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MACROECONOMIC IMBALANCES IN THE WORLD ECONOMY

by

Terry Roe
Mathew Shane
Kari Heerman

Center for International Food and Agricultural Policy
University of Minnesota
Department of Applied Economics
1994 Buford Avenue
St. Paul, MN 55108-6040
U.S.A.

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Macroeconomic Imbalances in the World Economy

Terry Roe, Mathew Shane and Kari Heerman[1]

Abstract: This paper explores the emergence of large current account imbalances in a few large countries, the factors behind the emergence, the role of those imbalances in the financial crisis of 2008-09, and the implications of achieving global balance. Imbalances reflect a country's net savings and suggest that growth in GDP of a surplus country is partly dependent upon growth in external demand of deficit countries. Although a country can incur a surplus or deficit for ever, we suggest that the increasing surpluses of relatively large and rapidly growing countries is likely to be destabilizing to global growth in the long-run. The adjustment will likely require a surplus country, such as China, to rely more on domestic demand for growth while a deficit country, such as the U.S., may need to rely more on external demand for growth. We suggest the Eurozone imbalances are not directly linked to U.S. imbalances. There are a variety of potential causes of global imbalances including excess savings in surplus countries, the twin deficit hypothesis, the export-led growth hypothesis, and the possible miss-measurement of the U.S. current account due to repatriation of profits from U.S. owned foreign affiliates. However, whatever the combination of causes of the growing imbalances, adjustments need to be made to return to long-term sustainable growth.

1. Introduction

Many suggest the financial crises that ushered in the recession beginning 2008 has as its root, the growing global imbalances that some date back to the East Asian financial crises of the late 1990s[2]. This event coincides with a relatively large increase in the current account (CA) imbalances of relatively small number of countries, with the U.S. and China being most

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[1] This is a revision of a paper by the same title presented at the annual meetings of the American Agricultural Economic Association (AAEA), Denver Col., July 2010. Views expressed are those of the authors alone. Roe is Professor, and Heerman a graduate student, University of Minnesota. Shane is Senior Economist, USDA/ERS. Appreciation is expressed to Cheryl Christenson, Chief of the Food Security and Development Branch of ERS for her review and comments on earlier drafts as well the feedback provided by AAEA session participants.

[2] Mayer-Foulkes (2009) links the root of the 2008 world financial crises and CA imbalances to the acceleration of financial globalization in which foreign direct investment and the repatriation of profits by transnational corporations play a central role. Obstfeld and Rogoff (2005) argue that the U.S. CA deficit has to be viewed as the net result of the collective investment and saving decisions of the entire world, and thus cannot be explained by U.S. Macroeconomic policy alone. They suggest, as does McKinnon (2010) and Aizenman et al (2007) that the savings glut in East Asian emerging markets was part of the cause because it was more than sufficient to fund domestic investment leading to current account surpluses. Views on adjustments vary. McKinnon parts ways with Krugman's view that rebalancing requires an appreciation of the Yuan.

prominent[3]. Growth in China's CA surplus, which by a simple accounting identity, equals a countries net saving balance, parallels growth in the U.S. CA deficit. Globally, the net savings balance must sum to zero so that one country's CA surplus must be others' CA deficit. This constraint suggests that countries such as China cannot continue indefinitely to rely on foreign demand to sustain growth, and that an eventual rebalancing must entail CA deficit countries relying more upon growth in external demand and deficit countries less on growth in internal demand. The puzzle is how this rebalancing is to be accomplished in an orderly way.
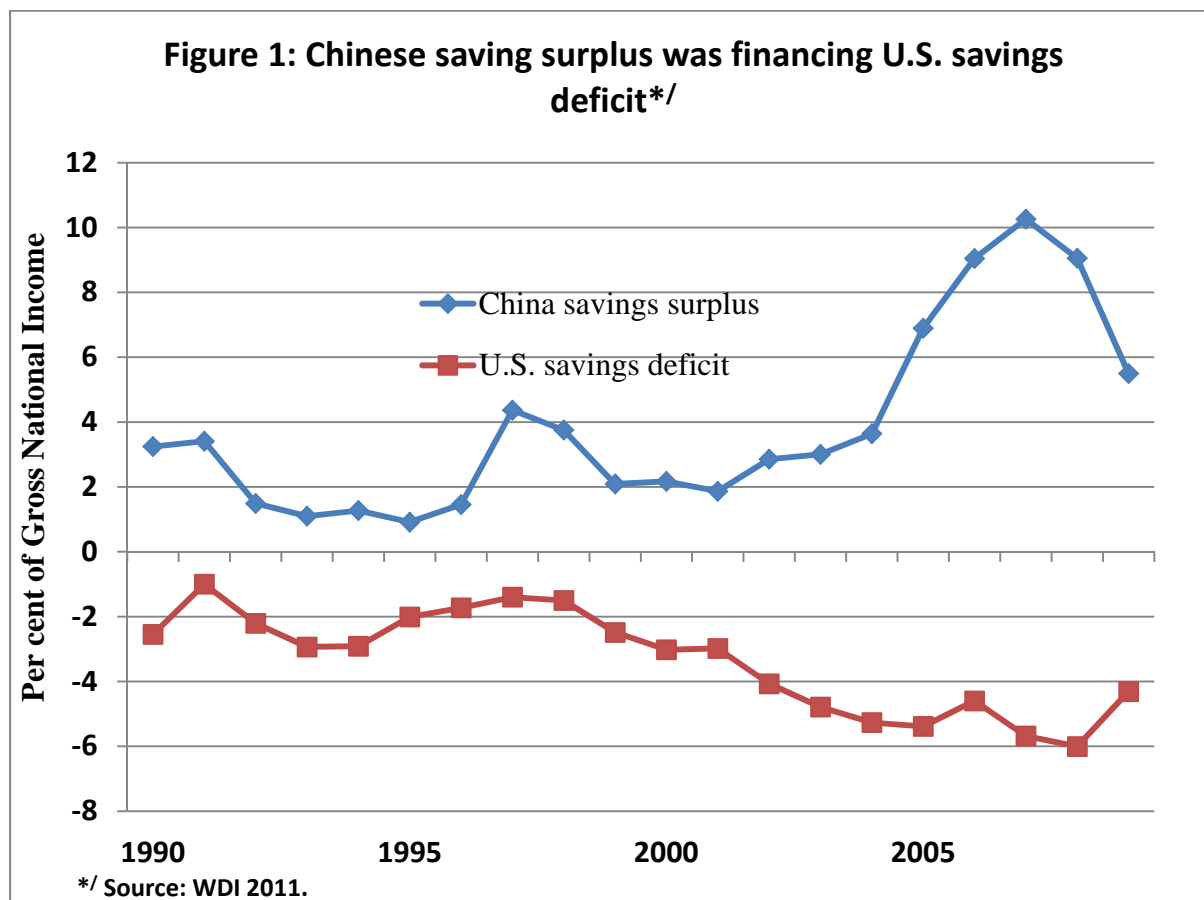
This paper explores the emergence of large current account imbalances in a few large countries, the factors behind the emergence and the implications for global balance and the financial crisis of 2008-09[4]. The imbalance effect on other economies is exacerbated because size matters; China and Japan's CA surplus in 2008 was almost 45 percent of total world CA surplus, and jumps to almost 60 percent if the CA surplus of selected European countries is subtracted from the world total[5]. To maintain disproportionately large CA surpluses, countries tend to prevent the real value of their currencies from appreciating relative to the currencies of countries supplying the external demand by sterilizing their excess foreign exchange holdings.   To maintain a relatively low currency value to the U.S. dollar, a country can exchange their excess dollar holdings for dollar denominated assets. Since most primary commodities are exchanged in dollars, and other countries are willing to hold reserves in U.S. dollars, this further facilitates this strategy by providing other dollar denominated activities that have negligible effects on the value of the dollar.

An undervalued currency tends to subsidize a country's producers of traded goods, and to attract multinational enterprises that employ the country's relatively abundant resources to compete in international markets. An undervalued currency tends to implicitly tax domestic households by limiting their purchasing power (and thus dampening their demand for domestic goods), while stimulating employment in the production of traded goods. Another factor helping a country to supply external demand is the savings behavior of households. Chinese and Japanese households in particular tend to save at rates that are in excess of that needed to finance increased production capacity to meet growing domestic and external demand. Some of this excess savings (gross savings minus gross capital formation) is used to purchase dollar denominated assets thus providing investment funds to make up the shortfall of savings in deficit countries, particularly the United States (Figure 1). Notice that with the onset of the global financial crisis after 2008, both China's surplus and the U.S. deficit declined. Part of this decline is explained by the lagged response to the real appreciation of the Yuan and the real depreciation of the dollar, and to the decline globally in total final expenditures (Anderton and Tewolde, 2011).

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[3]See Aizenman and Sun (2010), and World Economic Outlook, April 2010.

[4]Pittes (2010) argues it is impossible for either China or the U.S. to adjust to this imbalance without a major counterbalancing adjustment from the other. He suggests that the inability to adjust could lead to a steep drop in global growth, much of it borne by China, and possibly even a collapse in global trade.

[5]We show later that the CA surplus of major European countries is roughly equal to the CA deficit of other European countries, so we can view this as a transfer of net saving surplus within the EU.

Figure 1: Chinese saving surplus was financing U.S. savings deficit*/

Per cent of Gross National Income

- China savings surplus
- U.S. savings deficit

*/ Source: WDI 2011.

For a country incurring a net savings deficit, such as the U.S., a number of characteristics help to supply the necessary external demand. One is the dollar serves as the world's numeraire currency. Another is fiscal deficits (which approached 5 percent of GDP by 2008), as well as relatively efficient capital markets which create financial instruments that help countries sterilize their positive net savings including their excess holding of dollars. These capital inflows place downward pressures on U.S. real interest rates (declining from about 4.0% in 2000 to 2.0% in 2005)[6]. These pressures tend to reduce domestic savings because returns are lower, and to appreciate dollar denominated asset prices. Inflated asset prices tend to give the illusion of an increase in wealth. At the same time, imports of foreign goods appear relatively cheap. Together, these forces induce an increase in consumption expenditures- partly by withdrawing home equity- with the supply of imported goods helping to dampen inflation in consumer prices (although building material prices increased, food, clothing, transportation, household durable prices remained relatively flat over the 1990 - 2008 period). The growth in countries' net saving surplus-deficit coincided with an increased globalization of world capital markets and growth in gross global capital flows that exceeded 16 percent of world GDP in 2007[7]. This growth in

[6]Taken from Blanchard's presentation, Mexico City, May 2007.

[7]IMF Global Financial Stability Report, April 2010, Table 1

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global capital flows (e.g., converting US consumption into Chinese savings which are then recycled back into U.S. financial markets), together with households' response to appreciating asset values, and bankers' eagerness to accommodate increasing demand for credit, can be argued to have facilitated financial innovations including the invention of new derivative financial assets. The growing integration of global capital markets as this process evolved in the early 2000s resulted in contagion effects on other advanced countries.

These forces appear to have set the stage for the financial crises of 2008 that, at the depth of the recession, led to a decline in the annual rate of growth in real US GDP per capita of 3.9 percent which amounts to a decline from trend growth per capita of almost 6 percentage points. If the economy simply returns to trend growth rates without a higher rate to compensate for the recession, the discounted present value of the loss in real per capita income, assuming a discount rate of 3.5 percent over a twenty year period, is about $16,000.

We focuses next on the growth of global imbalances, the role of exchange rates in maintaining the imbalance, and then, using a simple numerical illustration, argue that continued growth in the imbalances is not sustainable in the longer term. This constraint implies that adjustments are likely to entail CA surplus countries becoming more reliant on internal demand for economic growth and deficit countries becoming more reliant on external demand for growth. We conclude with a short discussion of some of the likely causes of the growth in imbalances that have emerged since the late 1990s.

2. The growth in current account imbalances

### 2.1 The role of exchange rates in the growth of global imbalances

The exchange rate can be an extremely powerful instrument to alter a country's relative competitiveness in global markets. By devaluing the exchange rate relative to the dollar, in a single action, the prices of all traded goods relative to nontradeables is changed, thus altering incentives of domestic agents to produce tradeable commodities rather than increase the supply of domestic non internationally traded goods. While we present various arguments for why the pattern of growing current account surpluses and deficits occurred later in the paper, one major factor has been the systematic undervaluation of the Chinese Yuan and the overvaluation of the U.S. dollar. Figure 2 shows that, historically, there have been major swings in the relative value of the dollar, with a modest trend toward depreciation. Since the dollar has been used as the world's reserve currency following the breakdown of the gold standard in 1973, its modest depreciation has not been sufficient to reverse the country's tendency for its CA deficit to increase since 1970. (Figure 3).

Figure 2. The real quarterly U.S. export trade-weighted exchange rate: a long term trend towards depreciation
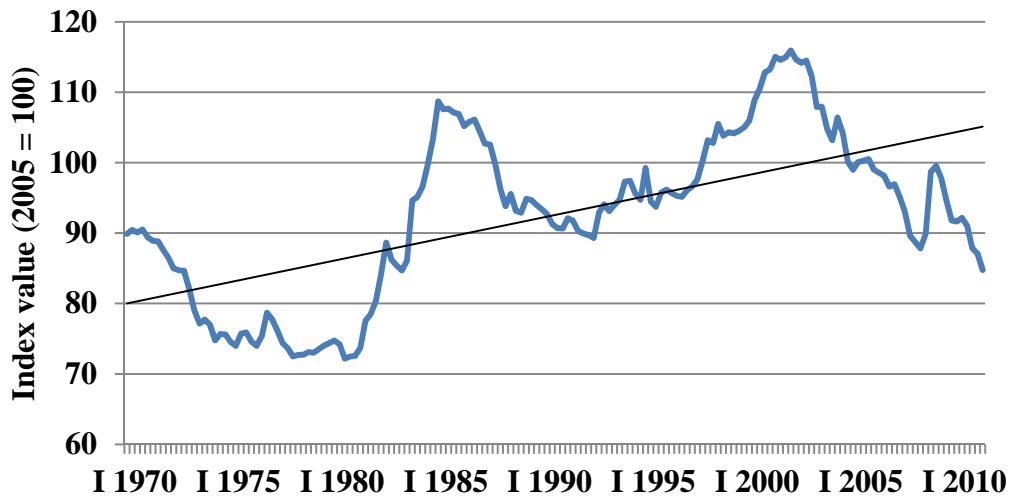
Source: ERS exchange rate data set, 2011.

Figure 3. U.S. current account as a share of GDP: the current account deficit has tended to increase over time
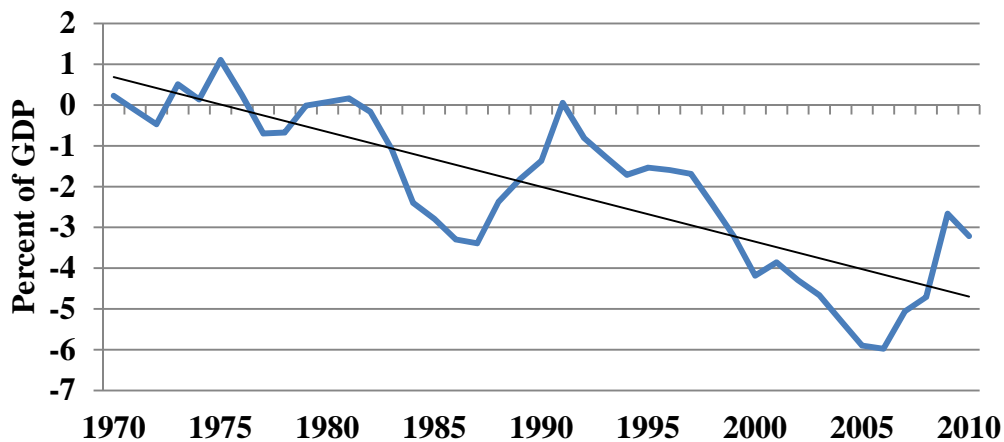
Source: Bureau of Economic Analysis: U.S. Department of Commerce, 2011.

The Chinese Yuan, on the other hand has had a long term pattern of depreciation through 2005 (Figure. 4). This pattern has contributed to the competitiveness of Chinese goods in international markets. As shown in Figure 5, this trend is associated with an increase in China's share of

global trade both with regard to the relative share of China's exports to GDP, but also her share of exports to total world exports. The Yuan has appreciated since 2006. If this continues or accelerates, it could signal the beginning of a pattern of adjustment where global imbalances are reduced.

Figure 4. The real Chinese Yuan: there has been a long term pattern of depreciation

Source: The ERS Exchange Rate Data Set, 2011.

Figure 5. China's share of world exports of goods and services significantly expanded after 1995
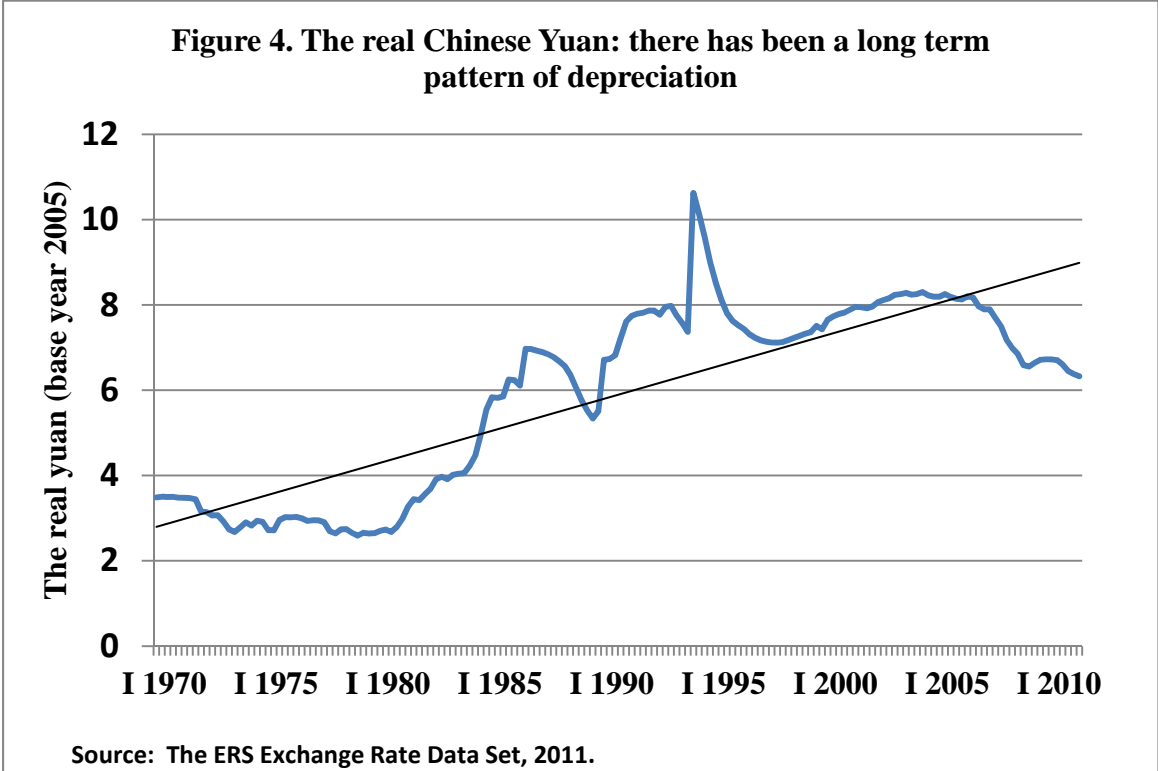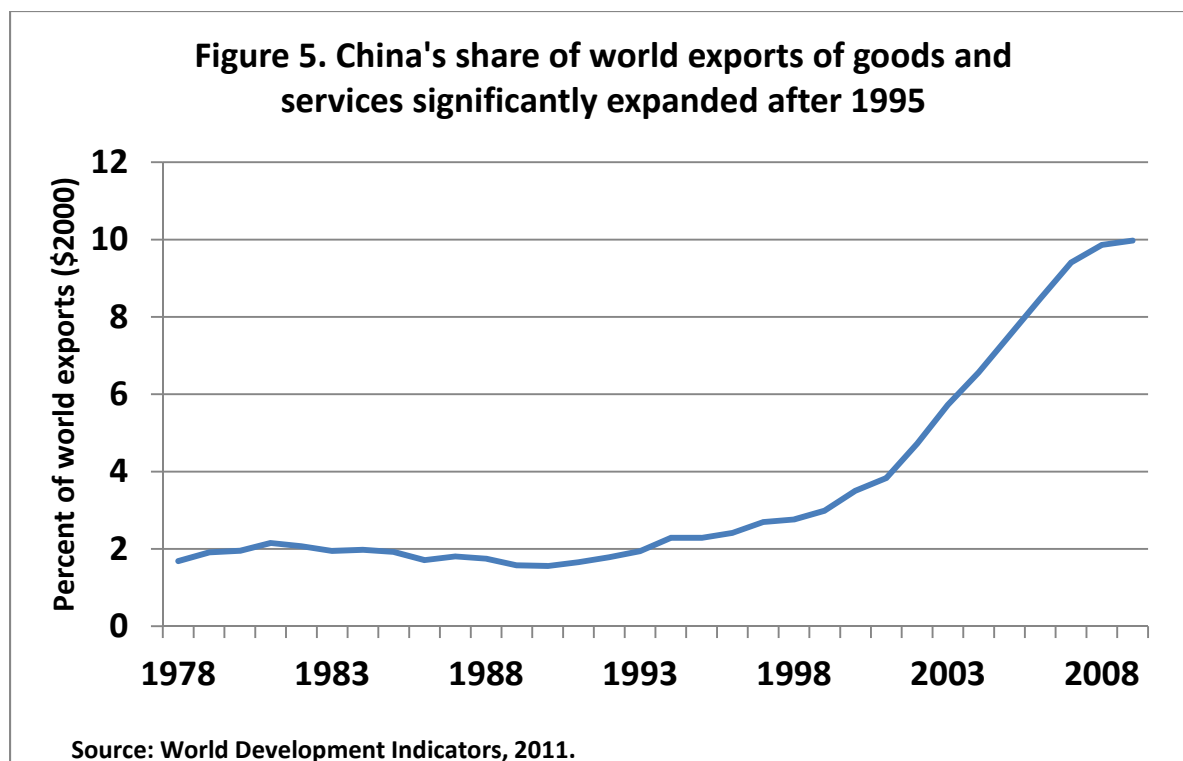
2.2 The data on current account imbalances

Large CA imbalances are concentrated in a few economies over the period 2005-10 (IMF, June 2011). Five countries (U.S., Spain, the UK, Australia and Italy) account for 79 percent of world CA deficits while another five countries (China, Germany, Japan, Saudi Arabia, and the Russian Federation) account for 71 percent of world CA surplus[8]. The US and China account for the largest deficit - surplus shares that average 57 percent and 26 percent, respectively. Adding Japan to China's surplus increases their CA share to over 1/3 of world CA surplus over the 2001-09 period.

Figure 6 shows the evolution of the US CA deficit in total world deficits and China and Japan in total world CA surplus. Notice the rise in China's share following the East Asian financial crisis of the late 1990s. Of particular interest is the sharp increase in the US share of total world CA deficits, and while falling after 2002, still dominate the share of total world deficits.

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[8]Based on WDI (2011) data, the major petroleum exporters averaged 23 percent of total world CA surplus over the 2000-2007 period.
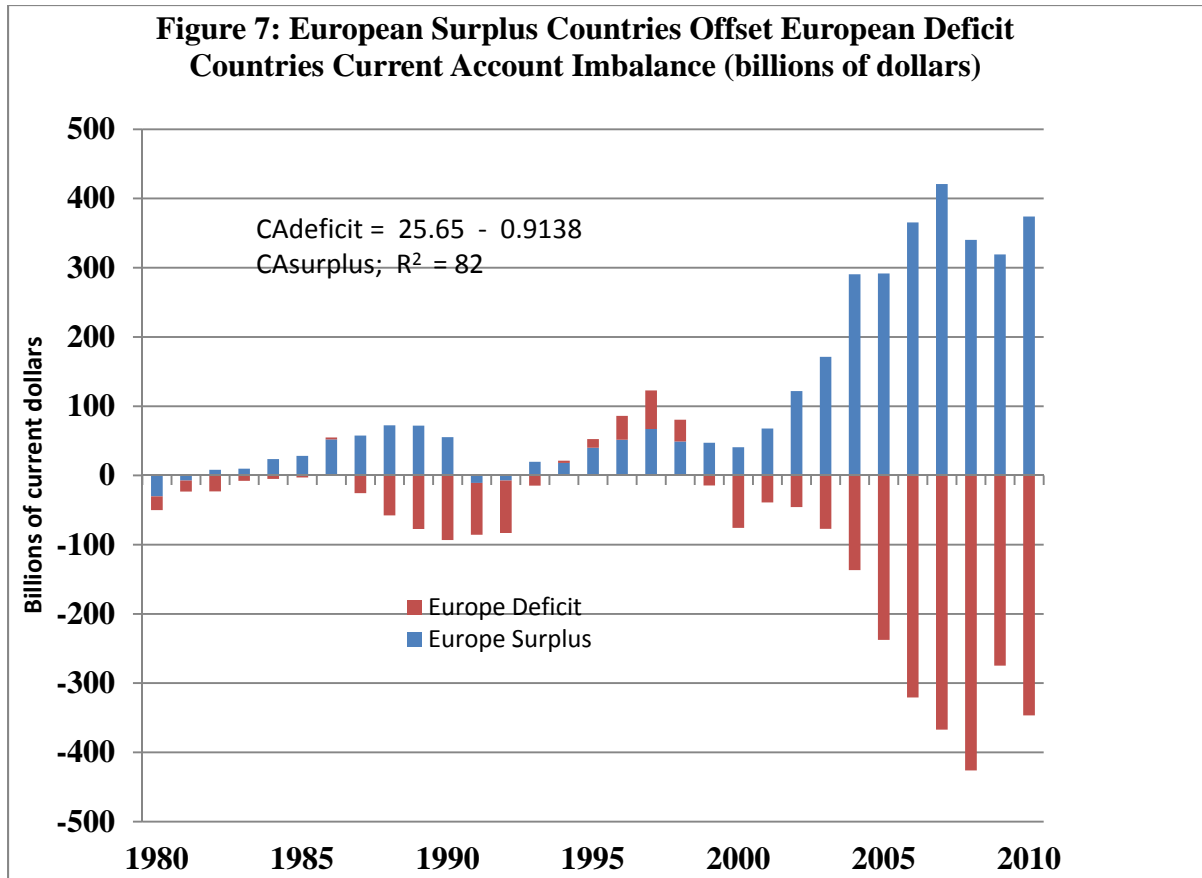
Figure 6: Only a few countries account for most of the current account imbalances
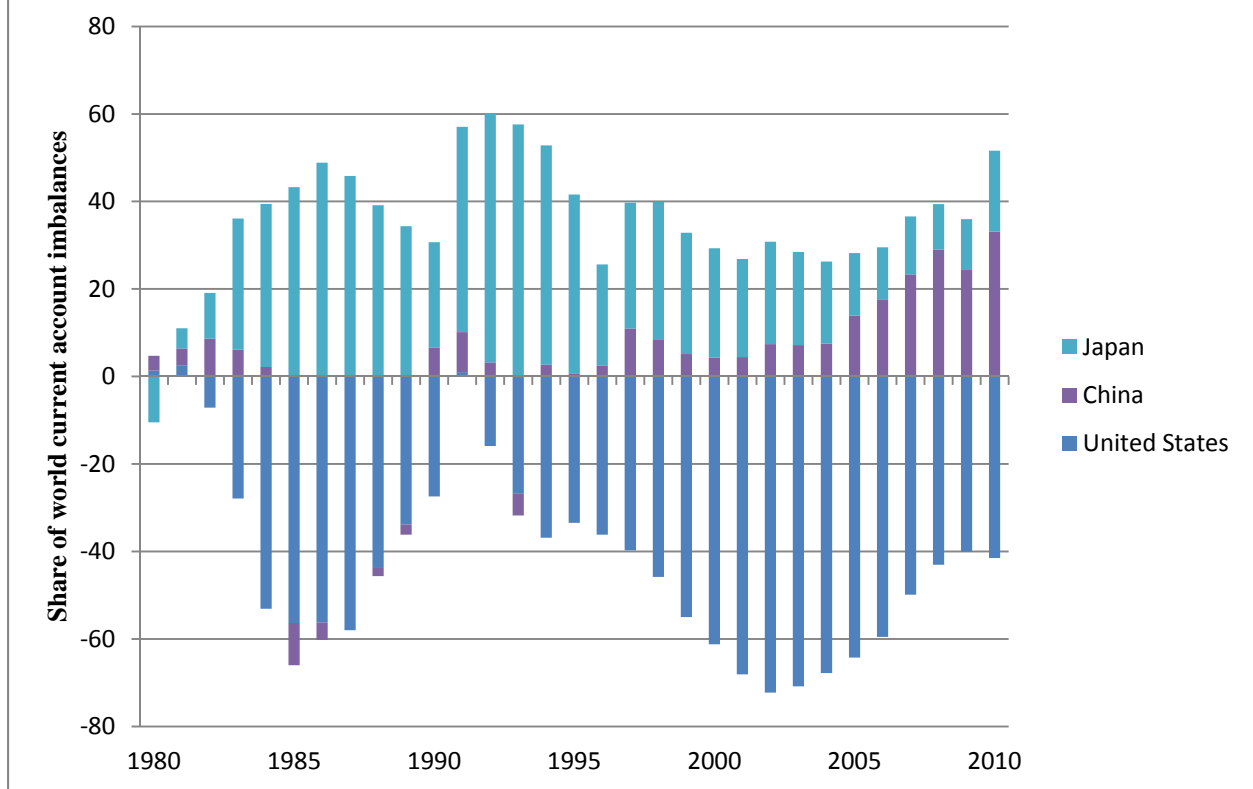
While the U.S. CA deficit has fallen since the financial crisis, the share of China has increased. This depiction is even more pronounced if we remove from the data European CA surplus-deficit countries.

Figure 7 depicts, in billions of dollars, the CA surplus of Germany, the Netherlands, Sweden, and Switzerland and the CA deficits of Portugal, Ireland, Italy, Spain and Greece. As suggested by the simple regression equation for the years when the Euro has been in effect, (1999 – 2010) European CA surplus countries appear to be largely financing the net saving deficits of her CA deficit countries. While there was some contraction of the EU surpluses and deficits in 2009 because of the global recession, they expanded again in 2010. The offsetting nature of the EU imbalances suggests underlying problems with integrating euro zone countries with diverse fiscal policy environments under a single currency. This also suggests that the U.S. case is rather unique, and related to using the dollar as a reserve currency[9].

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[9]The pattern of imbalance starting in 1999 might link to a Euro that is undervalued for the higher per capita income European countries and overvalued for the relatively lower income countries. In contrast to states in the U.S.,

Figure 7: European Surplus Countries Offset European Deficit Countries Current Account Imbalance (billions of dollars)

CAdeficit = 25.65 - 0.9138
CAsurplus; R^2 = 82

■ Europe Deficit
■ Europe Surplus

Billions of current dollars

1980   1985   1990   1995   2000   2005   2010

If we focus on the CA imbalances between the U.S., and Japan, China and oil exporters, we observe a pattern where China's growth in CA surplus corresponds to the growth in the U.S. CA deficit (Figure 8). To infer cause and effect conclusively, an analysis of countries' capital accounts would be required.

European resources, particularly labor, remain relatively spatially restricted and some countries have incurred fiscal deficits. A departure of the Euro from an economy's underlying fundamentals in this environment can exacerbate imbalances. See Kelch et al (2011).

Figure 8: China, Japan and the Oil Exporters are financing the U.S. Deficit

Current Account in (billion of dollars)

CAus = 130.67 - 3.35 CAjapan - 0.822 CAchina,
R² = 67

Legend: Oil Exporters, Japan, China, United States
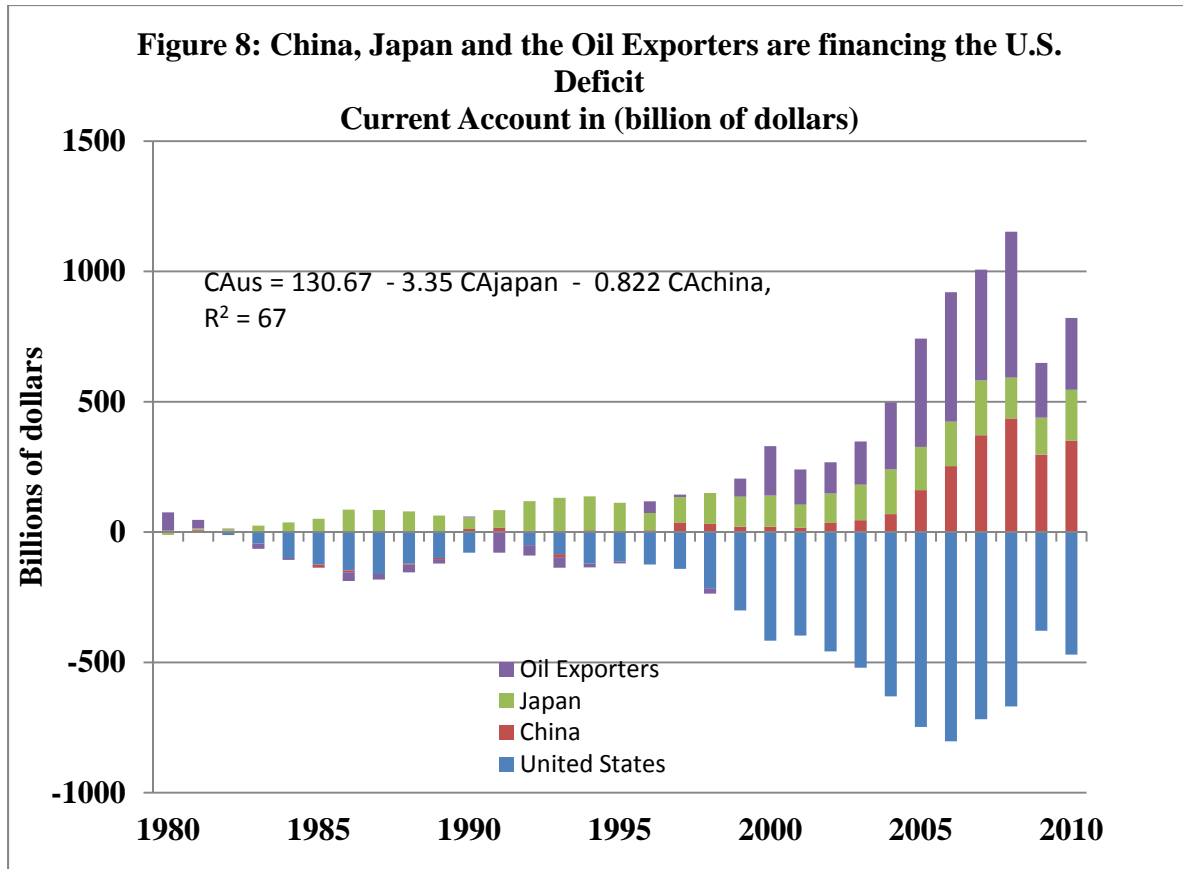
The regression shows a relatively high correlation between US CA deficits and China and Japan's net saving surplus over the period 1990-2010. The surplus-deficit pattern suggests the recycling back to the US of their exchange earnings, much of which was in the form of US treasuries and other U.S. dollar assets. Other sources of capital flows to the U.S. are the oil surplus countries. This process, as Pettis (2010) notes, serves as a great liquidity generator for the world, converting U.S. consumption into Chinese and Japanese savings, which are then recycled back into U.S financial markets.

2.3 On the sustainability of large CA imbalances

Subject to statistical discrepancies, the sum of all current account surpluses and deficits in a common currency must equal zero. Following Aizenman and Sun (2010), this world constraint for each t can be stated as

$$\sum_i \frac{GDP_i(t)}{GDP_w(t)} \cdot \mu_i(t) = 0$$

where $GDP_i(t)$ denotes gross national product (GDP) of the $i-th$ country, $GDP_w(t) = \sum_i GDP_i(t)$ denotes world GDP, and the $i-th$ country's current account $CA(t)$ to GDP ratio is $\mu_i(t) = CA_i(t) / GDP_i(t)$.

Next, let's separate China and aggregate the rest of the world in this identity. Let the c subscript denote China and o denote the rest of the world. Then, the constraint becomes

$$\frac{GDP_c(t)}{GDP_w(t)}\mu_{cj}(t)+\frac{GDP_o(t)}{GDP_w(t)}\cdot\mu_o(t)=0$$

where world GDP is $GDP_w(t)=GDP_c(t)+GDP_o(t)$. Suppose the following: China's real GDP continues to grow at the average rate observed over the 2003-2008 period of $x_c=0.1047$ per annum while the rest of the world grows at its average rate observed over the same period of $x_o=0.0314$. Presume further that China seeks to sustain net external demand as a proportion of GDP at the rate of $\mu_c=0.073$, a rate she sustained on average over the same period.

These assumptions imply the following paths of $GDP_i(t)$

$$GDP_c(t)=GDP_c(0)e^{x_c t}$$
$$GDP_o(t)=GDP_o(0)e^{x_o t}$$

beginning in some initial year denoted by $GDP_i(0)$. China's CA surplus can be calaculated as follows

$$CA_c(t)=0.073GDP_c(0)e^{0.1047t}$$

Given the world CA constraint stated above, this implies an evolution of the CA to GDP ratio for the rest of the world according to

$$\mu_o(t)=-\frac{0.073GDP_c(0)e^{0.1047t}}{GDP_o(0)e^{0.03145t}}=-\frac{0.073GDP_c(0)}{GDP_o(0)}e^{0.0733t}$$

The smaller the ratio $GDP_c(0)/GDP_o(0)$, i.e., the smaller the economy in question relative to the rest of the world, the smaller is the effect of one country's imbalance on the rest of the world. Thus, size matters. Further, since the rate of growth of China, in this example, exceeds that of the rest of the world, i.e., $x_c-x_o>0$, $\mu_o(t)$, a negative value, increases in absolute terms geometrically. At 2008 values of $GDP_o(0)$ and $GDP_c(0)$, the rest of the rest of the worlds' $\mu_o(t)$ value, a net deficit, would double in about 9.5 years.

We illustrate the effect on the U.S. CA deficit assuming that Japan and China's CA surplus correlates with the U.S. CA deficit as predicted by the equation appearing in Figure 8. We use

$$CA_{us}(t)=-a-b_1[\mu_j G_j(0)e^{x_j t}]-b_2[\mu_c G_c(0)e^{x_j t}]$$

where $\mu_j=0.038$ and $\mu_c=0.073$ are the average value over the 2003-08 period of the two countries' CA to GDP ratio, and trend growth in their respective nominal GDP's are $x_j=0.0155$ and $x_c=0.1914$ per annum. Given the evolution of US nominal GDP as $GDP_{us}(t)=GDP_{us}(0)e^{x_{us}t}$ where $x_{us}=0.0536$, Figure 9 shows the US CA deficit as a percent of GDP, i.e., the term $\mu_{us}(t)$, from the year 2010 to 2030. Business as usual suggests that in about thirty years the US CA deficit as a percent of GDP would reach its all time high of over 6

percent.. Together, China and Japan's GDP are roughly 65 percent of US GDP. Thus, the values $G_j(0)$ and $G_c(0)$ are relatively large. China's growth in nominal GDP (since the regression equation is in nominal terms) is large relative to the U.S. Consequently, the U.S. CA imbalance tends to grow geometrically. It is unlikely that this imbalance could be sustained.

Figure 9: U.S. Current Account as Percent of GDP, Data and Simulation
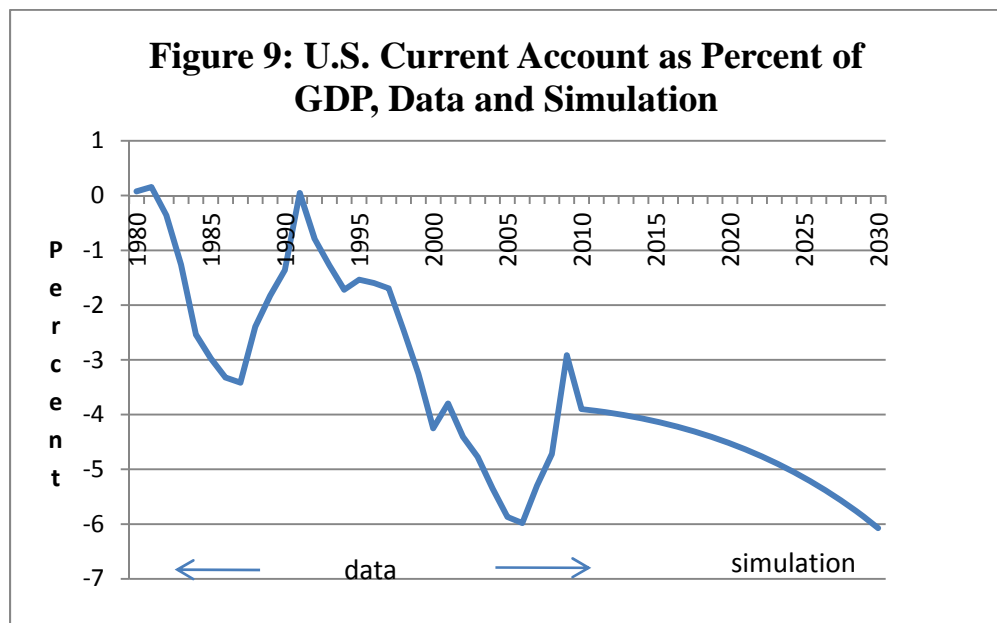
We conclude that imbalances in the world economy are linked to a relatively small number of the world's larger economies. The CA deficits and surplus of the selected countries suggest that the EU surplus - deficit economies may be unrelated, at least in a direct way, to the economic forces associated with the U.S. and the Japan and China imbalances. We also make the point that "business as usual," i.e. "big" economies relying upon external demand to sustain their growth in GDP is likely to increase these imbalances. Thus, it seems reasonable to conjecture that major adjustment is likely wherein large net saving countries rely more on internal demand for economic growth while many of the negative net saving countries rely more on external demand for economic growth. These imbalances are symptoms of some underlying economic forces that need to be assessed more clearly to determine whether the imbalances are "natural" - market driven forces, whether they reflect possible market failures or, the choices of major economies pursuing export-led growth policies that externalize the impact of imbalances upon other countries.

3. Possible causes of imbalances

Global capital flows between the U.S. and the rest of the world appear to be just the opposite from what many economists might have expected. In a stylized world, emerging economies have abundant labor relative to capital. To grow, they need access to technology and to increase

their stock of capital per unit of labor. While their savings rates tend to be relatively high, their level of savings is too low to support capital deepening at a rate of return commensurate with rates prevailing in the capital markets of advanced nations. Multinational companies take advantage of the relative factor abundance implied by the differential rates of return between advanced and emerging economies, causing net capital inflows to the emerging economies. The expected result is a CA surplus for rich countries and negative CA of emerging economies. These imbalances could grow and reach a long run equilibrium where, relative to country GDP, they remain relatively constant forever. Our discussion above, at least for the U.S., suggests just the opposite.

A large body of literature has emerged to explain this result. In our brief review of this material, we categorize this literature into four themes: a savings glut in emerging economies and China in particular, U.S. fiscal deficits that create a supply of relatively safe assets, the pursuit of export led growth by emerging economies, and the mis-measurement of the U.S. current account.

3.1 The savings glut: growth in savings relative to the abundance of safe assets

In a well-known 2005 speech, United States Federal Reserve Chairman, Ben Bernanke, argued that global imbalances, and the US current account deficit in particular, are rooted in a prodigious increase in the global supply of savings since the late 1990's, which he dubbed the "global saving glut." Since the United States has been the primary destination for this savings, it has effectively become a substantial net borrower from the rest of the world (Bernanke 2005). The proximate conclusion is Americans' level of saving is too low. Bernanke suggests that massive capital inflows from the rest of the world inflated asset values, a point we noted in the introduction to this paper. Consequently, American firms' and households' perceptions of their wealth was modified by a rise in value of the assets they held leading to a reduction in savings and an increase in consumption.

Blanchard (2008) notes the growth in East Asian level of saving following the late 1990's financial crises. He suggests the crises led to higher uncertainty both at the individual and aggregate level in this region. The emergence of markets in China is associated with the collapse of the safety net provided by the state. This transformation introduced additional firm and household risk and thus induced an increase in precautionary savings. At the same time, new market opportunities signaled increased earnings from moving from agriculture to non-agricultural employment, and higher returns to education, all of which provided households incentives for an increase in savings. Pettis (2010) argues that China has had net excess savings implying that China was more than able to finance its own investment (see Figure 1 above). He then suggests that investment caused growth in production to exceed growth in domestic demand which caused a growing trade surplus and the accumulation of foreign currency reserves. Given China's net savings surplus, it seems surprising that the Government followed a policy of encouraging direct foreign investment. In recent years, net foreign direct investment in China has run around $50 billion. While they had adequate domestic saving to finance investment, direct foreign investment in China was more than a financial transaction. Associated with China's growth has been a substantial transfer of technology resulting in total factor productivity growth averaging around 3 percent a year (Shane, 2004).

In several papers, Ricardo Caballero and co-authors argue that the primary driver of the present imbalances is the combination of the saving glut in emerging economies and a limited global supply of low-risk assets. After the financial crises of the 1990s, the perceived soundness of developing country financial assets declined substantially, causing East Asian investors to seek safe investments externally, particularly in the United States (Caballero, Farhi, and Gourinchas 2008a, 2008b; Caballero and Krishnamurthy 2009; Caballero 2010). Indeed, the recent period of large and growing current account deficits has coincided with massive accumulation of US dollar reserves and treasuries by developing countries, particularly in East Asia (Aizenman 2008; Bems, Dedola, and Smets 2007; Bernanke 2005; Dooley, Folkerts-Landau, and Garber 2004; Jeanne 2007). Caballero and co-authors explain that by about 2001, the demand for safe debt instruments had risen above what the US corporate world could "naturally" provide. In order to satisfy demand, lenders created triple-A assets by securitizing and tranching riskier payment streams like sub-prime mortgages and student loans. This caused leverage to build up in the financial system generating considerable instability and driving up the value of other assets in short supply like real estate (Caballero and Krishnamurthy 2009).

A body of literature focuses on a precautionary or self-insurance motive to explain the large capital flows from developing countries to the U.S. Aizenman and Lee (2005) find evidence that demand for international reserves can be explained by precautionary savings to self-insure against capital account crisis using data from 1980-2000. However, for the 2000 – 2005 period, Jeanne (2007) finds that the costs of a capital account crisis must be extraordinarily large in order to justify the level of reserves accumulation in this period. Aizenman (2008) reconciles these accounts, noting two structural shifts in the trend of reserves accumulation. Increased reserves accumulation in 1997-2000 is well-explained by precaution in the face of the aggregate risk of capital account crisis. He finds the increase in reserves accumulation after 2000 was mainly driven by China.

Forbes (2010) takes a broader perspective than the precautionary and self-insurance literature. Her analysis of international capital flows finds the most consistent result is that a country's financial development is an important factor affecting its share of investment in both U.S. equity and debt markets. She finds that countries with less developed financial markets, such as China and other East Asian countries, invest a larger share of their portfolios in the U.S. and the magnitude of this effect decreases with income per capita. Countries that trade with the U.S. also invest more in U.S. equity and debt markets, and countries with fewer capital controls tend to invest more in U.S. equities. Blanchard (2007) and Cooper (2005) express similar views. Nevertheless, safety is an important factor determining capital flows. This is illustrated in Forbes' analysis: foreign investors did sell U.S. equities, corporate and agency debt during the peak of the crisis, but they also purchased $381 billion of U.S. T-bills, up sharply from about $75 billion in both the 1st half of 2008 and the 2nd half of 2009.

3.2 The twin-deficits hypothesis

An alternative view of global imbalances finds their source in U.S. fiscal deficits and monetary policy. Proponents of this view argue that U.S. policy raised disposable household income beyond factor earnings from the production of goods and services. The resulting increase in

consumption gives rise to excess demand for tradable goods, causing the value of imports to exceed the value of exports and an appreciation of the real exchange rate. US export competitiveness thus falls, widening the current account deficit. Several authors refer to this explanation as the "twin-deficits hypothesis."

Bems, Dedola and Smets (2007) are able to explain much of the behavior of the US current account during the 1980's and 2000's in a structural VAR model identifying fiscal shocks, monetary shocks and productivity shocks. A positive government spending shock is found to lead to an immediate deterioration in the current account, whereas a tax cut's effect on the external balance takes longer to materialize and is less significant. However, their model's predictions diverge from the data in the late 1990's, leaving the trade deficit that began to emerge in the late 1990s unexplained. The authors suggest that non-US factors, specifically the Asian financial crisis, might have been important determinants of the U.S. current account deficits during this latter period.

While some authors (Obstfeld and Rogoff, 2005) suggest that the fiscal deficit contributes to current account imbalances, they tend to place more emphasis on other factors. Others reject the twin-deficits hypothesis, pointing out that while US fiscal and current account deficits have both widened since 2000, they were negatively correlated during the 1990's (Backus and Henriksen 2009; Bernanke 2005). Caballero (2008a, 2008b) argues that the mechanism through which fiscal deficits generate current account deficits would also drive up interest rates, in contrast to the data. Corsetti and Muller (2006) find that the twin deficits hypothesis is more likely to hold with persistent fiscal shocks in countries with a large share of imports in GDP, which is not the case of the U.S.

3.3 The export-led growth hypothesis

The economic development and growth literature contains extensive discussion on relationships between exports and economic growth. Part of this debate centers on whether countries should promote the export sector to obtain economic growth. Empirical evidence in support of this being a successful strategy is weak. Giles and Williams (1999) conclude from their review of this literature that the results from various time-series based studies are not robust to specification and method. They caution extreme care when interpreting much of the applied research on the export-led growth hypothesis.

In the case of China, the long-term pattern of the real value of the Yuan depreciating relative to the dollar occurred in spite of the rapid growth in the Chinese economy over the 1978-2010 period which exceeded by a factor of almost two that of the U.S. economy over this period. If the two countries saving rates were roughly equal (which of course they are not), the prices of China's non-internationally traded goods could be expected to have increased at a more rapid rate than the prices of U.S.'s non-internationally traded goods, that is, a real appreciation of the Yuan. Only since 2006, has China experienced a modest real appreciation. Given that economic growth has only recently been accompanied by a modest real appreciation, it could be argued that economic growth drove exports, instead of exports driving growth. In a panel study, Yang (2008) in fact finds that economic growth led to only a modest real appreciation of the Yuan. His findings suggest that growth has driven China's exports rather than exports causing growth.

Another view of export led growth is termed the Bretton Woods II hypothesis by Dooley, Folkerts-Landau and Garber (2004). They argue that the Bretton Woods system of managed exchange rates was never truly eliminated; rather it went through a period of dormancy only to re-emerge with a new "periphery". The United States remains the "center." Like Japan and Europe just after World War II, the new periphery countries – mostly in East Asia – forego high returns in favor of accumulating foreign reserves from the center. These countries thus hold down the value of their currency to subsidize exports and build their domestic capital stock. The strain on the income and trade accounts of the United States is a side effect of this strategy.

A logical conclusion from Bretton Woods II is that if China were to allow its currency to float, global imbalances would move toward resolution. It has become *de rigeur* for policy makers and opinion leaders to call on China to increase the flexibility of its exchange rate regime. The presumption is that the Chinese currency will appreciate against the dollar and facilitate rebalancing by eroding its export competitiveness. Cheung, Chinn and Fujii (2009) find evidence that an appreciation of the *bilateral* US-China exchange rate would reduce the *bilateral* trade imbalance, although they contend that the extent to which the Yuan is undervalued is not well-understood. Chinn and Wei (2008) demonstrate that the flexibility of a country's *de facto* exchange rate regime and the rate of convergence of its current account are not significantly correlated, raising concern as to the degree to which Yaun appreciation alone will rebalance U.S. – China imbalances.

Pettis (2010) suggests China pursues a Bretton Woods II strategy in response to a high rate of domestic savings. He contends that high savings are a response to opportunities presented by market opening. He explains that savings in China is "systematically funneled into domestic investment." This generates a surplus of domestic production over consumption which must be exported. Foreign currency, mainly dollars, earned from exporting is purchased by the central bank and "recycled" back to the United States through purchases of treasuries and other dollar assets in order to maintain the currency peg, and hence the source of external demand while dampening domestic demand for traded goods due to an undervalued currency. Aizenman (2008) offers a competitiveness argument to the hoarding of foreign reserves. He advances the notion that China engages in 'competitive hoarding' of reserves to improve its competitiveness in the markets of wealthy countries *vis-a-vis* its competitors.

Whether China's recycling of dollars is for mercantilist purposes to support an export led growth strategy supported by the fact that U.S. treasury bills offer an opportunity to obtain a high, relatively risk free return remains an open question.

3.4 Miss-measurement of the current account

An entirely different perspective on global imbalances suggests that our understanding of external wealth is distorted by data limitations. Mayer-Foulkes (2009) points out that profits of multinational corporations' foreign affiliates skyrocketed over the period 1985-2007. In 2007, 70 percent of the roughly $1,100 billion in profits of foreign affiliates were repatriated. Repatriated earnings enter the balance sheet as foreign capital inflows although they arguably represent US wealth. For the United States, these inflows are substantial. Mayer-Foulkes shows that over 1980-2007, the volume of repatriated profits of foreign affiliates track US trade deficit

very closely. Interestingly from the perspective of global imbalances, much of this profit remained in the financial system, contributing to the saving glut described in Bernanke (2005).

Others have asserted that changes in the value of foreign assets held over time are an important reflection of a country's true external wealth. So-called valuation effects, changes in the value of gross assets and liabilities and exchange rate movements, are not recorded as returns in the income account as traditionally measured. Devereux and Sutherland (2009) use data from a subset of OECD countries to illustrate the quantitative importance of valuation effects between 1980 and 2006. Since the 1990's these effects have become large relative to the traditional measure of the current account. For every country in their sample except the United States the average valuation effect is between -2% and 0% of GDP. For the United States it is 1.4%, implying that the measured current account overstates the deficit.

Another challenge to current account measurement focuses on the treatment of intangible assets of foreign subsidiaries. These assets have come to play an increasingly important role in the value of many countries' external wealth. Intangible assets represent much of the value of services firms, but they are also significant for manufacturing firms where much of the value of tangible assets is embodied in intangibles like branding and R&D. Lipsey (2006) points out that the primary determinant of how intangible assets enter the US balance of payments is the "residence" of the firm that holds them on its books. However, firms care about the residence of their intangible assets only inasmuch as it affects their tax bill. A residence-based measure could therefore misrepresent a country's external wealth.

McGrattan and Prescott (2010) demonstrate how unmeasured returns on intangible assets affect the measured current account deficit. The authors distinguish between plant-specific intangible assets and "technology capital". Technology capital captures general knowledge that can be used in any location and at multiple locations. Plant-specific intangible capital is expensed in the early years of a FDI investment, whereas technology capital earns rents even when nothing is expensed. Omitting technology capital from the measurement of returns on FDI causes the returns in long-term investments to appear overstated relative to newer investments. Since US firms have been investing abroad since just after World War II whereas foreign firms' presence in the United States was negligible until the 1970's, this distorts the United States' relative external wealth.

4. Concluding Remarks

Current account surpluses of major economies are the deficits of others. The resulting acceleration in growth in these imbalances cannot be sustained indefinitely. A CA surplus reflects a country's net saving balance. Growth in a country's CA balance suggests that growth in GDP is partly dependent upon growth in external demand. We show that the relative size of an economy and its relative rate of growth in GDP determine the degree to which an imbalance can grow. Big economies, like Japan and more recently China stand out in this regard, while the U.S. stands out for its relatively high share of total world CA deficits (over 60 percent between 2000-to 2005.). CA imbalances grew dramatically over the 1990-2008 period and prior to the global crisis of 2008-09. While a variety of factors could have led to growth in CA imbalances, the international liquidity and capital flow consequences of the growing imbalances were

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certainly a major causative factor in the global financial crisis that followed. While patterns of growing imbalances can persist under the right circumstances for a long period of time, at some point, market and policy readjustments that provide incentives for CA deficit countries to expand exports and CA surplus countries to rely proportionately more on internal demand to maintain growth in GDP is almost inevitable. The crisis of 2008-09 may reflect the beginning of these adjustments. Will the major countries interpret the crisis as a definitive statement that policies have to be changed and future growth has to take a different course? We have argued that continuing the past patterns of growth will not work because the growing CA imbalances are unsustainable under present circumstances. This, however, is yet to be seen. While there are some signs to changing direction, the changes to date have been fairly modest.

The growing CA imbalances among European countries appear symmetric in the sense that the CA surpluses of some European countries appear to be the deficits of other European countries. While this is related to the rigidities of the euro zone countries, these imbalances have also led to major problems between the surplus and deficit euro zone countries which might result in further economic integration in the EU. While the CA imbalance problem within the euro zone has its own distinct issues, the problem of growing CA imbalances have to be dealt with there as well. .

We explore a variety of potential causes of imbalances presented in the literature. The savings glut in many of the Asian economies, and relatively large economies pursuing export-led growth policies is one possible explanation. the flow of capital funds into the United States is certainly related to the efficiency of U.S. capital markets, and the repatriation of profits from U.S. based transnational corporations that enter U.S. national accounts as "foreign owned". U.S. fiscal deficits, by generating a supply of treasury bills, have served to help supply foreign investors with a dollar denominated investment vehicle. While imbalances may be due to a combination of the forces discussed above, the growth in countries' liabilities are surely bounded, and beyond some point, become a threat to global economic stability. Will the problems caused by the financial crisis of 2008-09 lead to a rethinking of macroeconomic policies by the major players and generate a new sustained period of world growth? This is still to be determined.

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