 43000 US dollars in China, 65600 USD in the USA, 50000 USD in Japan, 55100 USD in East Asia High Income, 46000 USD in UK, 54500 USD in North Europe, 50200 USD in Central Europe, 32500 USD in South Europe and 28000 USD in East Europe. The data and the growth extent can be understood further in Table 2.

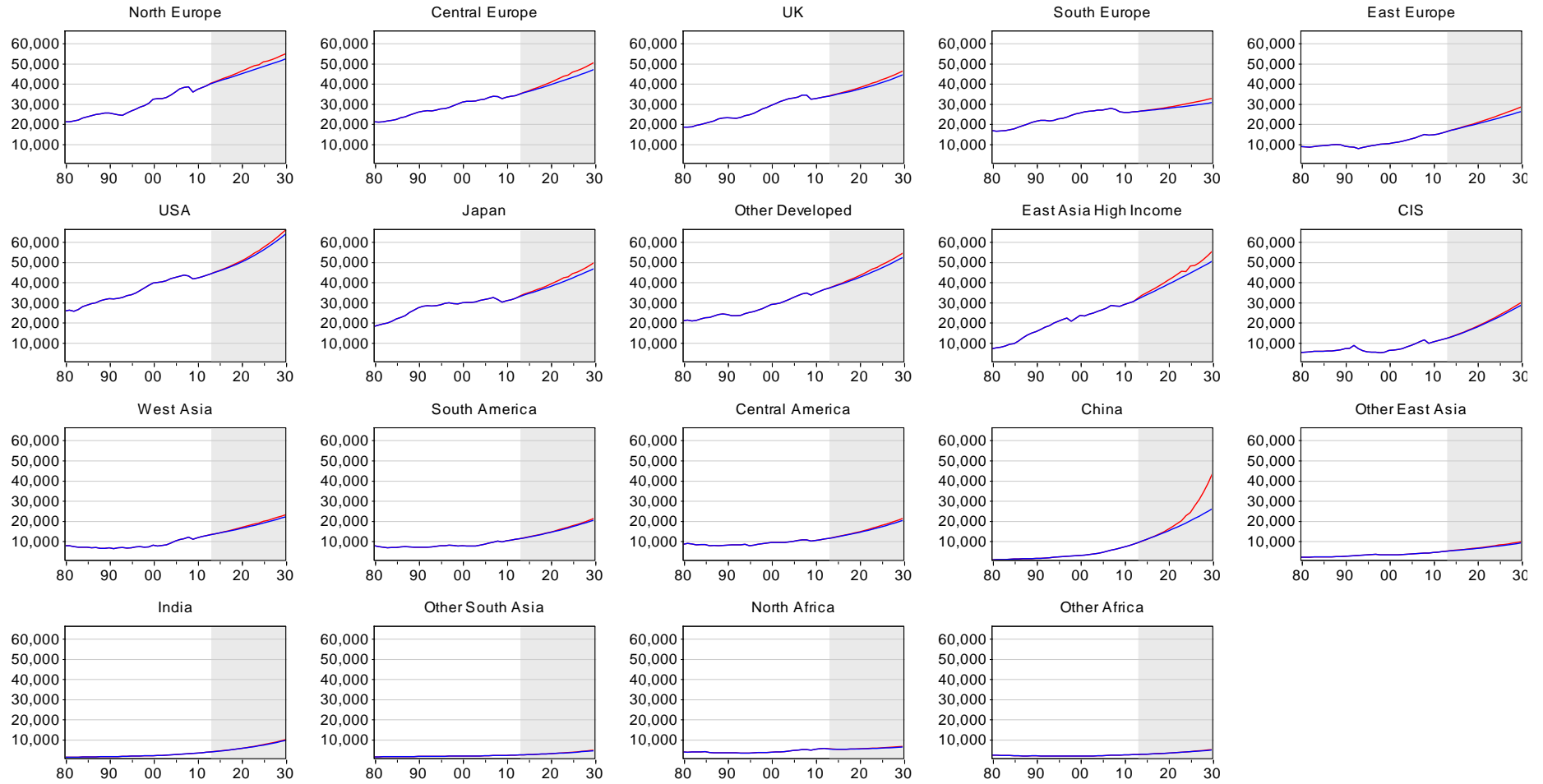
**Table 2. changes in income per capita at PPP rates between baseline and scenario
(Unit: US\$ at PPP rates)**

	China	USA	Japan	EAH	UK	North Europe	Central Europe	South Europe	East Europe
2010	7000	42100	30800	28300	32300	37000	33300	25500	14300
2030 (baseline)	25500	63400	46500	50000	44200	51800	46800	30200	25900
2030 (scenario)	43000	65600	50000	55100	46000	54500	50200	32500	28000

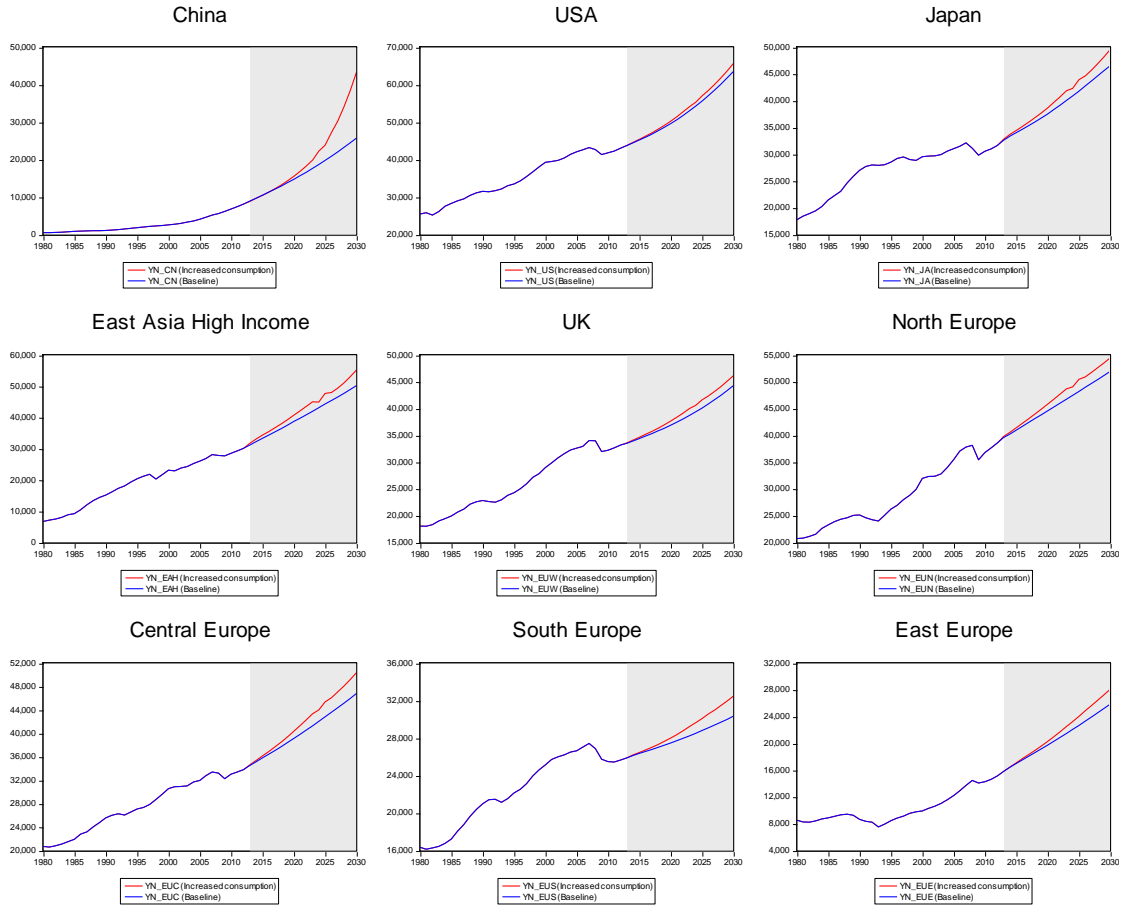
Graph 6. income per capita at PPP rates

Income per capita at ppp rates

baseline (blue), Increased consumption (red) Units: \$ ppp



Graph 7. income per capita at PPP rates



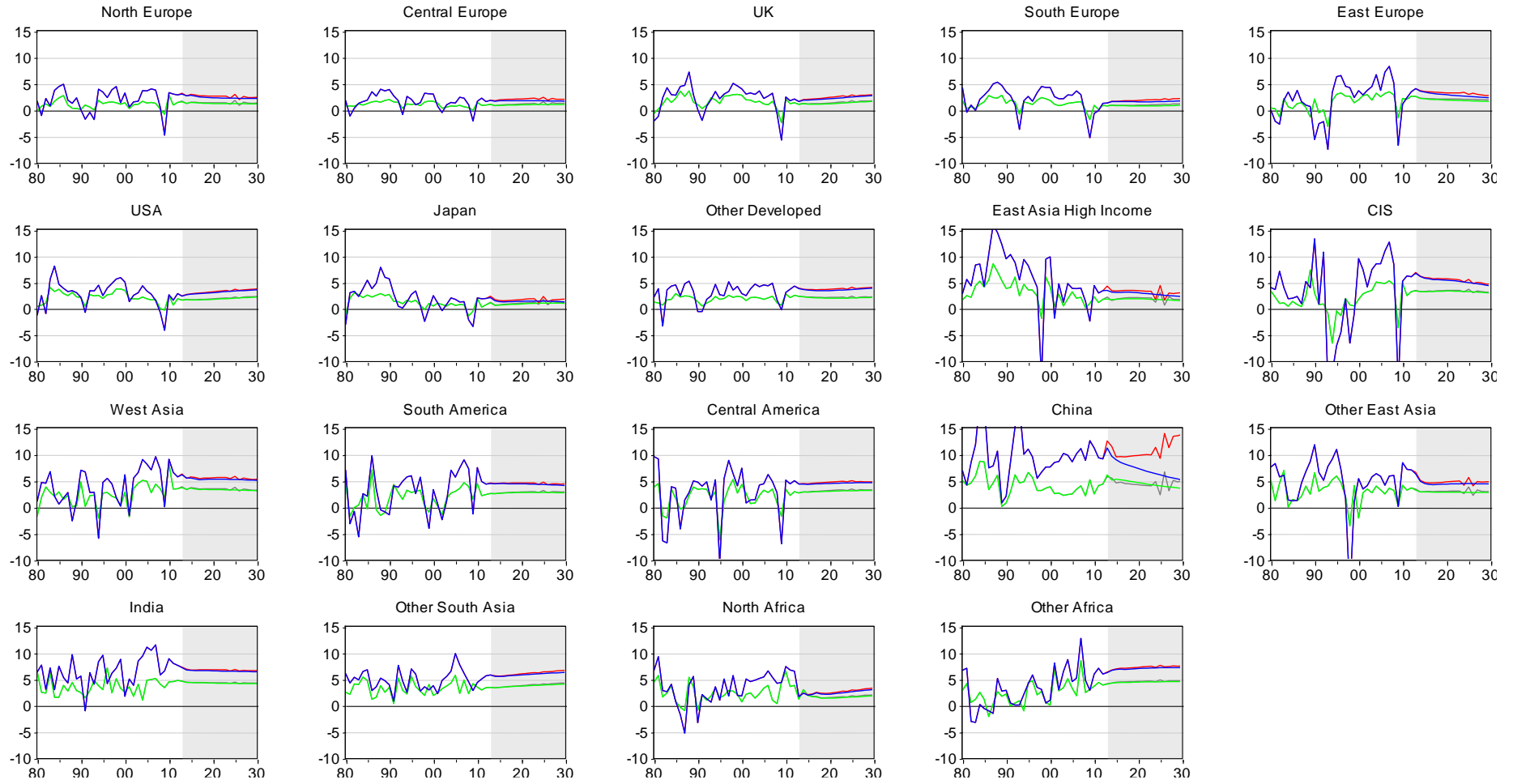
4.4 Impacts on contribution of consumption and total domestic spending to GDP growth

One of the goals pursued by the policy package is to increase resident income and reduce distribution inequality thus to expand China's domestic consumption, making domestic consumption and spending the main driving power of China's economy in the long run. In Graph 6, baseline of the contribution of consumption to GDP growth (the green line, DCV_CN_0) is only 3.5% in 2030, while the scenario of the contribution of consumption to GDP growth (the black line, DCV_CN_C) is 5.0% in the same year. Baseline of contribution of total domestic spending to GDP growth (the blue line, DHV_CN_0) is 5.1% in 2030, declining from 11.3% in 2010, while the scenario (the red line, DHV_CN_C) shows that although there are fluctuations between 2023 and 2027, the policy package will raise the contribution of total domestic spending to GDP growth to 13.8% in 2030, much higher than the baseline.

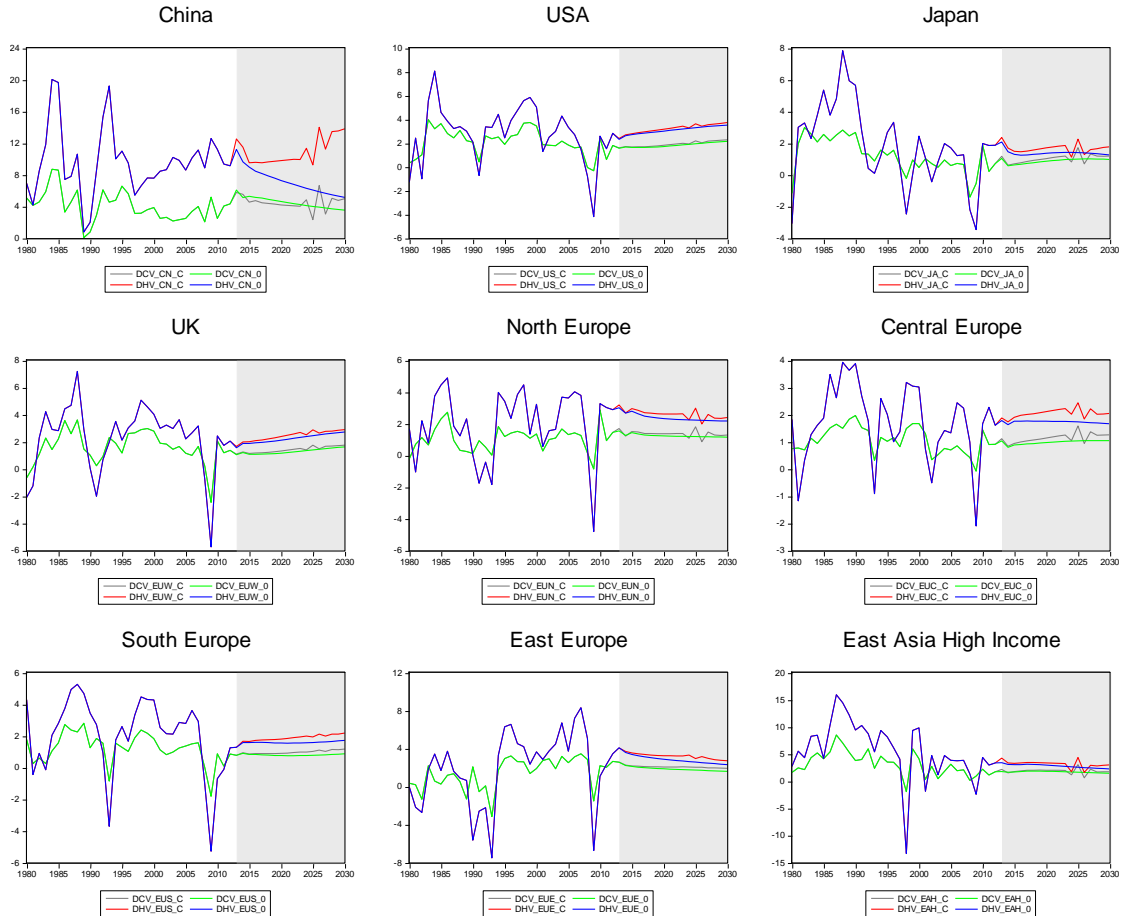
Graph 8. Contribution of consumption and total domestic spending to GDP growth

Contribution of consumption and total domestic spending to GDP growth

baseline (green,blue), Increased consumption (black,red) Units: %



Graph 9. Contribution of consumption and total domestic spending to GDP growth of the world's major blocs



4.5 Impacts on price inflation and cost inflation

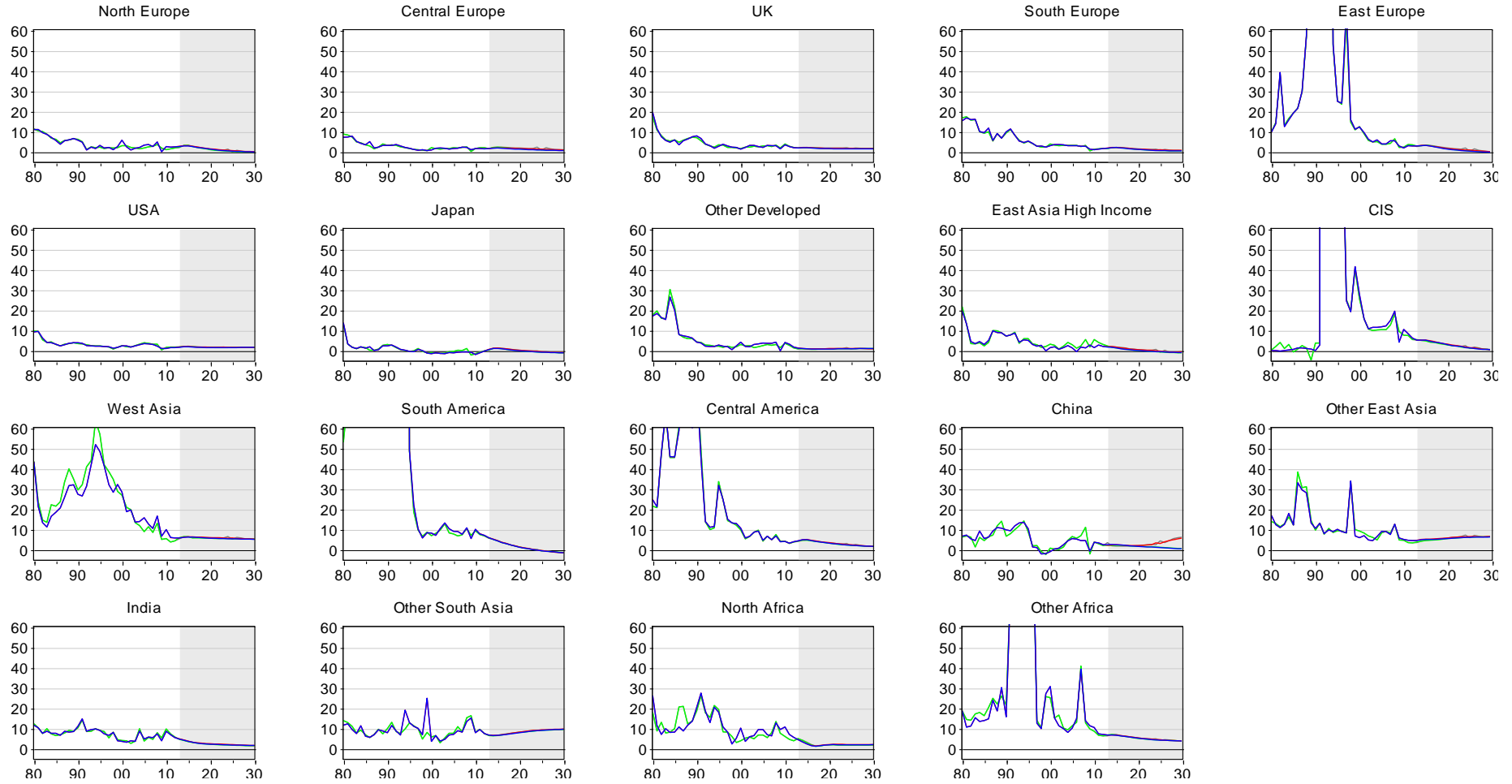
In the earlier paragraphs we can see world-wide GDP growth and increase of income per capita at PPP rate, and also the expansion of government in China; these may have significant impacts on global price inflation and cost inflation. However, in Graph 10, it seems that all factors above have no notable influence on inflation in EU, the US, Japan nor the East Asia High Income including Hong Kong SAR, Taiwan and Republic of Korea. In China, the red line (PVI_CN (Increased consumption)) is lower in the graph than the blue line (PVI_CN), which means there will be cost inflation pressure in China, but in USA, EU, Japan and the rest of the world, the inflation is trivial. This is powerful counter evidence to the viewpoint that China will transit from an abnormal economy with high growth but low inflation to a normal economy with somewhat lower growth but higher inflation¹.

¹ Huang, Yiping & Tingsong Jiang. 2010. What does the Lewis turning point mean for China? A computable general equilibrium analysis. *China Economic Journal*. Vol.3, No.2, pp.191-207.

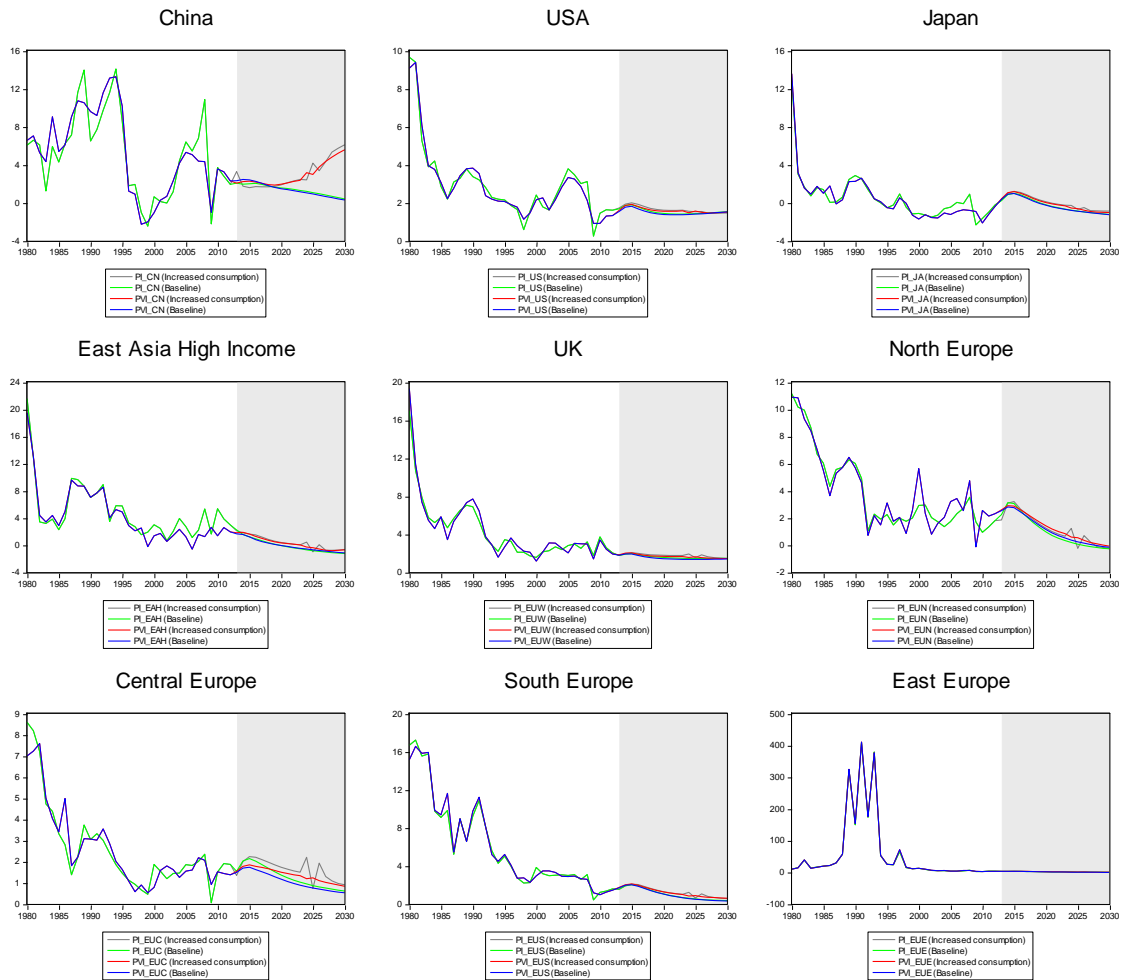
Graph 10. Price inflation and cost inflation

Price inflation and cost inflation

baseline (green,blue), Increased consumption (black,red) Units: %



Graph 11. Price inflation and cost inflation of world's major blocs



4.6 Impacts on employment and employment rate

Increase in consumption usually means more demand for products, including manufactures and services; by the driving force of profit seeking, entrepreneurs will invest more in fixed capital and employ more workers to expand the scale of production; expansion of government expenditure, including government investment in infrastructure construction, state-owned enterprises (SOEs), and national defense, and so on, has the same effect on employment with an increase in consumption. In neoclassical theory, the increase in consumption and government expenditure both signify the boom period of the business cycle, which will bring the economy into a situation with full employment. In Graph 12 and 13, under the action of the policy package, employment rate hikes in China by 3.5%, from 82.9% in the baseline to 86.4% in the scenario, 2030. In 2030, Employment rates are 60.2% in the baseline and 60.8% in the scenario in the US, 75.2% in the baseline and 77.5% in the scenario in Japan, 68.9% in the baseline and 73.0% in the scenario in East Asia High Income, 63.8% in the baseline and 64.9% in the scenario in UK, 67.7% in the baseline and 69.5% in the scenario in North Europe, 72.3% in the baseline and 75.0% in the scenario in Central Europe.

Table 3. changes in volume of employment between baseline and scenario

(Unit: millions)

	China	USA	Japan	EAH	UK	North Europe	Central Europe	South Europe	East Europe
2010	769	140	58.7	40	27.4	11.4	81.6	50.7	45.5
2030 (baseline)	803	140	50.3	40.5	27.9	12.0	83.4	59.0	40.9
2030 (scenario)	839	142	52	43.2	28.5	12.4	87	60.5	41.9

Table 4. changes of employment rate between baseline and scenario

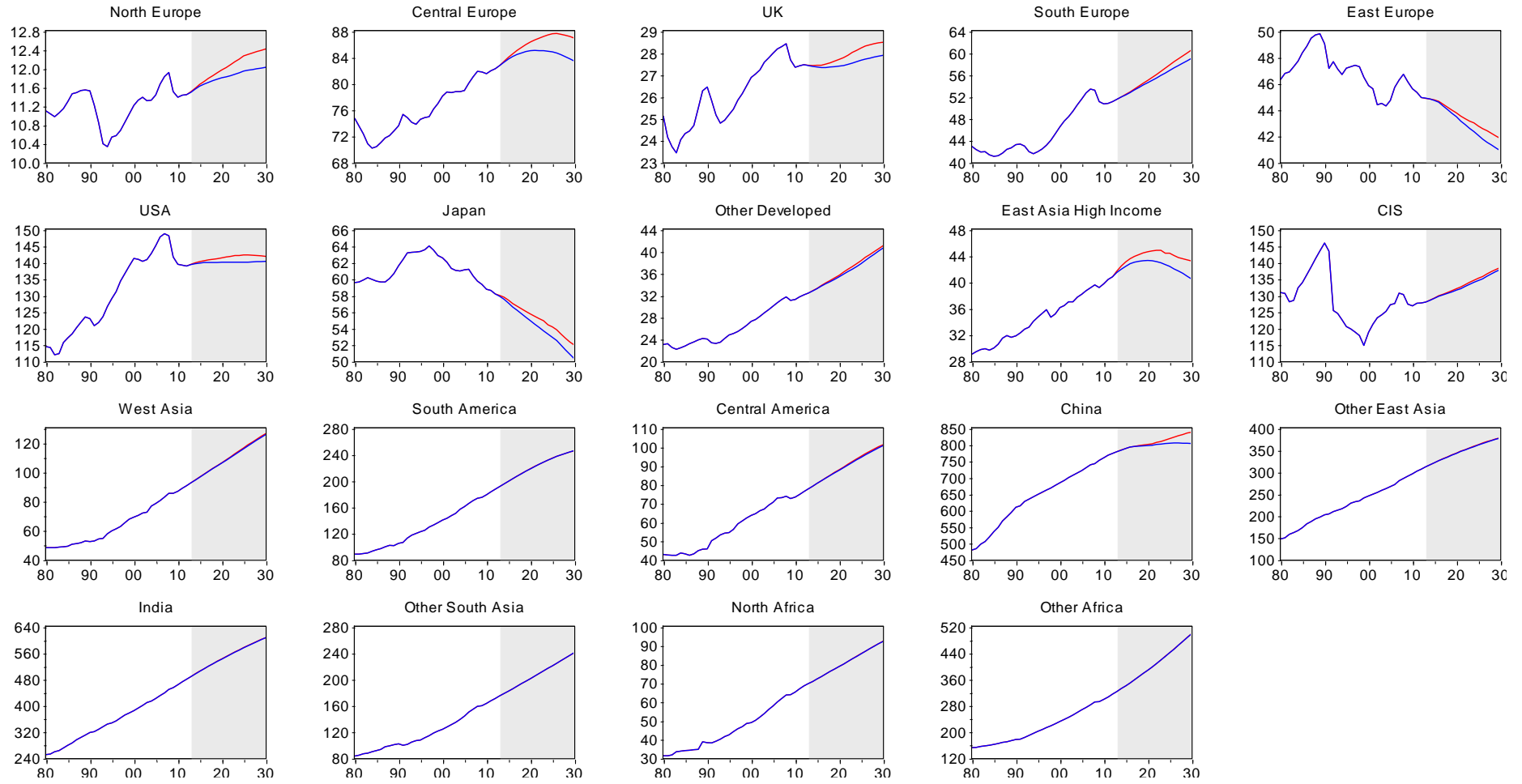
(Unit: %)

	China	USA	Japan	EAH	UK	North Europe	Central Europe	South Europe	East Europe
2010	78.1	65.0	72.0	64.9	66.9	69.5	65.7	56.9	54.8
2030 (baseline)	82.9	60.2	75.2	68.9	63.8	67.7	72.3	60.1	55.2
2030 (scenario)	86.4	60.8	77.5	73.0	64.9	69.5	75.0	61.5	56.3

Graph 12. Employment

Employment

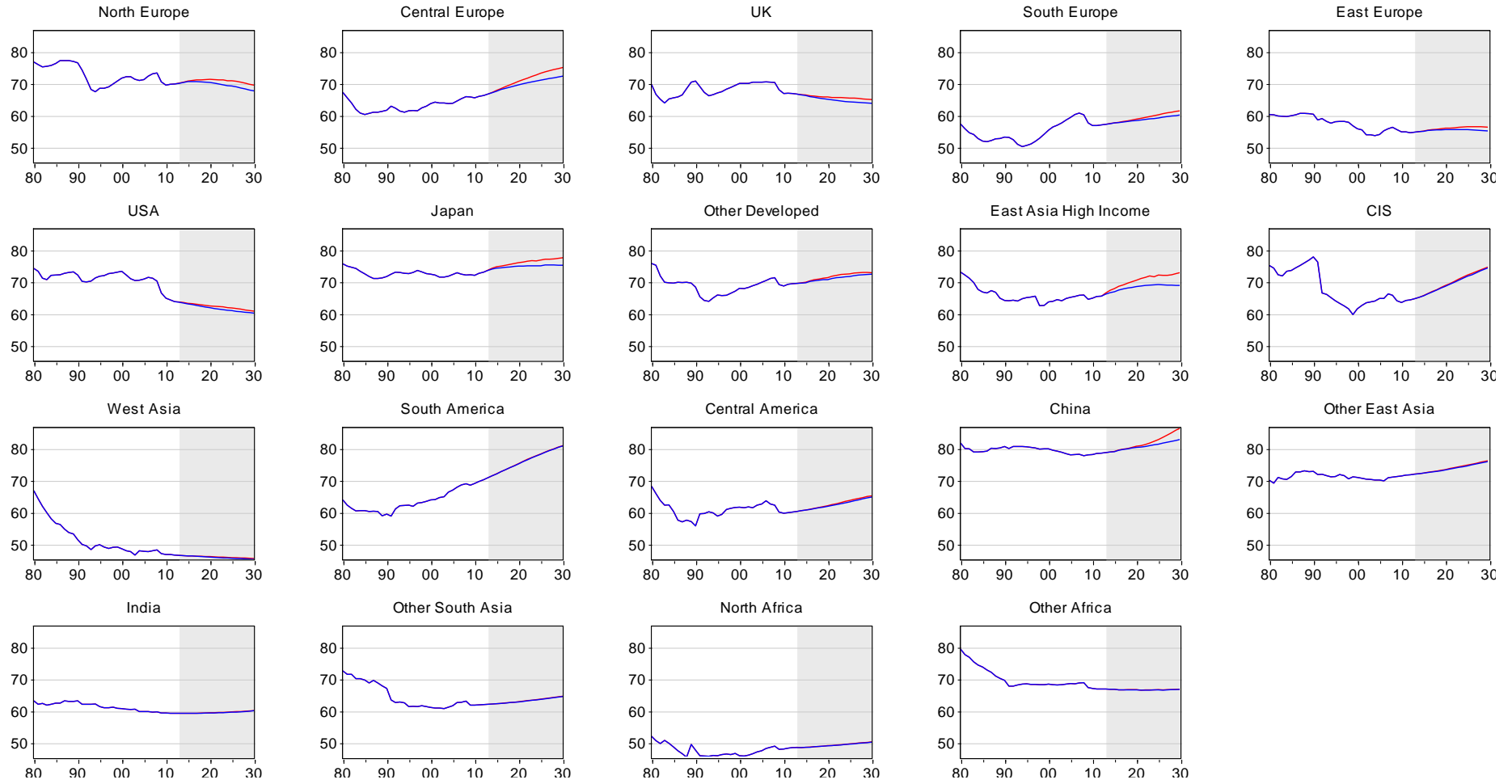
baseline (blue), Increased consumption (red) Units: millions



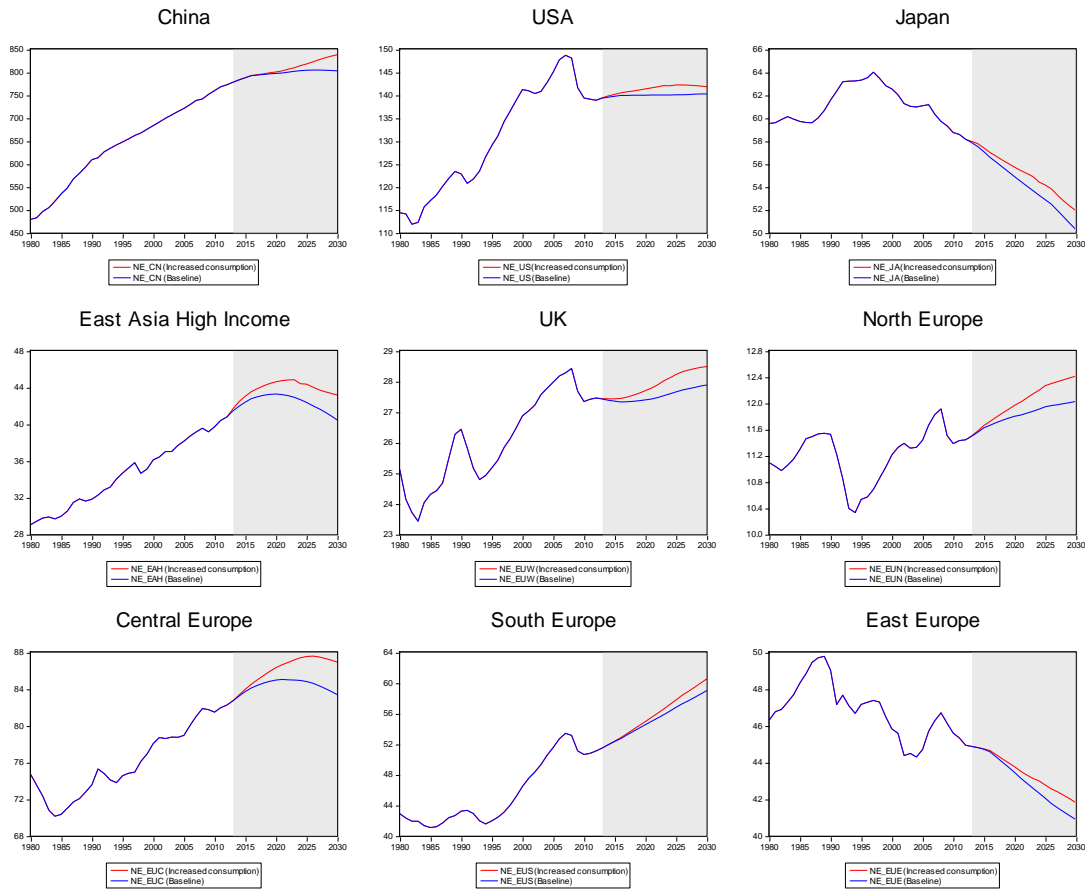
Graph 13. Employment rate

Employment rate

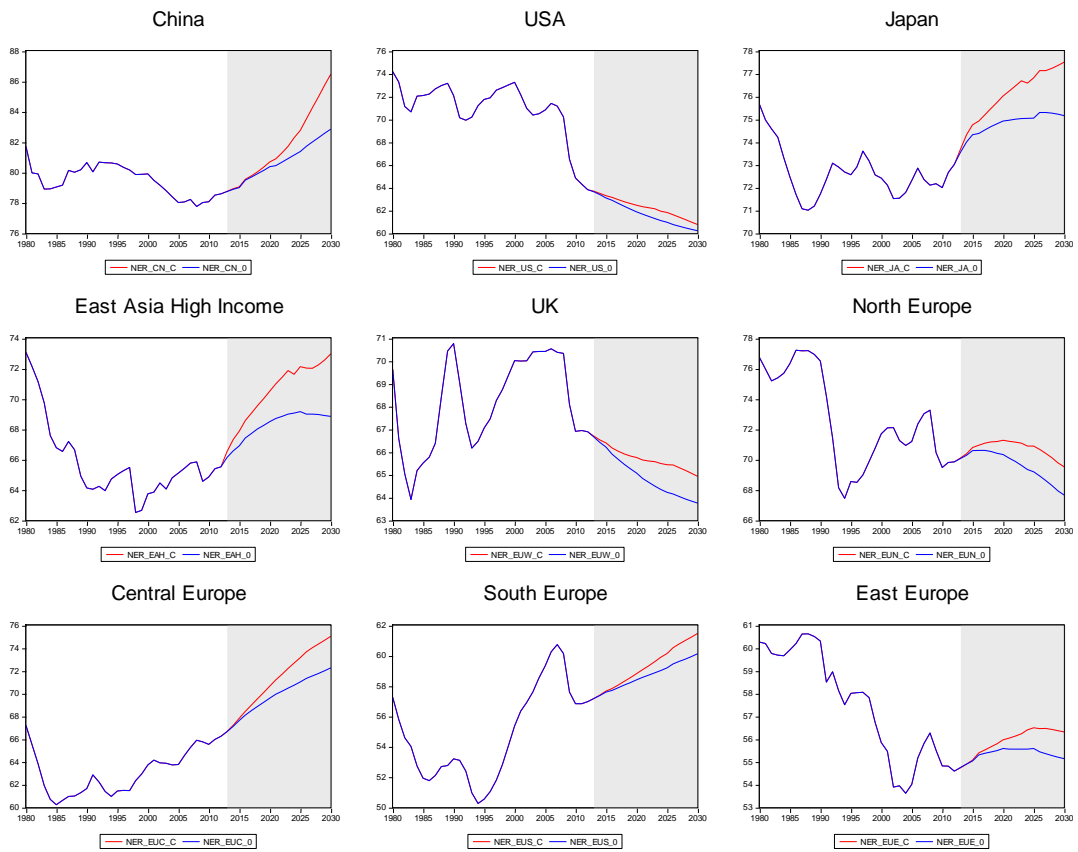
baseline (blue), Increased consumption (red) Units: %



Graph 14. Employment of world's major blocs



Graph 15. employment rate of world's major blocs



4.7 Impacts on real exchange rate

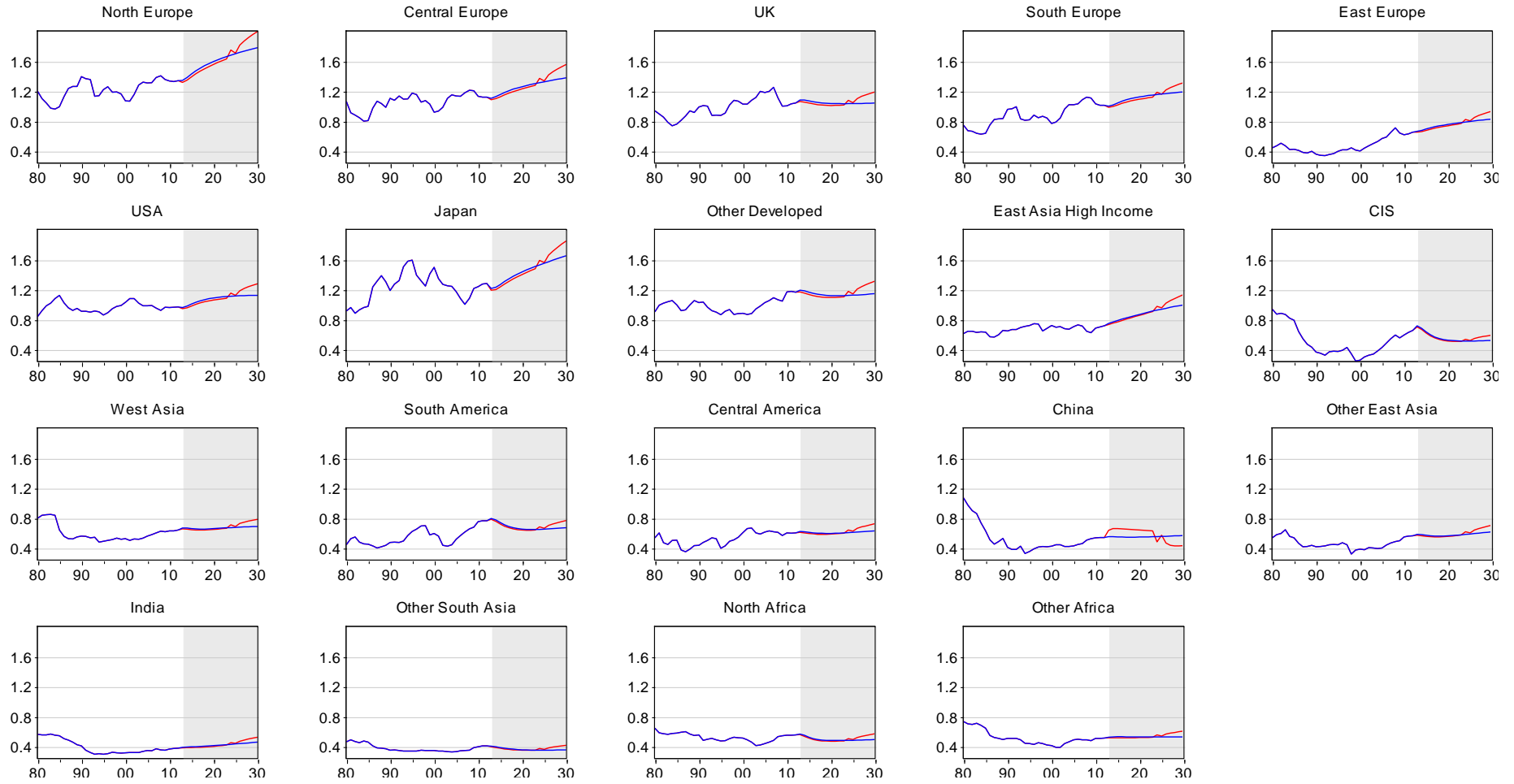
It is argued a lot in international society and also in China whether the exchange rate of RMB is under-appreciated. The US government attributes its large amount of trade deficit to the import from China; they assert that if the exchange rate of RMB is appreciated, the US will get a trade balance. In fact, the trade deficit of the US derives from its own industry structure and the excessive expansion of finance capital. Statistics show that the service sector including the finance sector takes over 70% of the GDP in the US - the US doesn't produce commodities or manufactures, it imports goods from the emerging economies such as China. The growth pattern of the US has resulted in a disequilibrium world economy system. On the one hand, countries like China and some other developing countries produce goods and export them to the US and accumulate a large amount of exchange reserves, with which they buy the US government bond, lending the money to the US to expand their consumption. On the other hand, the US's only production is the US dollars they print; they produce nothing but finance capital to promote GDP growth. This also leaves China in a disadvantaged position in international economy and vulnerable when an economic crisis breaks out in the US, just like the subprime crisis.

In this paper, we assume that the RMB exchange rate is appreciated in order to cut down China's dependence on export. We can see RMB's exchange rate significantly rise to 0.66 in 2014 in the scenario comparing with that in the baseline; however, it falls down to 0.48 in 2024 and goes up to 0.57 in 2025, and then declines again. On the contrary, other blocs witness slight depreciation first since 2011, but it soars from 2025.

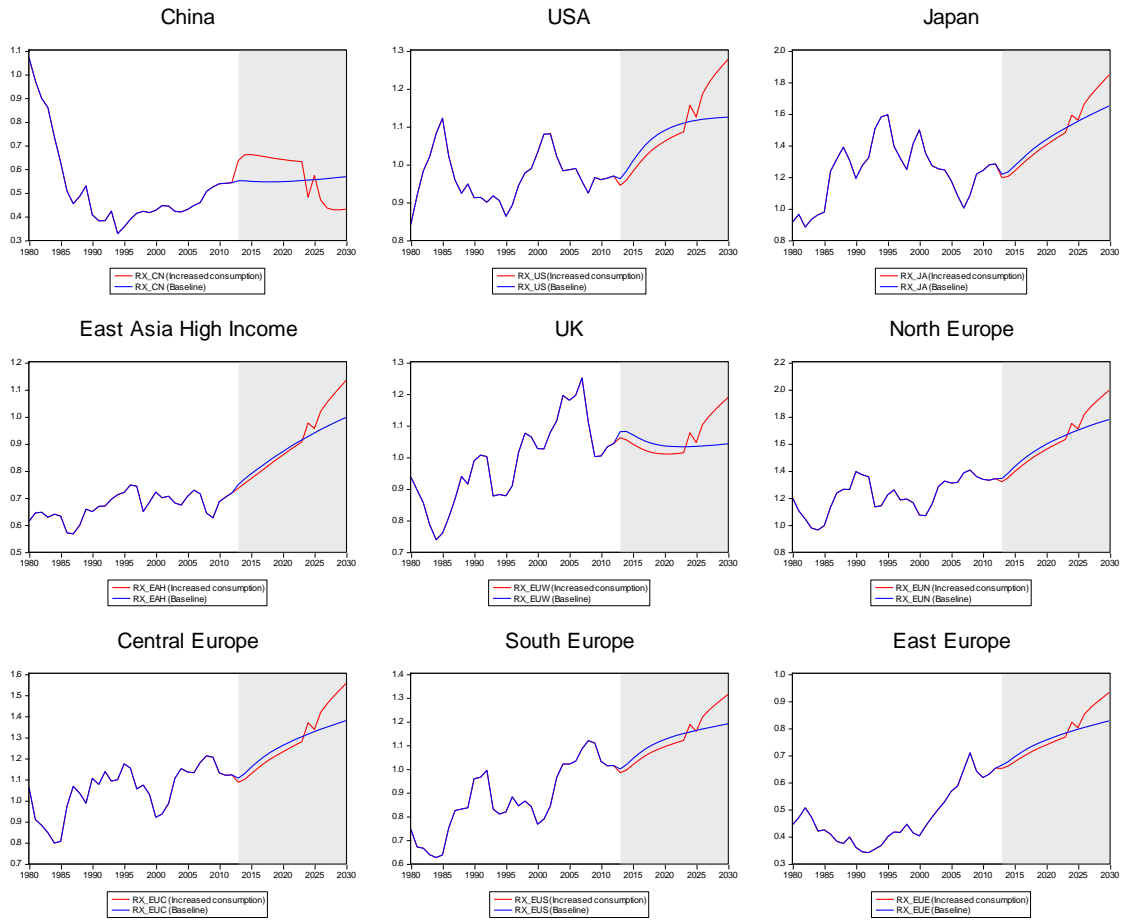
Graph 16. Real exchange rate

Real exchange rate

baseline (blue), Increased consumption (red) Units: index



Graph 17. Real exchange rate of world's major blocs



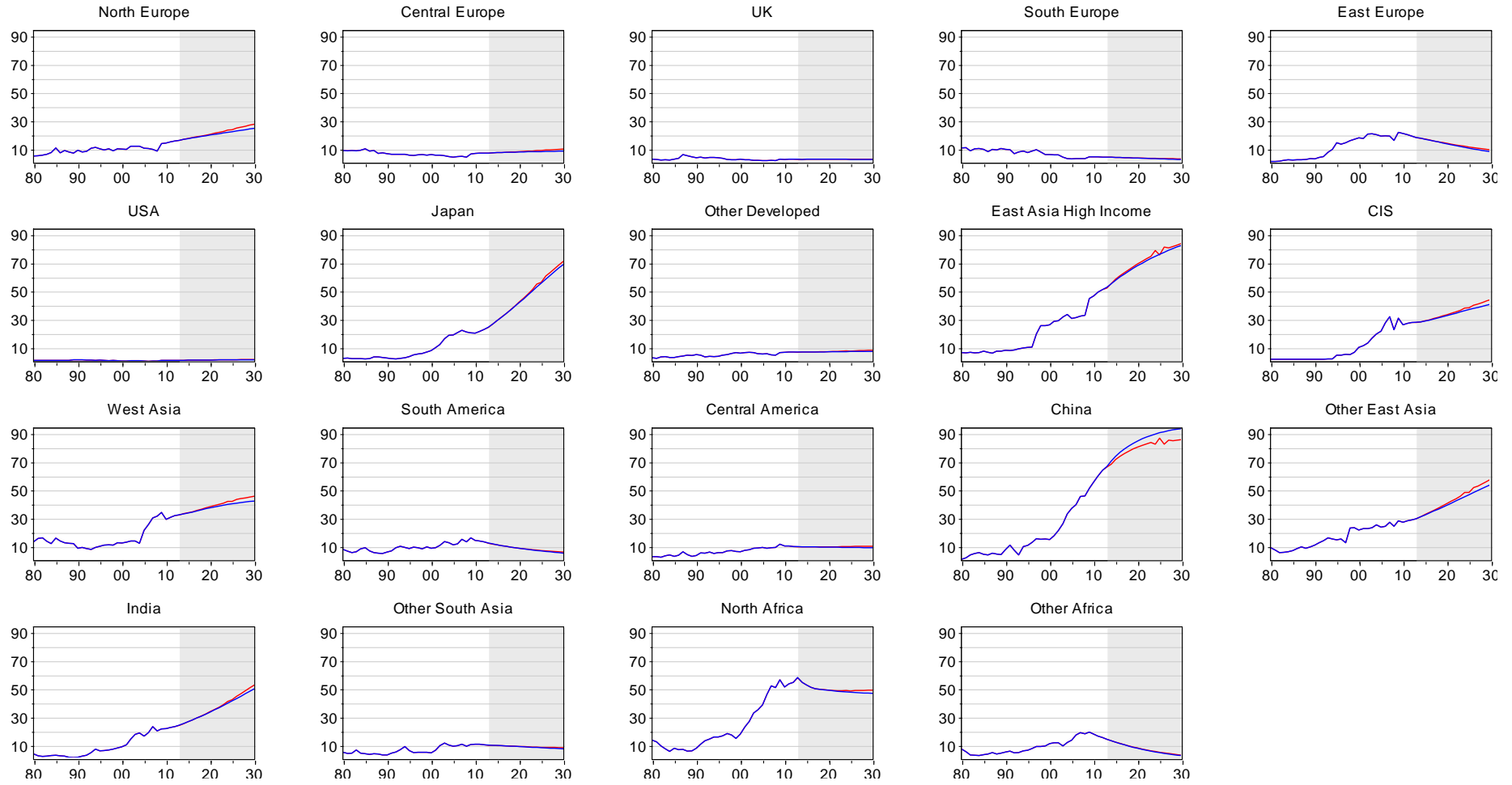
4.8 Impacts on exchange reserves as percentage of GDP

Theoretically, appreciation of the currency means a relatively higher price for foreign countries, which may probably lead to the country's export diminish and the decrease of exchange reserves. In 2010, the exchange reserve of China is equivalent to half of GDP of the same year, which is 59%. According to the baseline, the ratio of China's exchange reserve to GDP will surprisingly rise to 94%, and after the implementation of the policy package, it will be 86% in the scenario. Graph 18 shows the impacts on exchange reserves as percentage of GDP of the 19 blocs; there are trivial impacts on the developed countries such as UK, the US, while there are impacts to a certain degree on developing countries such as CIS, Other East Asia (including Indonesia, Malaysia and Cambodia and so on), West Asia, India and North Africa. The explanation is that since costs of commodities made in China are higher than before, the demands of developed countries have been transferred to other developing countries with a cheap and abundant labor force, which enables these developing countries to get some exchange reserves.

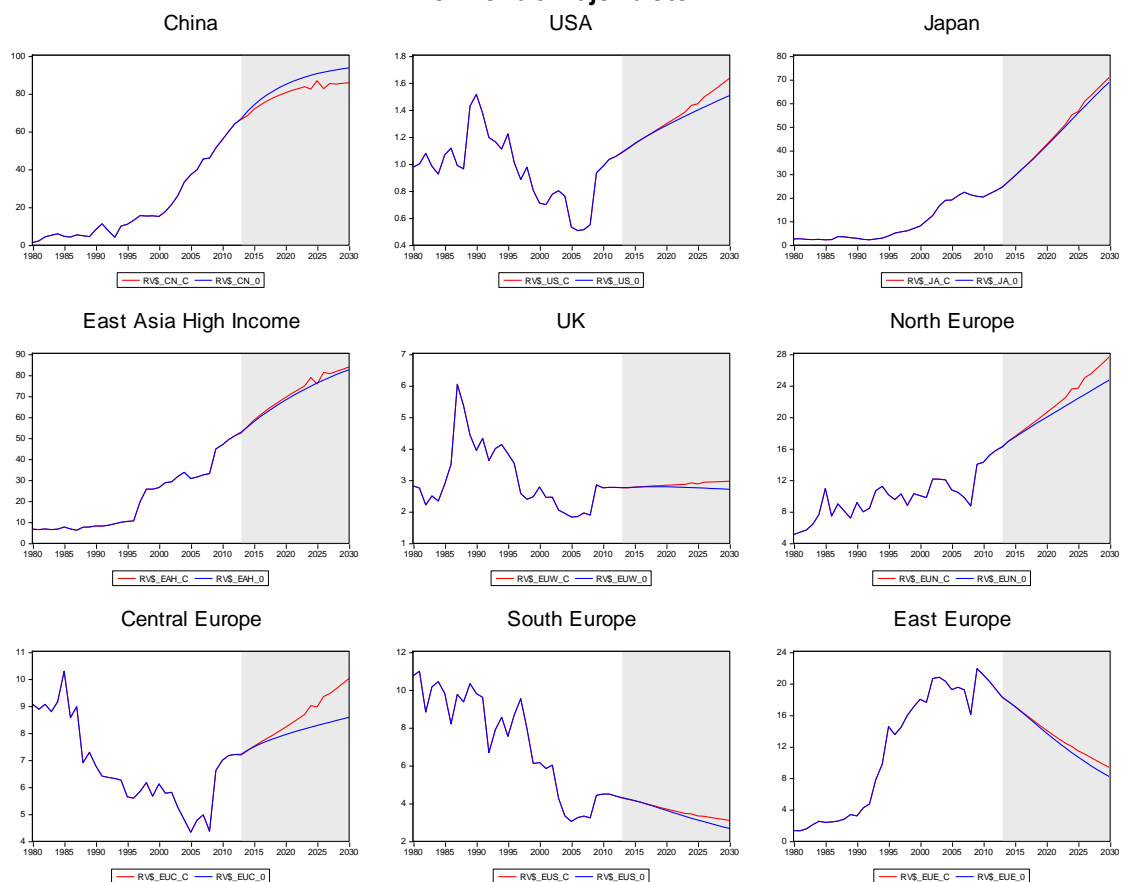
Graph 18. Exchange reserves as percentage of GDP

Exchange reserves as % of GDP

baseline (blue), Increased consumption (red) Units: %



**Graph 19. Exchange reserves as percentage of GDP
of world's major blocs**



5. Conclusions

The coming of the Lewis turning point is of great significance to China's economy; the cost of labor will rise and the labor-intensive industries should be transferred to other countries with cheap labor, technology-intensive industries will be highly developed and the government's investment in R&D and education should be increased; more and more rural resident flow into cities, the income gap between the rural and urban residents, between workers of different industries and between east, middle and west part of China should be narrowed, which will also improve domestic demand, leading China's economic growth driving force to turn to its huge and potential domestic market. As the economic globalization develops, China's different policy will affect different countries in the world; steady and fast economic development in China is important to the world economy, and China should deal with the exchange rate of RMB and foreign exchange reserve, and so on.

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