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Abstract

The U.S.-China trade imbalance is commonly attributed to a Chinese policy of currency manipulation. However, empirical studies failed to reach consensus on the degree and kind of RMB misalignment. We argue that this is not a consequence of poor measurement but of theory. The conventional principle of comparative advantage suggests real exchange rates will adjust so as to balance trade. Therefore, the persistence of trade imbalances tend to be interpreted as arising from currency manipulation. In contrast, the Smithian-Harrodian theory explains trade imbalances as the outcome of free trade and sees unequal real competitiveness as the root cause of the U.S.-China trade imbalance.

JEL Codes: B17, F10, F31, F32, F60

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1 Introduction

The history of globalizing capitalism shows the re-occurrence of lasting trade imbalances under different monetary regimes (Bordo, 2005). Large trade imbalances accumulated again on the eve of the 2008 global economic crisis with the U.S.-China imbalance being the most drastic case (Marchetti, Ruta, & Tech, 2012, p. 1). The overall trade deficit of the United States almost quintupled within ten years, reaching its peak of close to USD 828 billion in 2006 (Figure 1). China on the other hand, turned from a net importer into a net exporter in 1994 and its current account surplus surpassed 420 billion at its peak in 2008 (Figure 2). This reversed position of the U.S. and Chinese external imbalances is reflected in the bilateral trade balance. In the period leading up to the crisis, China increased its share in the U.S. trade deficit from around one fifth in 2002, the first year after China's accession to the World Trade Organisation (WTO), to about one third in 2008. Ten years after the crisis global trade continues to be highly unbalanced and the U.S. Treasury (2018) notes in a recent report: "The Administration remains deeply concerned by the significant trade imbalances in the global economy" (p. 1).

Reducing the U.S. trade deficit is on the top of the Trump Administration's foreign economic policy, to such an extent that the U.S. President is threatening a trade war (e.g. Trump, 2018). U.S. governments have long been concerned with trade imbalances and administrations of different political orientations have consistently attributed the U.S. trade deficit to currency manipulation by their trade partners. The 1988 Omnibus Trade Act While requires the U.S. Treasury to conduct semi-annual evaluations of unfair exchange rate devaluations by major trading partners. While China has increasingly been the focus, other trade surplus countries including Japan, Korea, Germany, Switzerland, and most recently also India, are also on the Treasury's 'Monitoring List' (U.S. Department of the Treasury, 2018, p. 3).

Many leading economists perceive global imbalances as a threat to the world's economic stability and as a root cause of the 2008 global economic crises (e.g. Obstfeld & Rogoff, 2009; Obstfeld & Rogoff, 2005; Lin, Dinh & Im, 2010). The most widespread explanation for the accumulation of large external imbalances on the eve of the crisis, specifically between the U.S. and China, which were the worlds' largest in 2008, points to currency manipulation. According to this argument, the Chinese government reduced the value of the Renminbi (RMB) through exchange rate interventions. This lowered the costs of China's exports to the United States and raised the costs of U.S. imports to China, thereby *artificially* causing the tremendous trade imbalance between the two countries. This view deems the Chinese "beggar-thy-neighbor devaluation" (Krugman, 2009a) to be the "single largest cause of the U.S. trade deficit and of unemployment" (Scott, Jorgensen, & Hall, 2013, p. 3). In order to accelerate growth and restore full employment the United States would

have to reduce its large trade deficit. This could be done at no cost to the U.S. budget, if the United States prevented other countries, primarily China, from manipulating their currency and allow for the Renminbi to return to a competitive level (Bergsten & Gagnon, 2012).

Proponents of the currency manipulation hypothesis point to China's massive accumulation of international exchange reserves as evidence for undervaluation (Bergsten & Gagnon, 2012; IMF, 2010, p. 19; Bergsten, 2006; Bergsten, 2007; Bergsten, 2010; Krugman, 2009b; Bergsten & Gagnon, 2012). China is indeed accumulating international exchange reserves at a high rate (see Figure 3 in the Appendix). The total of Chinese international exchange reserves increased almost 17-fold from 2000 to 2010. In 2013, the Chinese reserves reached a level of USD 3.6 trillion, 60 percent of which is estimated to be held in dollar-denominated assets making China the biggest creditor of the U.S. (Chinn, 2013; Reuters, 2013).

However, the link between China's exchange rate intervention and both the actual currency devaluation as well as the Chinese current account surplus is not directly established. Instead, the vast literature bases itself on the standard assumption that trade would be automatically balanced in unfettered exchange, which in turn leads to various attempts to estimate the undervaluation of the Chinese RMB that must account for its persistent trade surplus. Yet such attempts have failed to achieve any consensus. Estimates of the degree of misalignment vary widely and some studies even find that the RMB is overvalued (Cheung, 2012; Cheung, Chinn, & Fujii, 2010a; 2010b; Dunaway & Leigh, 2006; Cline & Williamson, 2007).

This paper argues that the great unity across the political spectrum with regard to currency manipulation as the cause of trade imbalances is rooted in a shared Ricardian outlook on international trade. We analyze the Ricardian theoretical underpinnings of the currency manipulation argument and presents the Smithian-Harrodian theory of trade as an alternative view. The currency manipulation argument stems from David Ricardo's radical departure from Sir James Steuart and Adam Smith's theory of international trade. Ricardian trade theory predicts trade to be balanced in the long run. This is based on the assumption that real exchange rates will adjust so as to guarantee equal competitiveness. Following this logic, the diversion from this '*natural*' state of affairs reflected in the persistence of trade imbalances can only be due to government intervention impeding the free movement of exchange rates. But the '*natural*' state of global balances is a fragile theoretical construct. As pointed out by Harrod (1957), the assumption of automatic exchange rate adjustment breaks down when the quantity theory of money is rejected. If a liquidity theory of the rate of interest is assumed instead, a change in the quantity of money induced by trade imbalances under free trade and well-functioning markets leads to capital flows in the opposite direction: from surplus to deficit countries. From this viewpoint international

creditor and debtor positions as well as persistent long-term imbalances can be understood as an outcome of global capitalist competition among countries with unequal real costs of production rather than being ‘*artificially*’ induced by market distortions (Shaikh, 2016, pp. 520-522). As an implication, real exchange rates will be regulated by relative real costs (Shaikh and Antonopoulos, 2012a; Shaikh, 2016, Ch. 11 Sections V-VI).

The paper is structured as follows. The next section briefly reviews the central position the currency manipulation argument has occupied in U.S. foreign economic policy over the last three decades. The third section evaluates the empirical studies which estimate the degree of exchange rate misalignment based on the *extended purchasing power parity* (PPP) and the *macroeconomic balance approach*. The fourth section analyzes the Ricardian theoretical foundation of these models and contrasts the currency manipulation argument with the Smithian-Harrodian view. The final section summarizes the opposed perspectives on the U.S.-China trade imbalance arising from the two theories of international trade.

2 Monitoring Currency Manipulation – An Integral Element of U.S. Foreign Economic Policy

The accusation against China for manipulating its currency has been a central theme in Trump’s belligerent foreign trade policy until a recent, unexpected turnaround. When Donald Trump announced his candidacy in 2015 he pronounced: “They’re [the Chinese] devaluing their currency to a level that you wouldn’t believe. It makes it impossible for our companies to compete, impossible. They’re killing us.” (CNN, 2015) At the Republican convention at which Trump was nominated as the candidate, he pledged he would stop China’s “devastating currency manipulation” and added “they are the greatest currency manipulators ever!” (Rauhala, 2016). President Trump’s Director of Trade and Industrial Policy, Peter Navarro (2011), proclaims in his book *Death by China* under the heading “Death by Currency Manipulation”: “China’s manipulation of its currency, the yuan, is the tap root of everything wrong with the U.S.-China trade relationship.” (p. 67) Yet while the rhetoric of Trump and his advisors represents a new level of aggression, the claim of currency manipulation has been a central concern of U.S. governments long before Trump.

The currency manipulation argument is deeply engrained in U.S. foreign economic policy. Since the 1988 Omnibus Trade Act the U.S. Treasury issues semi-annual reports to “consider whether countries manipulate the rate of exchange between their currency and the U.S. dollar for purposes of preventing effective balance of payments adjustments or gaining unfair competitive advantage in international trade” (Section 3004). Initially the reports targeted the Asian Newly Industrialized Economies (NIE) (i.e. Korea, Taiwan, Hong Kong and Singapore), with whom the U.S. was

running increasing trade deficits. In the first report of 1989 the Treasury “concluded that Taiwan and Korea engaged in such ‘manipulation,’ within the meaning of the legislation.” (U.S. Department of the Treasury, 1989, p. 12). China was added to the monitoring list in 1991, just after the demise of the Soviet Union, and has stayed on the list to the present day. Since 1994, when China unified its dual-track exchange rate, the Treasury has not found the legal criteria for currency manipulation fulfilled (Gao, 2005; U.S. Department of Treasury, 2018). Nevertheless, the Treasury has consistently pointed to the possibility that China might use currency manipulation and the accusation of unfair RMB devaluation has been a recurring claim in the U.S. policy discourse. A general pattern emerges from the U.S. Treasury reports over the last three decades: The U.S. government exerts continuous pressure by threatening to accuse the East Asian surplus economies of currency manipulation and demands that they enter into bilateral negotiations on a wide array of market liberalization policies, such as exchange rate and capital account liberalization, elimination of import restrictions, and market determined domestic prices.

In the aftermath of the 2008 crisis the tensions between the U.S. and China over the question of currency manipulation reached a new height under the presidency of Obama. Obama’s Treasury secretary Geithner stated in 2009: “President Obama – backed by the conclusion of a broad range of economists – believes that China is manipulating its currency.” (Wearden, 2009) Obama followed the logic of currency manipulation when he warned in 2010: “One of the challenges that we’ve got to address internationally is currency rates and how they match up to make sure that our goods are not *artificially* inflated in price and their goods are *artificially* deflated in price. That puts us at a huge competitive disadvantage.” (Weaver, 2010, emphasis added). The Obama administration enacted the Trade Facilitation and Trade Enforcement Act of 2015 in addition to the 1988 Act to strengthen the U.S. ability to take action against currency manipulation. The Group of 20 also adheres to the currency manipulation thesis in the context of its commitment to “a lasting reduction in global imbalances” and proposes “to move more rapidly toward more market-determined exchange rate systems and exchange rate flexibility to reflect *underlying fundamentals*, and avoid persistent exchange rate misalignments” (G-20, 2013, emphasis added).

In more recent years it has been acknowledged that China has taken steps to appreciate the RMB but the adherence to the currency manipulation argument continues. The Treasury (2017) finds that as a consequence of China’s slow and gradual strengthening of the RMB the “distortion in the global trading system resulting from China’s currency policy over this period [i.e. before the RMB appreciation] imposed significant and long-lasting hardship on American workers and companies” (ibid.). In April 2018, Trump made a U-turn and announced that he would not label China a currency manipulator (Baker, Lee, and Bender, 2018). Around the same time, the most recent

Treasury (2018) report once more did not legally establish that China is manipulating its currency. Nevertheless, the accusations that previous currency intervention caused the piling up of global imbalances continues and China is again warned “to refrain from engaging in competitive devaluation and to not target China’s exchange rate for competitive purposes” (U.S. Department of the Treasury, 2018, p. 4). The Treasury has not found any country to fulfil its own criteria for currency manipulation since 1994 while observing persistent global trade imbalances, but it continues to attribute these imbalances to misaligned currencies.

3 Measuring the RMB Misalignment

Despite great attention attributed to the RMB misalignment by policy makers, the degree of adjustment needed to reduce the Chinese current account surplus to a certain target level remains highly contested. The logic of the currency misalignment argument assumes that if there were no market distortions, the real exchange rate would converge to a certain *equilibrium level* which would balance the current accounts in line with selected *macroeconomic fundamentals*. However, several literature reviews have demonstrated that there is no consensus on how to determine the equilibrium exchange rate that brings about this external balance nor on the level of adjustment needed (Cheung, 2012; Cheung, Chinn, & Fujii, 2010a; 2010b; Dunaway & Leigh, 2006; Cline & Williamson, 2007). Since currency misalignment is defined as the deviation of the real exchange rate from its equilibrium level, there is consequently also no common measure of the currency misalignment (Cheung, 2012). While there was a proliferation of studies aiming to estimate the RMB misalignment in the decade following China’s accession to the WTO in 2001 and the analysis in this section focuses on this period, “the search for a consensus on whether the Renminbi is undervalued continues” (Almås et al., 2017, p. 19).

This lack of consensus results from the current state of exchange rate economics. There is no generally accepted exchange rate model (Cheung, Chinn, & Fujii, 2010b). Most widely applied are various incarnations of the Purchasing Power Parity (PPP) and the macroeconomic balance approaches (Ahmed, 2009; Cheung, Chinn, & Fujii, 2010a; Cheung, Chinn, & Fujii, 2010b; Dunaway & Leigh, 2006; Cline & Williamson, 2007). Both leave considerable room for judgment with regard to the model specifications (Cheung, 2012; Dunaway & Leigh, 2006). Consequently, studies using these approaches to estimate the misalignment of the RMB yield widely varying results. The following two sections introduce the PPP and the macroeconomic balance approach on a theoretical level and provide an overview of the estimation results by studies conducted since China’s accession to the WTO in 2001.

3.1 The Purchasing Power Parity (PPP) Approach

The PPP approach derives the equilibrium exchange rate directly from a comparison of price levels and estimates the degree of misalignment as the deviation of the actual real exchange rate from this equilibrium level, which also indicates the adjustment needed to overcome the current account imbalance. The PPP hypothesis is based on the law of one price (LoP), which states that in the absence of trading barriers and transaction costs *competition equalizes the prices of tradable goods across economies*. If e is the nominal exchange rate, P^* the foreign price index and P the domestic price index, then with no misalignment, the same bundle of goods would have the same price across countries denominated in a common currency¹:

$$1) \quad e P^* = P$$

Since price level data is generally in terms of index numbers, this implies that the real exchange rate (Q) converges to a *stationary* value around some constant level²:

$$2) \quad Q = \frac{e P^*}{P} = \text{constant}$$

The nominal exchange rate is expected to move to adjust the price levels in the long run (Cheung, Chinn, & Fujii, 2010a). If currencies are ‘misaligned’ by PPP standards, the real exchange rate as defined above will be non-stationary. According to standard trade theory, this might be either due to market interventions that prevent the equalization of prices or to currency interventions that hinder the nominal exchange rate from adjusting. The crucial challenge for an empirical evaluation of PPP is to find price indexes that represent an identical basket of goods in the countries of comparison (Shaikh & Antonopoulos, 2012; Shaikh 2016, pp. 528-535)³ Another fundamental obstacle to the PPP approach in the context of the debate over the RMB misalignment with respect to the dollar is that by definition the United States can never be blamed for over- or undervaluation, as the dollar is the numeraire with an exchange rate always equal to the market rate (Cline & Williamson, 2007).

¹ Note that the composition of goods as well as the ratio of tradables to nontradables must be the same in both price indexes P^* and P .

² See Shaikh (2016, pp. 517-527) for a detailed discussion of this point.

³ The simplest and methodologically most questionable PPP approach is the Big Mac index, compiled by The Economist. It tries to get around the problem by using a basket containing just one good, the Big Mac.

Since the PPP hypothesis was found to be very weak empirically, in particular, real exchange rates do not converge to any stationary level (Rogoff, 1996; MacDonald & Ricci, 2001)⁴, a number of extensions were introduced in hope of a better determination of the trade balancing equilibrium exchange rate. These are usually classified as extended (Dunaway & Leigh, 2006) or enhanced (Cline & Williamson, 2007) PPP approaches. This paper will refer to them as *extended PPP approaches*. Most common is the introduction of the Balassa-Samuelson effect to accommodate the deviation of the real exchange rate from purchasing power parity (Bosworth, 2004; Dunaway & Li, 2005). Note that this effect is based on the assumption that wages grow with productivity and that the economy is at full employment.⁵ The Balassa-Samuelson effect is intended to rationalize the empirical regularity, that in contrast with the LoP, higher income countries which are assumed to have higher productivity levels show higher price levels (Penn Effect).

In an attempt of a more precise calibration of the equilibrium exchange rate so-called *macroeconomic fundamentals* are introduced in PPP based approaches often labeled as behavioral effective exchange rates (BEER) (Cline & Williamson, 2007).⁶ These include for example net foreign assets (NFA), terms of trade (ToT), government consumption, trade openness and price controls.⁷ Panel regression or single country time series analysis is used to establish an equilibrium relationship between these variables and the real exchange rate (Dunaway, Leigh, Li 2006). The equilibrium exchange rate is derived from the past average of the economy under examination or from the average over a number of countries (Dunaway, Li 2005). This method is based on the assumption that the exchange rates are in equilibrium in the long run, whereas trade may be unbalanced trade but only in so far as this is reflective of the macroeconomic fundamentals. The selection of variables to extend the basic PPP approach, as well as the selection of the proxies used for these variables are guided by data availability and depend on the judgment of the researchers. In addition, the choice of the country sample and the examination period will affect and can be used to manipulate the estimation results (Cheung, Chinn, & Fujii, 2010a; Dunaway & Leigh, 2006).

⁴ The real exchange rate is not stationary over the short run (Isard, 1995, pp. 63-65). It does revert to a “target level” over runs of 10-20 years, but this is not the PPP level (Engel, 2000, p. 21). Even if there was a reversion to a non-stationary mean, the “speed of convergence is extremely slow” (Rogoff, 1996, p. 647). For a more detailed discussion see Shaikh and Antonopoulos 2012a.

⁵ The full-employment condition is not fulfilled in the Chinese case, as discussed below.

⁶ The IMF calls a similar approach “reduced form equilibrium real exchange rate” in its “Methodology for CGER Exchange Rate Assessments” (2006). Ahmed (2009) subsumes what Cline and Williamson (2007) call BEER under the label extended PPP approaches.

⁷ With respect to NFA it is assumed that debtor countries need more depreciated real exchange rates as compared to creditor countries. Higher ToT are expected to appreciate the real exchange rate due to an income effect. Government consumption would increase the demand and ultimately the price of nontradables and appreciate the real exchange rate. Greater trade openness would decrease domestic prices and appreciate the real exchange rate. Price controls might increase or decrease domestic prices and appreciate or depreciate the real exchange rate (IMF 2006).

3.2 The Macroeconomic Balance Approach

Whereas the PPP approach attempts to directly estimate the equilibrium exchange rate, the macroeconomic balance approach starts from the current account. The attributed misalignment is then evaluated in terms of the gap between the projected current account balance and a targeted norm.⁸ The question to be answered is: How much the real exchange rate needs to adjust in order to close the current account gap under *conditions of internal balance*? The analysis is usually conducted in three steps (Dunaway & Leigh, 2006; Dunaway & Li, 2005): First, the so-called underlying current account balance is estimated. Second, the *equilibrium current account* or “current account norm” is approximated which defines the targeted norm. Third, a trade model is estimated to calculate the exchange rate movement needed to close the gap between the actual and equilibrium current account balance.

The underlying current account calculated in the first step does not correspond with the observable current account. Instead, it represents a ‘thought experiment’ and is defined as the current account in percent of GDP that is expected to emerge over the medium term at prevailing exchange rates assuming that the trading economies will return to noninflationary full capacity employment (i.e. internal balance), the effects of past exchange rate changes will cease and cyclical effects will be adjusted (Borowski & Couharde, 2003; IMF, 2006). In this sense the underlying current account is the state which would evolve if all trading partners were to resume internal equilibrium but at a given real exchange rate.

In the second step, an equilibrium relationship is established between certain so-called macroeconomic fundamentals and the current account in order to estimate the equilibrium current account which is assumed to be sustainable in the long run (Ahmed, 2009). This equilibrium can be different from balanced trade but only in so far as this is in line with the macroeconomic fundamentals. Note that cost competitiveness is not part of the macroeconomic fundamentals. One set of fundamentals is derived by panel data techniques building on the assumption of stable structural relationships between saving, investment, and external current account balances (Dunaway & Leigh, 2006; Dunaway & Leigh, 2006; Chinn & Prasad, 2003). The starting point is the truism that in open economies national saving (S) does not have to be equal to domestic investment (I) (Obstfeld & Rogoff, 1996; Obstfeld, 2004). This can be expressed in the following accounting identity:

⁸ The macroeconomic balance approach was first developed by Williamson (1983) under the label Fundamental Equilibrium Exchange Rate (FEER). It is one of the three methods suggested for exchange rate assessment by the IMF (2006).

$$3) \quad CA = (S - I) + (T - G)$$

The current account (CA) is always equal to the sum of the saving-investment gap and the national budget balance (tax income (T) minus government expenditures (G)). Assumptions about causality are introduced implicitly by defining the fundamentals which are used to determine the current account norm. For example, the IMF Consultative Group of Exchange Rate Issues (CGER) introduces fundamentals which suggest that the domestic saving-investment balance determines the level of a ‘sustainable’ current account balance (2006).⁹ In addition, current account norms are defined with respect to capital flows in the balance of payment accounting. The current account norm is to be such as to either offset ‘normal’ or autonomous capital flows (Goldstein, 2004) or to stabilize the net foreign assets at a certain level (Dunaway & Leigh, 2006; Dunaway & Li, 2005).

Once fundamentals are defined, unobservable coefficients are estimated based on panel data analysis of a number of selected countries over a certain sample period. Note that this is again based on the assumption that current accounts will be in balance in the long run. Finally, current account norms are computed for individual countries as a function of the levels of the fundamentals projected to prevail in the medium term (IMF, 2006; Chinn & Prasad, 2003). The outcome of this estimation is highly dependent on the selection of fundamentals, the choice of the country set and sample period as well as on the judgment about what constitutes a sustainable external position (Cline & Williamson, 2007). The current account norm does not require that all countries are in balance. Instead it is used as basis for a normative judgment about the desirability of current account balances that are different from zero. Current account norms vary with the state of development because it is generally assumed that capital flows from developed to developing countries due to a higher investment demand in the latter than in the former. Accordingly, the current account target for developing countries tends to be a moderate deficit and a surplus for industrial countries (IMF, 2006).¹⁰

The third and final step uses the gap between the underlying current account and the current account norm to calculate the real exchange rate which is assumed to bring about the long-term sustainable external equilibrium at a level consistent with the assumption of internal balance. The whole gap between the underlying current account balance and the current account norm is assumed to be eliminated solely through a change in the real exchange rate (Dunaway & Leigh,

⁹ For example, a relatively higher government budget to GDP ratio is assumed to increase national saving and consequently the current account balance. With respect to demographics, higher shares of economically inactive population will lower savings and decrease the current account balance. High economic growth which is expected for early stages of development goes hand in hand with a high need for investment and therefore decreases the current account.

¹⁰ The consistency of the estimated current account norms is ensured by using the rest of the world not included in the determination of current account norms as residual (Saadaoui 2012).

2006; Dunaway & Li, 2005). But first, the country specific but mutually consistent trade elasticities with respect to the real exchange rate have to be pinned down (Cline & Williamson, 2007; IMF, 2006; Saadaoui, 2012). This again leaves room for normative judgment. Studies using the macroeconomic balance approach to evaluate China's currency misalignment are found to not always justify the choice of these trade elasticities theoretically or empirically (Ahmed, 2009). In general, there is a high degree of uncertainty concerning the estimate of the change in the real exchange rate required to achieve the current account norm, given that this estimate is effectively a residue (Dunaway & Leigh, 2006; Dunaway & Leigh, 2006).

In conclusion, studies using the extended PPP approach as well as the macroeconomic balance approach to estimate the equilibrium exchange rate and determine the degree of misalignment share the belief that current account imbalances beyond those reflective of macroeconomic fundamentals are the result of a single market *distortion*, namely exchange rate manipulation. The two approaches depend highly on the choice of fundamentals. This is because they both find that their guiding assumptions face severe problems with respect to the empirical evidence. In an attempt to maintain the basic approaches, estimations are augmented by further variables in order to accommodate deviations from the originally assumed correlations. The macroeconomic balance approach implicitly acknowledges that current accounts are not *fully* balanced while at the same time maintaining the notion of balance. Instead of coming up with a structural explanation of the observed imbalances, fundamentals which are found to correlate with saving and investment behavior are introduced to declare certain levels of current account *imbalances* as macroeconomically *balanced*. The presumed "tendencies in the co-movement of the current account balance with the underlying fundamentals" are, however, "unavoidably subject to significant uncertainty" - as the IMF (2006) admits while suggesting the extended PPP and macroeconomic balance approaches as standard methodology for exchange rate assessment.

3.3 Unpredictability of Exchange Rate Misalignment

Given the described challenges in measuring exchange rate misalignment it should come as no surprise that there is no agreement on the degree of misalignment. Indeed, there is not even a consensus on whether the RMB is over- or undervalued. Table 1 summarizes measurements of the RMB misalignment for the period of 2000 to 2011 as collected in the four literature reviews (Cline & Williamson, 2007; Dunaway & Li, 2005; Cheung, Chinn, & Fujii, 2010a; Cheung, 2012). The estimates of undervaluation in percent reported in Table 1 are plotted in Figure 4 and Figure 5 for estimates based on the extended PPP and the macroeconomic balance approach separately. All approaches that go beyond a simple PPP-based analysis are classified as extended PPP (including Penn effect, and various versions of BEER approaches). All approaches that follow the procedure

sketched above as macroeconomic balance approach are labeled as such (including FEER). As demonstrated in earlier literature reviews, similar approaches yield a wide range of results even for the same year of estimation and even if conducted by the same authors. For example, MacDonald and Dias (2007) estimate degrees of RMB undervaluation ranging from 7 to 30 percent when using the same BEER approach.

All literature reviews point to the fact that the estimation of currency misalignment is highly sensitive to the choice of variables, the equation specification, the sample period and country sets in the panel econometric approximations. For example, Cheung, Chinn, and Fujii (2010a) show that for 2009 an undervaluation varying from 1.6 to 38 percent can be generated using the same extended PPP approach while altering the sample period from 1990-2009 to 1980-2009 respectively. Further, sensitivity tests for the extended PPP approach suggest that China's real equilibrium exchange rate can vary widely when dropping one country from the panel or changing the proxies, because the estimated coefficients for explanatory variables change (Dunaway, Leigh, Li 2006). Authors who have used the same methodology and similar specification when applying the macroeconomic balance approach also deliver estimates of substantial variation (Dunaway & Leigh, 2006; Bénassy-Quéré, Duran-Vigneron, Lahrière-Révil, & Mignon, 2004; Cline & Williamson, 2007; Cheung, Chinn, & Fujii, 2010b). For example Wang (2004) finds only a slight undervaluation whereas Goldstein (2004) estimates the RMB to be undervalued by between 15 and 30 percent. Thus we share the conclusion of Schatz (2011) that the methodologies used for assessing the 'fair value' of a currency vary significantly with the specific assumptions chosen by the modeler.

One crucial challenge is to define the trade elasticities, which determine the claimed link between the exchange rate appreciation and the current account. For example Ahmed (2009) finds that a 20 percent appreciation of the RMB induces a USD 400 billion decrease in the Chinese exports after four years. Cheung, Chinn and Fujii (2011), on the other hand, only find an impact of USD 50 billion for the same appreciation. Consequently, the robustness of estimations of the equilibrium RMB exchange rate is very weak (Dunaway & Leigh, 2006, p. 3; Cheung, Chinn, & Fujii, 2010b). This causes serious problems of statistical significance. Cheung, Chinn, Fujii (2007) concludes: "One general observation is that, when one implements the standard operating procedure of accounting for sampling uncertainty in making inferences, there is no evidence supporting the claim that the RMB is substantially undervalued, using conventional significance levels." (p. 20) The lack of empirical foundation is reflected in the agreement in the literature on the unpredictable nature of exchange rates (e.g. Stein, 1995). The IMF (2006), for example, states: "While the econometric

model captures the broad trends in real exchange rate behavior, estimates of equilibrium exchange rates are unavoidably subject to significant uncertainty.” (p. 18)

4 The Currency Manipulation Argument in Theoretical Perspective

We argue that the ambiguity of exchange rate economics is not a mere problem of measurement, but one of substantive theory. Based on Shaikh (2016) and Shaikh & Antonopoulos (2012), this section suggests that the presented standard exchange rate models are rooted in the Ricardian principle of comparative cost which rests on the assumption of balanced trade in the absence of market distortions. The Smithian-Harrodian theory is presented as alternative view with trade imbalance as ‘natural’ state.

4.1 Ricardo’s ‘Natural’ State of Balanced Trade

In the Ricardian theory the real exchange rate is predicted to adjust so as to bring trade into balance. This assumption reaches beyond the proposition that a fall in the real exchange rate will improve the trade balance of the respective country. The real exchange rate is expected to fall (rise) if a country is running a trade deficit (surplus), until trade will be balanced (Dernburg, 1989, p. 3). That implies firstly that a real currency depreciation positively affects the trade balance. Secondly, given the free play of the market, currency depreciation is expected to evolve automatically if a country runs an external deficit. Therefore, the real exchange rate movement determines the trade balance (proposition 1) but, at the same time, the real exchange rate itself is determined by the trade balance (proposition 2). It follows that the automatic real exchange rate adjustment makes all freely trading nations equally competitive regardless of differences in absolute cost of production and leads to balanced trade if there were no market interventions and imperfections (Shaikh, 1980a).

As Shaikh (2016) points out, Ricardo (1951 [1817]) implicitly reduces the balance of payment to the balance of trade, whereas the balance of payment is defined as the sum of net inflows (i.e. exports minus imports, short-term capital inflows minus capital outflows, foreign direct investments (FDI) to the domestic economy minus FDI by domestic agents abroad etc.). This amounts to saying that the balance of payment has to be cleared by balanced trade. Ricardo considers money only as medium of circulation, not as financial capital and dismisses the link between money and credit flows. This is fundamental to the well-known Ricardian comparative advantage story. A country running a trade surplus sells more than it buys and therefore experiences a money inflow. The obverse is asserted for a country with a trade deficit.

Building on Hume’s Quantity Theory of Money, Ricardo assumes that, on the one hand, the increase in the money supply in the surplus country will only affect the national price level. Given a constant velocity and output level, domestic prices will rise and undermine the initial absolute

cost advantage of the producers. On the other hand, the trade deficit in the initially absolutely less competitive country will induce a money outflow reducing the domestic money supply and ultimately lowering the price level. Therefore the commodities with the smallest absolute cost disadvantage will become comparatively competitive and their export will diminish the trade deficit. This two-sided process continues as long as trade is unbalanced. But once commodity out- and inflows have reached the same level denoted in a common currency, the capital account will also be balanced and the domestic money supply will remain at a constant level. After an initial imbalance due to differences in absolute costs, trade will balance in the long run and will be to the benefit of all nations. Note that this original Ricardian version of the story is based on fixed exchange rates but Shaikh (2016, p. 503) demonstrates that the same holds for flexible exchange rates. In the former case the adjustment is transmitted by changes in the national price levels, in the latter by changes in the nominal exchange rate. In either case the result will be a real exchange rate movement that brings about balanced trade.

4.2 The Smithian-Harrodian ‘Natural’ State of Unbalanced Trade

The Ricardian standard hypothesis of automatic exchange rate depreciation in the case of a trade deficit relies on the quantity theory of money. If we, however, go back to Steuart and follow the argument implicit in Smith, Marx¹¹ and Keynes¹², and laid out in detail by Harrod (1957) this hypothesis does not hold on its own grounds (Shaikh & Antonopoulos, 2012).

Ricardo departs radically from Smith’s theory of international trade. Smith (1904 [1776]) finds the ability of a country to absorb a certain quantity of money to be limited: “The value of goods annually bought and sold in any country requires a certain quantity of money to circulate and distribute them to their proper consumers, and can give employment to no more. The channel of circulation necessarily draws to itself a sum sufficient to fill it, and never admits any more.” (Book IV, Ch. 1, p. 558) As Hollander (1911) points out, Smith assumes that “Redundancy [of money] (...) would be followed by an efflux of gold; but only for the reason that the ‘channel of circulation’ must in such event overflow, and this overflow being too valuable to lie idle, was sent abroad ‘to seek that profitable employment which it cannot find at home.’ ” (p. 437) Unlike in the Ricardian theory, here the inflow of money induced by a trade surplus does not lead to an increase in the price level and consequently no exchange rate adjustment occurs, which would give rise to comparative advantages and balanced trade. Instead, Smith extends the theory of absolute

¹¹ Marx hints on this point in Volume III of Capital: “If gold is exported, then, according to the Currency Theory, commodity-prices must rise in the country importing this gold, and decrease in the country exporting it. . . . But, in fact, a decrease in the quantity of gold lowers the interest rate; and if not for the fact that the fluctuations in the interest rate enter into the determination of cost-prices, or in the determination of demand and supply, commodity-prices would be wholly unaffected by them.” (Marx, 1967, p. 551)

¹² For a detailed discussion of Keynes’ rejection of the theory of comparative advantage see Milberg (2002; 1994).

advantage as formulated for trade between regions of one country to the international level: “Were all nations to follow the liberal system of free exportation and free importation, the different states into which a great continent was divided would so far resemble the different provinces of a great empire.” (Book IV, Ch. 5, p. 708) In the absence of Ricardo’s monetary mechanism “the natural advantage which one country has over another in producing particular commodities” (Book IV, Ch. 2, p. 596-7) is not transformed into a comparative disadvantage. Instead, trade imbalances reflect absolute cost advantages and are persistent in the absence of policy interventions.

By acknowledging the link between money and credit flows Harrod (1957) arrives at the same outcome of international trade as Smith. When introducing a liquidity theory of interest, there is no Ricardian automatic price adjustment mechanism. Emphasizing that capital and trade flows are not independent, Harrod states that “the capitalists of a country may be tempted to invest (or borrow) abroad precisely because of the conditions which the balance of trade has brought about.” (1957, p. 115) In the absence of policy interventions and assuming a constant liquidity preference of the public and banks, the money inflow in the surplus country does not increase its price level but raises the liquidity and lowers the interest rate. The opposite happens to the deficit country, so that an interest rate differential might arise, which can cause a short-term capital outflow from the surplus to the deficit country in the form of credit.

As a consequence of the competitive functioning of capital markets the surplus country would tend to become an international lender while the deficit country accumulates debt. These short-term capital flows induced by payment imbalances would eliminate the interest rate differentials by arbitrage. The short-term credit flows offset the trade imbalance to balance payments and thereby equilibrate the interest rates. Causation runs from trade to capital account, contrary to the Ricardian model where the trade balance adjusts to bring the capital account into balance. In the Smithian-Harrodian theory a surplus in the balance of payments is offset by money flows reducing liquidity and not by a rise in prices or an adjustment of the interest rate. The payment imbalances not only affect the liquidity and the interest rates but also the foreign exchange market. In the absence of policy interventions the level of the exchange rate might therefore balance payments instead of balancing trade. The real exchange rate may remain unaffected by changes in the trade balance or the exchange rate of the surplus country might even depreciate in a phase of overshooting when more money flows out of the surplus country in the form of credit than money flows into the country in the form of payments for the net exports.

The change in the interest rate resulting from trade imbalances can have a considerable impact on production costs or on the levels of aggregate demand and supply (Harrod 1957, pp. 130, 131-33,

135, 139).¹³ If investments are responsive to interest rate movements, the increased liquidity in the surplus country might stimulate investment, hence aggregate demand and output, which might in turn increase imports through a Keynesian demand channel. But it might also further reduce production costs by increases in productivity resulting from new investments. Hence depending on the profitability of investment and the initial interest level, the change in interest might contribute to a reduction in the trade surplus but it never sustainably eliminates the trade imbalance (Shaikh 2016, pp. 533-535).

Overall trade would only be balanced in the Smithian-Harrodian understanding, if all trading partners were equally competitive in absolute terms. Abstracting from policy, balanced trade is therefore an unlikely exception, certainly not the ‘natural’ state of affairs. Trade is primarily determined by the real cost of production, i.e. absolute cost advantages. Therefore global competition among unequally competitive trading partners engenders persistent global imbalances (Shaikh & Antonopoulos, 2012).

4.3 Ricardian Underpinnings and Smithian-Harrodian Challenge of the Currency Manipulation Argument

The presumption of Ricardian exchange rate adjustment is at the core of the currency manipulation argument. Only if it is assumed that in the absence of policy interventions, i.e. in the ‘*natural*’ state, the real exchange rate rested at its equilibrium level, defined as the real exchange rate which brings about balanced trade, *artificial* currency manipulation can be inferred from trade imbalances. The Ricardian notion of balanced trade also underlies both investigated exchange rate models.

The LoP, which is the foundation for the PPP hypothesis, does not - taken on its own - imply automatic currency account adjustment. Prices may well be equilibrated by competition, while the competitive capitals are all or predominantly located in one country rather than another. In this case competition between the more competitive capitals in the one country with the less competitive capitals in the other would bring about unbalanced trade. Therefore simple PPP can be reconciled with unbalanced trade. But when simple PPP is used to estimate an equilibrium exchange rate which is assumed to bring about balanced trade, PPP is employed in the service of the currency manipulation argument. Extended PPP on the other hand assumes a stationary equilibrium of balanced trade in the long run adjusted for macroeconomic fundamentals, which could be achieved by adequate currency re-alignment. Both PPP and extended PPP adhere to the Ricardian principle in that they assume that trade balances through currency alignment. They do

¹³ Note that this expands on the point quoted from Marx in footnote 12 that the interest rate affects costs and demand and supply.

account for macroeconomic fundamentals, but do not consider structural differences in cost competitiveness as the cause of persistent trade imbalances.

The macroeconomic balance approach, too, implicitly assumes the Ricardian proposition. It suggests that the deviation of the underlying current account from the current account norm could be overcome by the adjustment of the real exchange rate and conversely results from the lack thereof. The notion of a balanced 'natural' state is again reflected in the way the fundamentals are set up to determine the sustainable current account. The saving-investment balance is taken to determine the sustainable current account balance (see section on macroeconomic balance approach). This suggests that investment can be determined independently from trade and dismisses the impacts of interest rate adjustments.

Further, the current account norm is defined with respect to a certain 'normal' capital flow to which it has to adjust (Goldstein, 2004). Since the capital account must, as a matter of accounting, be equal to the trade balance in order for the payments to clear, a certain 'normal' capital account is also indirectly determined by the domestic saving-investment balance. In this sense it is a certain level of the investment-saving balance that is normatively attributed to countries of a certain stage of development that indicates what constitutes a sustainable current account. The reasoning resembles the patterns observed in Ricardo. The balance of payment is assumed to be balanced by trade and not by money flows. This is the precondition for the price level adjustment process to work.

In contrast, if the intrinsic link between the current account and the capital account is acknowledged, as Harrod (1957) suggests, there is no such thing as a normal capital account. Instead, Harrod argues that a trade imbalance will trigger capital flows and that these capital flows will in equilibrium offset the equilibrium trade balance. Since interest rates affect macroeconomic variables, the final trade balance depends both on competitiveness and also on macro factors, but the latter cannot offset the earlier. From this perspective there is no reason to believe that under conditions of free trade interest rates adjust to balance the current account, we expect persistent trade imbalances reflecting absolute cost advantages resulting from free international competition, i.e. we cannot infer from trade imbalances and from China's purchase of reserves that the currency has been manipulated. Instead, both the trade imbalance and the accumulation of foreign reserves might be a result of China's absolute cost competitiveness.

Harrod (1957, p. 132) notes that in the case of fixed exchange rates the capital movements induced to adjust the balance of payments can be produced by the interest rate policy of the Central Bank;¹⁴ the Central Bank thereby doing what the market would do in the case of flexible exchange rates. A similar argument can be made with respect to China's foreign exchange assets. China's outbound capital account has been liberalized only to a very limited extent in the decade following the WTO accession in 2001 (He, Cheung, Zhang, & Wu, 2012, S. 1). Consequently, the short-term capital outflows, which are predicted by the Smithian-Harrodian framework to come about as a result of the accumulation of a large trade surplus, were hampered. The capital account adjustment that would occur under the normal working of the market to clear the balance of payment could therefore only be achieved by increasing the official foreign reserves. The Chinese intervene in the foreign exchange and there is a persistent trade imbalance, but from a Smithian-Harrodian perspective this is not *prima facie* evidence of currency manipulation, since the Chinese foreign exchange intervention could be viewed as a *surrogate* for a market mechanism, rather than a market distortion (Harrod 1957, pp. 85-6). From the Smithian-Harrodian viewpoint, the Chinese authorities cannot necessarily be blamed for global imbalances and U.S. unemployment. Instead, the official foreign reserve policies of the Chinese state might only *mimic* what would be the outcome of free capital and trade flows. It is the lower costs in China that drive its trade surplus.

5 Conclusion

The currency manipulation argument remains a main point of reference for policy makers in the U.S. despite its lack of empirical evidence. The link between foreign exchange market interventions, exchange rate devaluation and current account imbalances has not been established empirically. Most studies focus on the estimation of exchange rate undervaluation approximated with respect to a statistically derived equilibrium exchange rate. However, consensus is reached neither on the degree nor the direction of misalignment.

Standard trade models trying to estimate the RMB misalignment are rooted in the Ricardian notion of comparative advantage. This has been discussed with regard to the extended PPP and the macroeconomic balance approach, the most widely used approaches for the estimation of currency misalignment. The currency manipulation argument and the misalignment measurements rely on the assumption that in the absence of market interventions real exchange rates would adjust such as to balance trade. However, this proposition has long been proved not to hold, if the quantity theory of money is substituted by a liquidity theory of the interest rate. In lieu of automatically balanced trade, the Smithian-Harrodian theory expects persistent imbalances as a result of free

¹⁴ Central Banks in deficit countries raise the interest rate in order to induce a capital inflow needed to cover the deficit and avoid a drain in reserves. Surplus countries on the other hand lower the interest rate to induce a capital outflow.

international competition. Trade imbalances tend to cause interest rate differentials which induce short-term capital flows in the opposite direction to the net trade flow. The balance of payments is then cleared by the capital account adjusting to the trade balance. Countries which are less competitive in absolute terms run a trade deficit and become international debtors because of competition. The opposite happens to countries with superior price competitiveness.

Some economists who about a decade ago vigorously argued it would be vital for the U.S. economy to prevent China from manipulating its currency have recently come to take a more cautious stance. For example, Paul Krugman who in 2010 laid out the currency manipulation argument and called for “Taking on China and its Currency” has come to downplay the importance of the trade deficit with China (Krugman, 2018). The fact that actual patterns of trade are so different from those derived from orthodox trade theory has become a pressing concern and we share with many economists the goal of showing why this is the case. But we think that the problems cannot be solved when staying within the framework of the theory of comparative cost. The Smithian-Harrodian theory of trade provides an alternative view to Ricardo’s principle of comparative advantage and arrives at an opposed interpretation of the causes underlying the U.S.-China trade imbalance. Whether China’s foreign exchange policy or China’s absolute cost advantages in terms of production costs are seen to be the reason for the massive bilateral trade surplus with the U.S. ultimately depends on the choice of theoretical perspective. If we assume a ‘natural’ state of balanced trade, trade imbalance appears to be the result of policy manipulation. If, in contrast, imbalance is the ‘natural’ state of international trade under conditions of unequal competitiveness, China’s policy intervention might only reflect what emerges under the free play of the market.

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APPENDIX

Figure 1

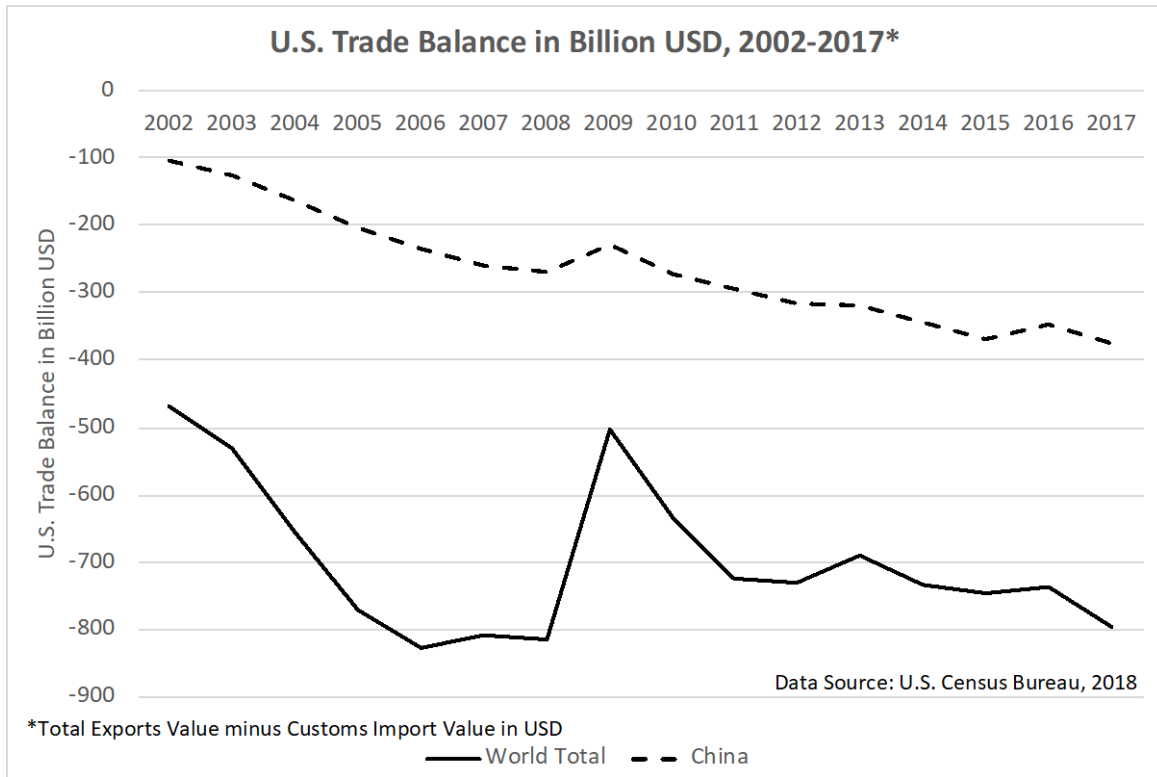


Figure 2

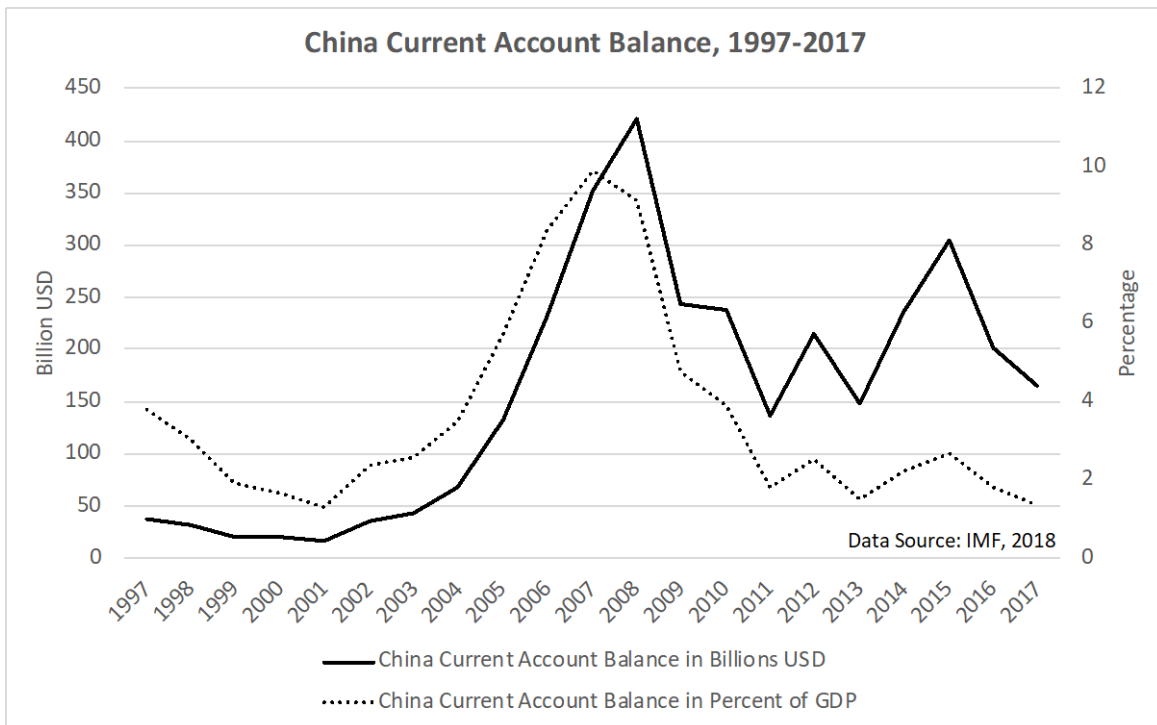


Figure 3

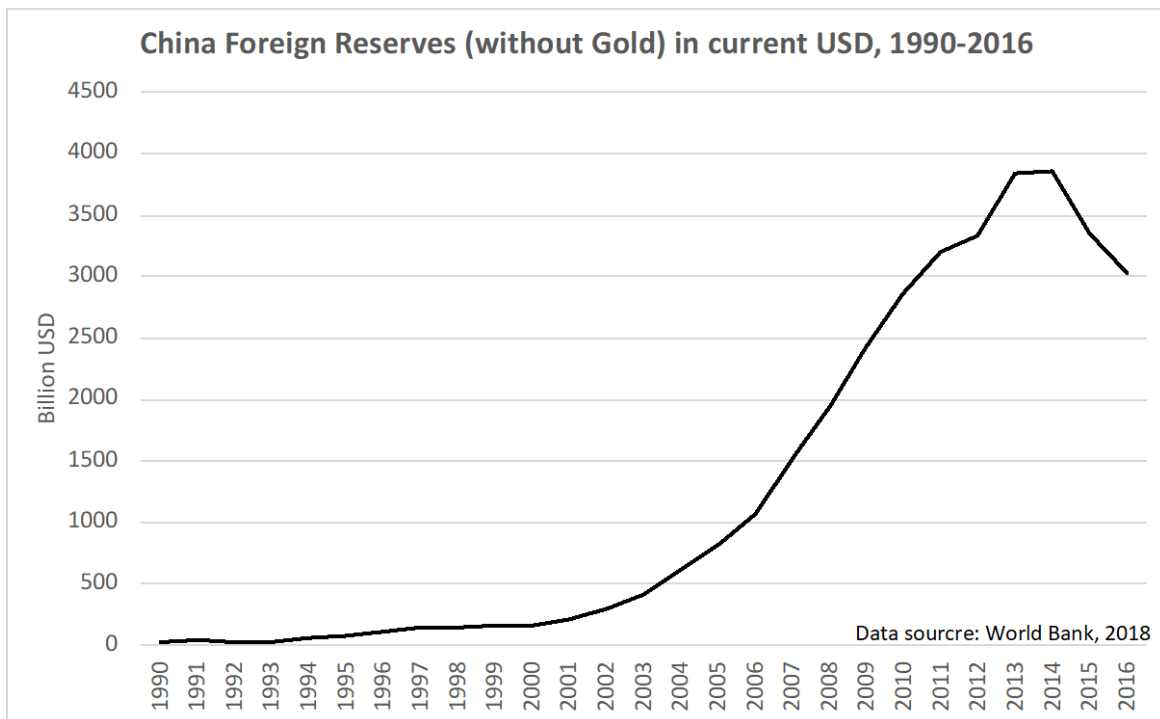
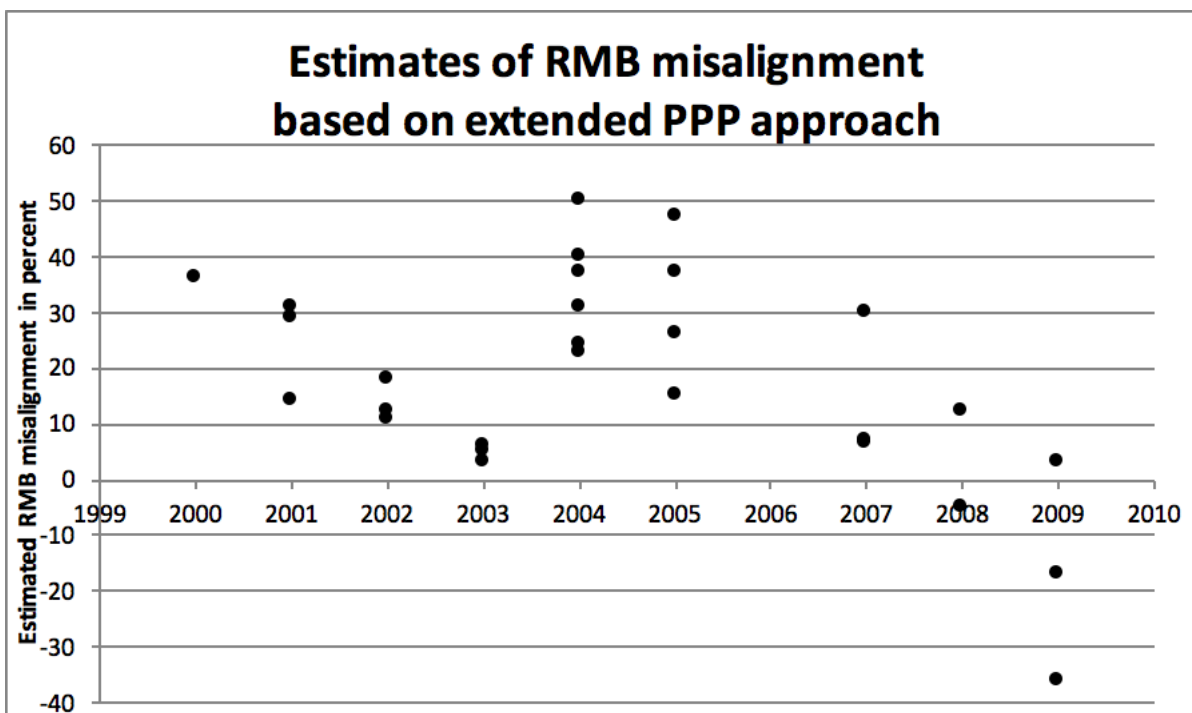
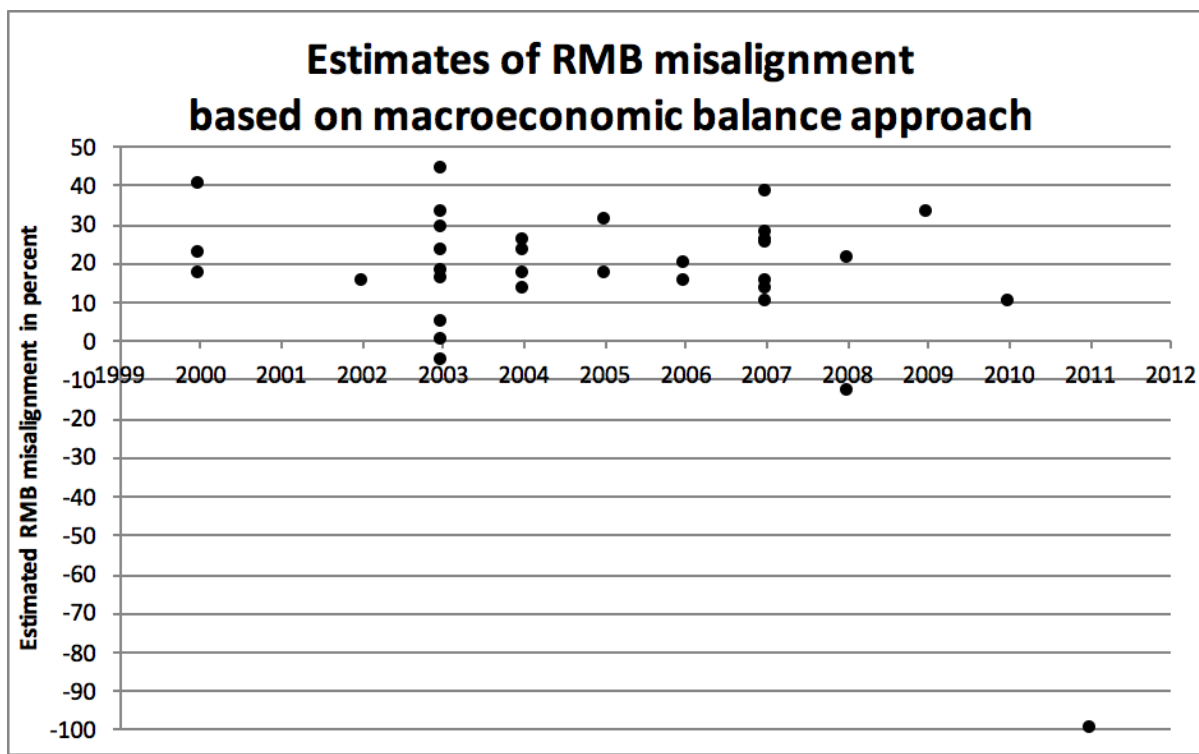


Figure 4¹⁵



¹⁵ Figure 4 and Figure 5 are compiled based on the estimates reported in Table 1. If a source reported more than one estimate of the RMB misalignment, each estimate was treated as a separate data point in the scatter plots. If the estimate of the RMB misalignment is reported as a range, the maximum and minimum value are reported in the scatter plots as two separate estimates.

Figure 5¹⁶



¹⁶ See footnote 15.

Table 1: Estimations of RMB Misalignment

Source	Time of estimation	Type of estimation approach	Specifications	Estimated misalignment of RMB* ¹
Anderson 2006	2006	MB	FEER, bilateral dollar rate	15-20%
Bénassy-Quéré et al. 2004	2001	Extended PPP	BEER, bilateral dollar rate	29-31%
	2001	Extended PPP	BEER, REER	14%
Bénassy-Quéré et al. 2006	2004	Extended PPP	BEER, bilateral dollar rate	23-37%
	2004	Extended PPP	BEER, REER	24-31%
Bosworth 2004	2004	Extended PPP	bilateral dollar rate	40%
Chueng, Chinn, Fujii 2007	2004	Extended PPP	bilateral dollar rate	50%
Cheung, Chinn, Fujii 2010b	2009	Extended PPP		-36%
	2008	Extended PPP		-5%
	2009	Extended PPP	relative PPP, bilateral dollar rate	-16,80%
Cline 2005	2005	MB	FEER, bilateral dollar rate	31%
	2005	MB	FEER, REER	17%
Cline 2007	2007	MB	FEER, bilateral dollar rate	25-28%
	2007	MB	FEER, REER	10-15%
Cline & Williamson 2010	2009	MB	FEER	33%

¹ Values derived from the summary in Cline and Williamson 2007 were reported in terms of "Appreciation Needed to Eliminate Undervaluation" in percentage and transformed based on the following formula "For an under valuation of x percent, the appreciation needed for correction is: $100([1/(1-.01x)]-1)$ " (p. 9). This transformation has been reversed in this table to make the values comparable to other sources.

Source	Time of estimation	Type of estimation approach	Specifications	Estimated misalignment of RMB
Coudert & Couharde 2005	2002	Extended PPP	BEER	18%
	2003	MB	FEER, bilateral dollar rate	44%
	2003	MB	FEER, REER	23%
Frankel 2006	2000	Extended PPP	bilateral dollar rate	36%
Funke & Rahn 2005	2002	Extended PPP	BEER, bilateral dollar rate	11-12%
	2003	Extended PPP	BEER, REER	3-6%
Goldstein 2004	2004	MB	FEER, REER	13-23%
Goldstein & Lardy 2006	2004	MB	FEER, REER	17-26%
Goldstein & Lardy 2007	2007	MB	FEER, REER	26-38%
Goldstein & Lardy 2009	2008	MB	external balance	21%
Hu & Chen 2010	2008	MB	FEER	-13%
Jeong & Mazier 2003	2000	MB	FEER, bilateral dollar rate	40%
	2000	MB	FEER, REER	22.5%
MacDonald & Dias 2007	2007	Extended PPP	BEER, REER	7-30%
Reisen 2009	2008	Extended PPP		12%
Schnatz 2011	2011	MB	FEER	-100%
Stolper & Fuentes 2007	2007	Extended PPP	BEER, bilateral dollar rate	6,50%
	2007	MB	FEER, bilateral dollar rate	13%
Stupnytska, Stolper, Meechan 2009	2009	Extended PPP	BEER	3%

Source	Time of estimation	Type of estimation approach	Specifications	Estimated misalignment of RMB
Subramania 2010	2005	Extended PPP		15%
	2005	Extended PPP		26%
	2005	Extended PPP		37%
	2005	Extended PPP		47%
Tenengauzer 2010	2010	MB	external balance	10%
Wang & Hui 2010	2000	MB	FEER, external balance	17,50%
Wang 2004	2003	Extended PPP	BEER, REER	5%
	2003	MB	FEER, REER	-5% - 5%