

Overtaking the U.S. Economy by China and India: How Sound Are the Expectations?

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ABSTRACT

This paper attempts to examine the sentiment or euphoria expressed at the beginning of this current century that the two emerging Asian economies – China and India – can overtake the U.S. economy in strength and vigor. It is true indeed that China's GDP is very close to the GDP of the U.S. economy, and India's GDP is still way behind, but the highest growth rate of Indian economy and next highest growth rate of China's economy may make people believe that the U.S. economy may fall behind China's and India's economies in due course. But analyses of comparative structures and economic dynamics of the internal and external balances in the Mundelian fashion exhibit that although nothing can be beyond the range possibility, but the overall picture of the probability of that occurring - that is, China and India overtaking the United States is at best weak enough.

JEL Classifications: F11, F13, F31, F41

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I. INTRODUCTION

At the turn of this century euphoria ran deep and high that Asia's two most populous countries – People's Republic of China (PRC) and India – would overtake the long-held stronghold of the world, which is the U.S. economy, and economic balance of power would swivel. It was then and it is now the hope of the eastern countries, but the question remains after 15 years into this new century if the hope and the euphoria are sound and valid. Hope and expectation are not necessarily equivalent. In view of that distinction and clarity, it is imperative that we attempt to assess the potentials of the growth of these three countries and the trajectories of the growth rates. In this context, the overall pictures of the gross domestic products (GDP), money supply, trade balance (or current account balance), net capital inflows (capital account balance), exchange rate movements, and so on are posited for analytical scrutiny. We then establish the linkage and causation of these factors in our analysis of the occurrences in these countries under examination.

Note the vital economic statistics of the United States, China and India at the outset of this century and the latest data on these items, which are presented later in this work. It may give a good sense that these Asian economies had a good potential for big take off in Rostovian sense. Now the question is: where are these Asian economies *vis-à-vis* the U.S. economy now. It must be noted, however, that almost depression-like deep recession in 2007-2008 has affected every economy of the world, although effects are quite unequal and disproportionate.

II. ECONOMIC SCENARIOS

A. The Economy of the People's Republic of China

The economy of China (People's Republic of China) is the world's second largest economy by nominal GDP, and the world's largest economy by purchasing power parity according to the IMF. Until 2015 China was the world's fastest-growing major economy, with growth rates averaging 10% over 30 years. Due to historical and political facts of China's developing economy, China's public sector accounts for a bigger share of the national economy than the burgeoning private sector.

China is a global hub for manufacturing, and is the largest manufacturing economy in the world as well as the largest exporter of goods in the world. It is also the world's fastest growing consumer market and second largest importer of goods in the world, has been a net importer of services products. For more details, one should examine (Shenkar, undated).

Being the largest trading nation in the world, it plays a vital role in international trade, and has increasingly engaged in trade organizations and treaties in recent years. This country became a member of the World Trade Organization in 2001. It also has free trade agreements with several nations, including China–Australia Free Trade Agreement, China–South Korea Free Trade Agreement, ASEAN–China Free Trade Area, Switzerland and Pakistan. On a per capita income basis, however, it ranked 77th by nominal GDP and 89th by GDP (PPP) in 2014, according to the International Monetary Fund (IMF). Here are some relevant statistics in Table 1.

Table 1
Economic statistics for the People's Republic of China

Nominal GDP	\$13.88 trillion (2016, estimate), \$1, 35 trillion (2014)
PPP GDP	\$20.98 trillion (2016, estimate), \$18.09 trillion (2014)
GDP growth rate	6.9 percent
Inflation (CPI)	1.4 percent
Exchange rate (in terms of USD)	6.52 CNY
Exports	\$2.28 trillion (2015)
Imports	\$1.68 trillion (2015)
Foreign reserves	\$3.3 trillion (1st; March 2015)
Shanghai Stok Exchange Capitalization	\$2.574 trillion

B. The Economy of India

The economy of India is the 9th largest in the world by nominal GDP and the third-largest by (PPP). The country is classified as a newly industrialized country, one of the G-20 major economies, a member of BRICS. India's economy became the world's fastest growing major economy from the last quarter of 2014, replacing the People's Republic of China.

The long-term growth prospective of the Indian economy is positive due to its young population, corresponding low dependency ratio, healthy savings and investment rates, and increasing integration into the global economy. It has the potential to become the world's 3rd-largest economy by the next decade, and one of the largest economies by mid-century. According to the IMF, the Indian economy is the "bright spot" in the global landscape. India has already been at the peak of the IBRD's growth outlook for 2015-16 for the first time with the economy having grown 7.6% in 2015-16 and expected to grow 7.7-8.0% in 2016-17.

Table 2
Economic statistics for India

Nominal GDP	\$2.051 trillion (2014)
PPP GDP	\$7.411 trillion ((2014)
GDP growth rate	7.4 percent
Inflation (CPI)	5.9 percent (January, 2016), 6.32 percent (December 2015)
Exchange rate (in terms of USD)	67.23 INR
Exports	\$310.3billion (2015 ^[11])
Imports	\$447.9 billion (2015 ^[11])
Foreign exchange reserves	\$353.46 billion (end of July, 2015)
Bombay Stok Exchange Capitalization	\$1.71 trillion

The economy of India has the one of fastest growing service sectors in the world with annual growth rate of above 9% since 2001, which contributed to 57% of GDP in 2012-13. It has capitalized its economy based on its large educated English-speaking population to become a major exporter of IT services, BPO services, and software services with \$167.0 billion worth of service exports in 2013-14. The country has \$600 billion worth of retail market in 2015 and one of world's fastest growing E-Commerce markets. Here are a few statistics on this country in Table 2.

C. The Economy of the United States

The United States is the world's largest national economy in nominal terms, representing 22% of nominal global GDP and 17% of global GDP (PPP). The gross domestic product (GDP) of the US was estimated to be \$17.914 trillion as of Q2 2015. The U.S. dollar is the currency most nations use in their international transactions and is the world's foremost reserve currency. Several countries use it as their official currency, and in many others it is the *de facto* currency.

It has the world's ninth-highest per capita GDP (nominal) and tenth-highest per capita GDP (PPP) as of 2013. Americans have the highest average household and employee income among OECD nations.

The U.S. is the world's largest producer of oil and natural gas. It is one of the largest trading nations in the world as well as the world's second largest manufacturer, representing a fifth of the global manufacturing output. The US not only has the largest internal market for goods, but also dominates the trade in services. US total trade amounted to \$4.93trillion in 2012. Of the world's 500 largest companies, 128 are headquartered in this country. The United States has one of the world's largest and most influential financial markets. The New York Stock Exchange is by far the world's largest stock exchange by market capitalization. Foreign investments made in the US total almost \$2.4 trillion, while American investments in foreign countries total over \$3.3 trillion. Consumer spending comprises 71% of the US economy in 2013. The United States has the largest consumer market in the world, with a household final consumption expenditure five times larger than Japan's. The labor market has attracted immigrants from all over the world and its net migration rate is among the highest in the world. The U.S. is one of the top-performing economies in studies such as the *Ease of Doing Business Index*, the *Global Competitiveness Report*, and others.

The US economy went through an economic downturn following the financial crisis of 2007–08, with output as late as 2013 still below potential according to the Congressional Budget Office. The economy, however, began to recover in the second half of 2009, and as of November 2015, unemployment had declined from a high of 10% to below 5%.

In December 2014, public debt was slightly more than 100% of GDP. However, domestic financial assets totaled \$131 trillion and domestic financial liabilities totaled \$106 trillion. Here are the vital statistics of the U.S economy in Table 3.

Table 3
Economic statistics for the United States

Nominal GDP	\$17.348 trillion (2014)
PPP GDP	\$17.348 trillion ((2014)
GDP growth rate	4.6 percent (July, 2014), 3.9 percent (July 2015)
Inflation (CPI)	5.9 percent (January, 2016), 6.32 percent (December 2015), .0 percent (January, 2016)
Exchange rate (in terms of USD)	1
Exports	\$1.5 trillion (2015 ¹¹¹¹)
Imports	\$2.2 trillion (2015 ¹¹¹¹)
Foreign exchange reserves	\$434,416,453,480 million (2015)
New York Stock Exchange Capitalization	\$16.613 trillion (2011)

III. A COMPARATIVE ASSESSMENT

The euphoria has or had its basis for sure. China has topped the US economy in terms of GDP in purchasing power parity measure, and India is next to the United States (see Arize *et al.* (2016). From the beginning of the last decade of the past century, both China and India began to get unhinged and made moves to liberalize their economies from the shackles of old and orthodox principles of regulations. Inflation is low (1.4 percent), and unemployment is low too (4.05 percent). A close look at financial data, even though they are not available at the same time for all three countries, however, reveals a few facts for further insights. Average income for Chinese people is \$8,500, yearly (2015), GDP per capita are \$10,059 (nominal; 75th; 2015) \$14,190 (PPP; 89th; 2015), which signify huge headwinds for China to come to the rank of the topmost country in the world. There has been a chorus of criticism that China has been a currency manipulator all along, and now the RMB devaluation and further float of it heightens more concerns on the competitive advantage in trade transactions. Despite yuan devaluation and on-going depreciations, China's trade balance, even though still is in surplus, is deteriorating on a steady basis.

India has become the major exporter of IT services, business process outsourcing services, and software services with \$167.0 billion worth of service exports in 2013-14. It is also the fastest-growing part of the economy. The IT industry continues to be the largest private sector employer in India. It is also the fourth largest start-up hub in the world with over 3,100 technology start-ups in 2014-15. The Agricultural sector is the largest employer in India's economy, but contributes to a declining share of its GDP (17% in 2013-14). The economy ranks second worldwide in farm output. The Industrial sector has held a constant share of its economic contribution (26% of GDP in 2013-14). The Indian auto mobile industry is one of the largest in the world with an annual production of 21.48 million vehicles (mostly two and three wheelers) in fiscal year 2013-14. It has \$600 billion worth of retail market in 2015 and one of world's fastest growing E-Commerce markets. All are good, and yet the economy's regular negative balance of trade had a drag on the economy. The external value of Rupee has been on steady decline for a long time with no benefit to the external balance. Internal balance is messy, too. In

January of 2016, the domestic inflation rate is 5.90 percent, and a month before that it was 6.32 percent. International Labor Organization (ILO) has indicated in its recent report that the unemployment scenario in India over the last two years has been showing a rising trend. It is expected to be 3.8 percent. It is not large unemployment rate, but when both external balance and internal balance do not intersect, the disequilibrium sets in. The corrective policy menu should be injected to restore equilibrium on both fronts.

The evolution of Chinese economy and Indian economy is closely tied to the interconnectedness of these economies to the world economies in open-economy framework. That involves mostly the current account and capital account balances and the exchange rates scenarios. Exchange rate and capital flows are interlaced for a long time, and it is still being examined. Theories about and yet the explanation of the relationship in each specific situation are not clear-cut. So, it is inadequate for less-developing and newly-developing countries where economic structures are not like western varieties to be compared properly. Here, we bring the existing literature with specific slant to our investigation in theoretical terms and then relating it to what is happening in the countries such as China and India. Different approaches are taken to explain this interrelationship, and then we attempt to do some empirical tests in this work.

IV. THEORETICAL ANALYTICS

The economic structure of any economy is captured through two major balances – internal balance and external balance. The latter is imbedded in the balance of payment equation of an economy, and the internal balance is reflected through its national income accounting picture in most part. Literature abounds in the analysis of the subject in hand, and yet we need more to connect the dots when many economies are not like most western varieties because of structural, legal, and financial differences. China and India are not real clones of the U.S and UK, and the like in the western hemisphere. In view of recognizing that reality, differences exist in many facets, and yet some commonalities may admit of many approaches that western countries take as the paradigms to accept. People's Republic of China and India are not in fixed exchange regime *per se*, but a closer look exhibits a virtual peg to US dollar; fluctuations are within a very narrow band except periodically.

In our analytical frameworks, we bring out, as noted in the *Abstract* earlier, the two balances – external and internal – and put them together to see how exchange rate and capital flows interact in the context of an economy. However, it is imperative we do those balances one at a time. In the section II, we develop the entire structure, part by part.

A. Analytical Look

1. Specie-flow price mechanism

Under Gold Standard which typified virtual fixed exchange, balance of payments between any two countries could automatically correct any imbalance through the built-in adjustment process of gold inflow and gold outflow. Note that in Gold Standard, money supply was proportionally fixed with the physical quantity of gold a country had. If gold stock increased, money supply would increase *pari passu*, and *vice versa*. Now,

consider country A *vis-à-vis* country B, and assume A is in balance of payments surplus and B is in balance of payments deficit in their mutual relationship at time t. Here we explain how balance of payments balance occurred. In the old Gold Standard framework the following sequence had to take place: Deficit country would lose gold and surplus country gained gold as payments were structured. Here is the sequence presented in Table 4.

Table 4
Sequence

A (surplus country)	B (deficit country)
1. gold inflow (gain)	1. Gold outflow (loss)
2. increase in money supply	2. decrease in money supply
3. price hike (inflation)	3. price drop (deflation)
4. drop in interest rate	4. rise in interest rate
5. export drops and import rises	5. export rises and import drops
6. trade surplus shrinks	6. trade deficit shrinks
7. capital account shrinks	7. capital account shrinks
8. Process continues until the balance of payments is restored.	

This set of occurrences need a bit more exposition. Note that deficit country must pay surplus country by gold, and thus it loses gold and the surplus country gains gold, and as an immediate response to gold loss and gold gain, deficit country will decrease its money supply and the surplus country will increase its money supply. The consequence of decrease (increase) in money supply is the decrease (increase) in commodity price, and a drop (rise) in interest rate, and these two factors induce adjustments in current account and capital account balance until the equilibrium is reached. This exchange rate regime no longer exists because of a few deficiencies in its structure. It must be noted that Gold Standard had a narrow band of exchange fluctuations with export and import points of gold transfer, and in that sense it resembles Gulf Cooperation Council (GCC) comprised of Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and United Arab Emirates (UAE).

Specie-flow price mechanism became adequately deficient in economies not operating in conditions of less than full employment and money supply is not proportionally related to gold stock of any country. If those conditions are not met, the sequence of adjustments will not follow, and in some cases opposite events may occur. Why do we bring in Gold Standard adjustment mechanics in this analysis? Seemingly, there is no reason, and yet on a more in-depth review of the background scenarios, one can note that China and India are hoarding gold in enormous amounts. The United States of America from time to time attempts to go back to the Gold Standard during the beginning of the Reagan Administration, and now Donald Trump has been trumpeting for the return to Gold Standard. Gold Standard is dead, but the dead entity is walking in the minds of many policy makers.

The question then is: how to check the relationship between exchange rates movements and capital flows? In the following section, we look into the Irving Fisher's

view of an economy with purchasing power parity inserted into it, and then bring out the price level, exchange rates and money Supply.

2. Irving Fisher and Fisher open parity

In a profound way Irving Fisher brought out the quantity theory of money by the following relation (which got further attention and elucidation of Frenkel (1976), and Ghosh et al (2000).

$$P \cdot Q = M \cdot V \quad (1)$$

where P stands for price level, Q for quantity of goods produced (GDP), M is country's money supply, and V is the velocity of circulation of money - all for the home country. If we take the same relation for a foreign country, we have:

$$P^* \cdot Q^* = M^* \cdot V^* \quad (2)$$

Here, * denotes the foreign country variables. From (1) and (2), one can get the following:

$$\frac{P}{P^*} = \frac{M \cdot V}{M^* \cdot V^*} \cdot \frac{Q^*}{Q} \quad (3)$$

By virtue of the absolute purchasing power parity, we know that exchange rate (e) is the ratio of two countries' prices. More precisely,

$$e = \frac{P}{P^*} \equiv \frac{M \cdot V}{M^* \cdot V^*} \cdot \frac{Q^*}{Q} \quad (4)$$

From (4) one can obtain the following (by logarithmic differentiation):

$$\frac{de}{e} = \left(\frac{dM}{M} - \frac{dM^*}{M^*} \right) + \left(\frac{dV}{V} - \frac{dV^*}{V^*} \right) + \left(\frac{dQ^*}{Q^*} - \frac{dQ}{Q} \right) \quad (5)$$

It shows that exchange rate changes (percentage-wise) by three percentage-wise changes: relative change in money supply $\left(\frac{dM}{M} - \frac{dM^*}{M^*} \right)$ relative change in velocity of circulation $\left(\frac{dV}{V} - \frac{dV^*}{V^*} \right)$, and the relative change in GDP $\left(\frac{dQ}{Q} - \frac{dQ^*}{Q^*} \right)$. Normally, $\left(\frac{dV}{V} - \frac{dV^*}{V^*} \right)$ is negligible, and $\left(\frac{dM}{M} - \frac{dM^*}{M^*} \right)$ and $\left(\frac{dQ}{Q} - \frac{dQ^*}{Q^*} \right)$ will set the stage for the value of $\frac{de}{e}$. If exchange rate movement is minimal (because of virtual peg), we must examine $\left(\frac{dM}{M} - \frac{dM^*}{M^*} \right)$ and $\left(\frac{dQ}{Q} - \frac{dQ^*}{Q^*} \right)$ very carefully. If growth (or decrease) of money supply is *almost* matched by the decline (or growth in GDP) in the home country *relative* to the foreign country, exchange rate movement is *almost* nil. Do these countries (China and India) exhibit this phenomenon? Secondly, how is it related to capital flows? On this

issue, we must dig further into the standard balance of payments structure and bring it out to explore the relationship.

3. Balance of payments

Analysis of balance payments (Ghosh, 2017; Ghosh *et al.*, 1987 and 2000), and IMF studies (2012 cited here, and others) gives a connection to the economic conditions of a country. Balance of payments (β) of a country (say, home country) is defined by the following:

$$\beta = X - M + NUT + K_I - K_O + NFR + E_oO \quad (6)$$

where X = export revenue in home currency; M = import expenditure in home currency; NUT = net unilateral transfers in and out of home currency; K_I = capital inflows into the home country in home currency; K_O = capital outflows from the home country in home currency; NFR = net foreign reserves of the home country in home currency; and E_oO = errors or omission in home currency. Note that NUT , NFR , and E_oO are insignificant compared to the rest of the balance of payments constituents. So, ignoring NUT , NFR , and E_oO ,

$$\beta = \beta_c + \beta_K \quad (6A)$$

where

$$\beta_c \equiv X - M \quad (6A.1)$$

is the measure of trade balance (or current account balance), and the capital account balance is defined by

$$\beta_K \equiv K_I - K_O \quad (6A.2)$$

Note that is a function of domestic price (P), exchange rate (e , measured as the price of a foreign currency in terms of home currency), and national income (Y), and indirectly interest rate r . That is,

$$\beta_c = f(P, e, Y, r) \quad (6A.3)$$

where $\frac{\partial \beta_c}{\partial P} < 0$, $\frac{\partial \beta_c}{\partial e} > 0$, $\frac{\partial \beta_c}{\partial Y} < 0$, $\frac{\partial \beta_c}{\partial r} < 0$. As one can see that β_c is not *directly* impacted by domestic interest rate, r , or more appropriately by interest rate differential ($r - r^*$) where r is the domestic interest rate and r^* is the foreign interest rate. Yet, a more comprehensive understanding of macroeconomic dynamics a la Keynes should bring us to the reality that as investment (I) is inversely related to r , the Keynesian multiplier comes out with the following relationship:

$$\Delta Y = \left(\frac{1}{1 - mpc + mpi} \right) \Delta I$$

and that signifies that if r drops and investment rises (as a result), national income rises consequently, and $\Delta Y > \Delta I$ since multiplier $\left(\frac{1}{1-mpc+mpi}\right) > 1$. Here mpc and mpi are marginal propensity to consume and marginal propensity to import, respectively (where $0 < mpc < 1$, and $0 < mpi < 1$). So when r drops and drops, more and more investment is spurred, and that triggers more and more national income, which then induces higher and higher imports, export remaining unchanged. It means as r goes down and down, trade balance deteriorates, - from lower surplus (if any) to higher and higher deficits for given domestic price level (P), exchange rate e , and national income (Y).

From all these transpires is the graphic view of the trade or current account balance, exhibited by Figures 1A and 1B below. Horizontal axis represents trade balance (or current account balance β_c in both positive and negative magnitudes in relationship to r (in Figure 1A) and $(r - r^*)$ (in Figure 1B).

Let us elaborate on the diagrammatic situations in Figure 1A and Figure 1B. Let r^* be equal to, say, 8 percent (given), which is not a control variable for the home country, and let us consider r at its different values: $r = r_1 = 18\%$, $r = r_2 = 10\%$, $r = r_3 = 7\%$, $r = r_4 = 5\%$, and $r = r_5 = 3\%$ for illustrative purpose here. At $r = r_1 = 18\%$, hardly any increase in investment expenditure and consequently there is hardly any increase in income (via investment multiplier) and any increase in import expenditure. At lower and lower interest rates, more income and more income and imports. The following scenario depicts the picture and explains Figure 1A and Figure 1B:

$r = r_1 = 18\%$,	$X = \$200, M = \$150, X - M (\equiv \beta_c) = \$50;$
$r = r_2 = 10\%$,	$X = \$200, M = \$180, X - M (\equiv \beta_c) = \$20;$
$r = r_3 = 7\%$,	$X = \$200, M = \$200, X - M (\equiv \beta_c) = \$0;$
$r = r_4 = 5\%$,	$X = \$200, M = \$240, X - M (\equiv \beta_c) = \$40;$
$r = r_5 = 3\%$,	$X = \$200, M = \$300, X - M (\equiv \beta_c) = \-100

Note again that lower and lower interest rates boost more investment, and thereby increase income levels (by Keynesian multiplier) whereupon import expenditures get bigger and bigger (with no effect on export revenue), and current account balance starts deteriorating and pushing finally in deficit. AA curve depicts this picture.

Note that ZZ curve is negatively-sloped when positive current account balance (that is, *surplus* of the balance) is being measured on negative horizontal axis and negative current account balance (that is, *deficit* of the balance) is being measured on positive horizontal axis. This ZZ curve, as noted earlier, so-sloped and shaped if national income, domestic price level, and exchange rate are assumed constant. If, for instance, income rises and/or domestic price rises and/or exchange rate appreciates, ZZ curve moves bodily upward to the right, that is, ZZ curve becomes Z'Z', and vice versa.

Next, consider the capital account balance (β_K) It obviously moves in the same direction with the movement of r (or $r - r^*$). The curve, NN, shows the relationship in Figure 1A and Figure 1B. More formally,

$$\begin{aligned}\beta_K &= F(r) \\ \beta_K &= F(r - r^*)\end{aligned}$$

where $\frac{\partial \beta_K}{\partial r} > 0, \frac{\partial \beta_K}{\partial (r - r^*)} > 0$.

Figure 1A

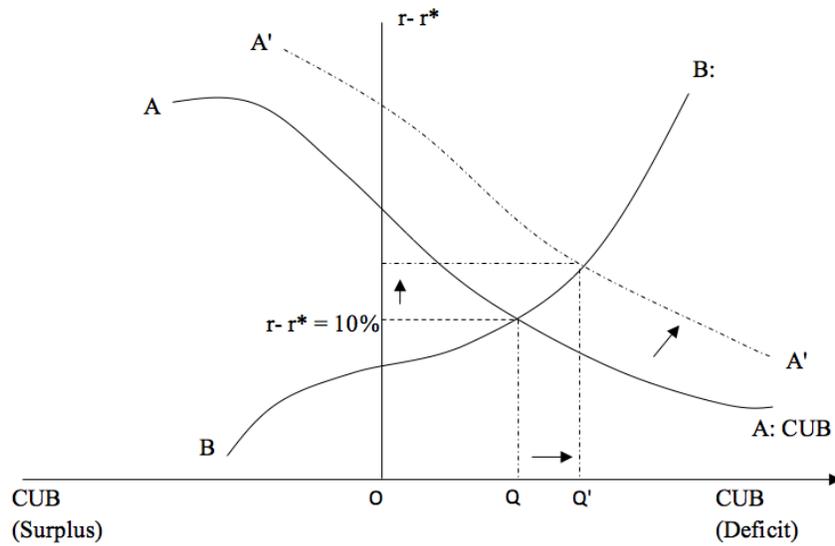
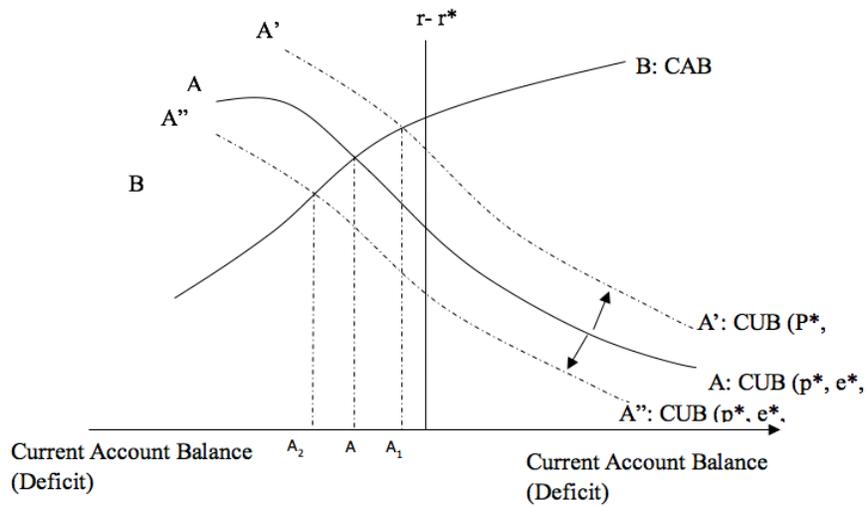


Figure 1B



BB curve portrays that as domestic interest goes up and up, net capital inflows will keep rising. At this point the equilibrium in the balance of payments – the so-called external balance must be posited. On that score, it must be noted that external balance for an economy occurs when

$$\beta = 0 = \beta_C + \beta_K$$

That is, current account balance (CUB) and capital account balance (CAB) must be exactly equal in magnitude but opposite in sign in equilibrium. Look at Figure 1A and Figure 1B again. The intersection of original ZZ curve and NN curve defines the external balance where equilibrium is reached with negative current account balance, and (matching amount) of capital account surplus in Figure 1A and opposite scenario in Figure 1(b). Figure 1(a) depicts China's position and Figure 1B portrays the position of India and the United States.

4. Current account balance and capital account balance: an alternative approach to the relationship

In balance of payments equilibrium, current account balance and capital account balances have already been shown as follows as follows (as shown by Meade (1951), Ghosh (1987, 2017)):

$$\text{BOP} = \text{CUB} + \text{CAB} \text{ or } \text{CAB} = \text{BOP} - \text{CUB}.$$

Here, one again, we establish the same relationship in a different way and for emphasizing different policy menu for correcting disequilibrium. Consider the following symbols for that purpose:

Y = Aggregate income of the home country;
 E = Aggregate expenditure of the home country;
 C = Aggregate consumption expenditure of the home country;
 S = Aggregate savings of the home country;
 I_d = Aggregate investment expenditure of the home country;
 I = Aggregate investment expenditure = I_d + I_f;
 I_f = Investment expenditure (foreign);
 G = Aggregate government expenditure of the home country;
 T = Aggregate tax revenues of the home country;
 D = Aggregate expenditure on domestic goods and services;
 X = Aggregate export revenues of the home country;
 M = Aggregate import expenditure of the home country.

On national income accounting in the Keynesian tradition one gets in a simple structure:

$$Y = C + S \quad (7.1) \qquad Y = D + X \quad (8.2)$$

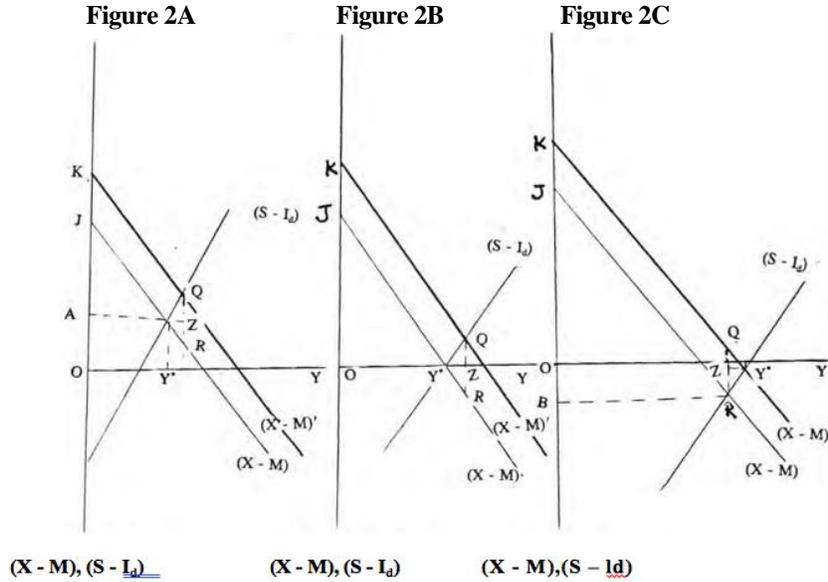
$$E = C + I_d \quad (7.2) \qquad E = D + M \quad (8.2)$$

Subtract (7.2) from (7.1), and the subtract (8.2) from (8.1) and obtain the following:

$$Y - E = S - I \quad (9.1) \qquad Y - E = X - M \quad (9.2)$$

From (9.1) and (9.2) one then finds $S - I_d = I_f = X - M$ (9.3)

In words, excess of savings over domestic investment (= foreign investment (I_f) is equal to excess of exports over imports (that is, $CAB = CUB$, as noted earlier). The diagram depicted in Figure 2A represents the scenario of China, and Figures 2B and 2C exhibit basically the balances of payments of the United States and India, respectively.



V. ECONOMIC DYNAMICS

Consider equilibrium conditions in the real (goods and services) sector and equilibrium in foreign exchange sectors for any open economy, and they have been enunciated for a long stretch of time (see, Meade, 1951; Tinbergen, 1952; Mundell, 1960; Suliman *et al.*, 2014). The dynamic structures are defined, respectively, as follows:

$$\psi(e, r) = 0 \tag{10}$$

$$X(e, r) = 0 \tag{11}$$

From (10) and (11), we can get the following relations:

$$\left. \frac{dr}{de} \right|_{\psi=0} = - \frac{\frac{\partial \psi}{\partial e}}{\frac{\partial \psi}{\partial r}}, \tag{13}$$

which measures the slope of the internal balance curve, and

$$\left. \frac{dr}{de} \right|_{\chi=0} = - \frac{\frac{\partial \chi}{\partial e}}{\frac{\partial \chi}{\partial r}}, \tag{14}$$

which defines the slope of the external balance schedule. Since

$$\frac{\partial \psi}{\partial e} < 0, \frac{\partial \psi}{\partial r} < 0, \frac{\partial \chi}{\partial e} < 0, \frac{\partial \chi}{\partial r} > 0,$$

It is evident that that the slope of the internal balance is negative and the slope of external balance is positive.

Let the dynamics of the exchange rate and interest rate be defined as follows:

$$\frac{de}{dt} = \lambda \psi(e, r) \quad (15)$$

$$\frac{dr}{dt} = -\mu \chi(e, r) \quad (16)$$

Taylorizing (15) and (16), one can get (17) and (18) as follows:

$$\frac{de}{dt} = \lambda \frac{\partial \psi}{\partial e} (e - e^*) + \lambda \frac{\partial \psi}{\partial r} (r - r^*) \quad (17)$$

$$\frac{dr}{dt} = -\mu \frac{\partial \chi}{\partial e} (e - e^*) - \mu \frac{\partial \chi}{\partial r} (r - r^*) \quad (18)$$

The characteristic equations are then:

$$\gamma^2 - \gamma \left(\lambda \frac{\partial \psi}{\partial e} - \mu \frac{\partial \chi}{\partial r} \right) + \lambda \mu \left(\frac{\partial \psi}{\partial r} \cdot \frac{\partial \chi}{\partial e} - \frac{\partial \psi}{\partial e} \cdot \frac{\partial \chi}{\partial r} \right), \quad (19)$$

and the eigen values are as follows:

$$\gamma_1 = \frac{\lambda \frac{\partial \psi}{\partial e} - \mu \frac{\partial \chi}{\partial r} + \left\{ \left(\lambda \frac{\partial \psi}{\partial e} + \mu \frac{\partial \chi}{\partial r} \right)^2 - 4\lambda\mu \frac{\partial \psi}{\partial r} \frac{\partial \chi}{\partial e} \right\}^{\frac{1}{2}}}{2} \quad (20)$$

$$\gamma_2 = \frac{\lambda \frac{\partial \psi}{\partial e} - \mu \frac{\partial \chi}{\partial r} - \left\{ \left(\lambda \frac{\partial \psi}{\partial e} + \mu \frac{\partial \chi}{\partial r} \right)^2 - 4\lambda\mu \frac{\partial \psi}{\partial r} \frac{\partial \chi}{\partial e} \right\}^{\frac{1}{2}}}{2} \quad (21)$$

The system is centripetal asymptotically or cyclically if $\left\{ \left(\lambda \frac{\partial \psi}{\partial e} + \mu \frac{\partial \chi}{\partial r} \right)^2 - 4\lambda\mu \frac{\partial \psi}{\partial r} \frac{\partial \chi}{\partial e} \right\}^{\frac{1}{2}}$ is greater than or less than 0.

Now the question is: In view of these dynamic structures of economic situations, what can we say? The answer is not obvious as continuous time series of data are not available for any of these countries. If we sketch the discrete data series, available from IMF, we can reasonably conclude that the economies are under centripetal forces, even at times some traces of opposite reactions are noticeable. The economies of China and India portray cyclical behaviors for some time lengths.

VI. CONCLUSION

At the beginning of this current century there came a speculation that China and India would surpass the vibrancy and economic status of the United States, which had become the dominant economy in the world over 80 years. F. D. Roosevelt changed the structure of the global economy by its new and vigorous growth and development. International Monetary Fund and International Bank for Reconstruction and Development put permanently the U.S. economy on the front line and U.S. dollar became the vehicle currency. Klinghoffer and Ghosh (1984) delineated many attempts by a few powers to derail dollar-economy, but eventually it became irreplaceable. A few currencies came in the basket of key currencies, the latest being the Chinese yuan. Yet, as of today the trade transactions are carried through U.S. dollars. China is the second largest economy today and, for a while in the past, and India has moved further with more and more rigor (see Lin (2013), Niu, Xu, and Chen (2013), a number of IMF studies, and a series of Reserve Bank of India publications). Lu (2017) and Naughton (2007) discuss China's growth and Chinese economy quite extensively. It should be, however, noted that growth rates of GDP of both China and India are way above the growth rate of the United States. But the economic structures and political strategies are not at par with those of the United States. Regulatory burdens and income distribution patterns may ultimately overshadow the measures of growth and handicap these two emerging economies. The U.S. economy has been in political chaos under Trump Administration, and it can cause major setback. So, the overall pictures are murky, and the expectation that China and India will overtake the U.S. economy is at best weak enough.

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