



An OLG model of global imbalances

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ABSTRACT

In this paper, we investigate the relationship between East Asian countries' high propensity to save and global imbalances in a two-country OLG model with production. The saving behavior of emerging economies and capital outflows to the United States can be attributed to their poor pay-as-you-go systems. The model predicts that emerging countries run a trade surplus only as long as the long-run growth rate of the economy is higher than the real interest rate (capital overaccumulation case). The low real interest rate in the US is therefore evidence in favor of the hypothesis that there is a "global saving glut" in the world economy. The model can explain why the US current account deteriorated gradually and only in the late 1990s, although the net foreign asset position had already turned negative in the early 1980s. Finally, the analysis also implies that an improvement of the pay-as-you-go system in China would have the effect of reducing the imbalances. In accordance with the theory, we find that the higher is the percentage of the working population covered by the pay-as-you-go system the lower are savings and the current account balance in a cross-section of countries.

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1. Introduction

The trade imbalances between the United States and East Asian economies, or global imbalances, have attracted an unprecedented amount of attention from both economists and policy makers. The reasons are several. Firstly, the size of these imbalances is unprecedented as they involve one of the richest countries in the world and a large area of emerging, growing economies. Second, global imbalances are not a temporary phenomenon. Fig. D.1 shows the steady deterioration of the United States' current account deficit since the late 1990s. The recent adjustment has involved trade with Europe and oil-producing countries, but not other emerging economies. In particular, the US deficit towards China, which mirrors very closely the Chinese surplus, did not shrink with the recession.

One of the most common views on global imbalances is the "global saving glut hypothesis", due to Bernanke (2005). The core of the argument is that the high saving rates in East Asia have created an excess of savings in the world economy, which has resulted in capital flows towards the US and low real interest rates. Bernanke (2005) also stressed that the understanding of global imbalances requires a "global perspective" and that they do not "primarily reflect economic policies and other economic developments within the United States itself". In other words, current account imbalances must be thought of as an equilibrium phenomenon.

In this paper, we provide a general equilibrium framework to discuss the global saving glut hypothesis and therefore investigate the relationship between emerging countries' high propensity to save and global imbalances. Our setup is a two-country OLG model with production along the lines of Diamond (1965). The Diamond model is a natural framework to deal with questions related to the presence of excess savings in an economy. The model admits the possibility that, in a perfectly competitive economy, there is capital overaccumulation. Therefore, the concept of "excess savings" has a precise meaning in the OLG model, as it corresponds to the notion of dynamic inefficiency. The advantage of this approach is that we can ask with clarity the question of whether it is true that a global saving glut have led to global imbalances.

Before tackling the issue of excess savings, the first question that we need to answer is why East Asian countries' saving rates are higher than the United States'. Fig. D.2 depicts the saving rates of the US and a few East Asian countries over the last 30 years. An interesting – and crucial, to us – aspect of the data is that while global imbalances emerged in the late 1990s, that East Asian countries save more than the United States is certainly not a new fact. This divergence in the countries' saving rates is structural as it can be observed in the data long before global imbalances emerged.

Our explanation behind this fact is that pay-as-you-go social security systems are very poor in East Asian countries as compared to the United States. Officially, many East Asian countries have schemes which are classified as pay-as-you-go. However, the percentage of the working population actually covered by such schemes is much lower than in the US. Table 1 reports the wide difference between the US coverage

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Table 1
Pay-as-you-go systems' coverage.

	Coverage % labor force	Coverage % working population
United States	92.2	71.4
East Asian countries	44.1	31.3
China	33.5	27.7

Notes: See Appendix E for data definitions and sources.

rate and that of East Asian countries that are reported to have a pay-as-you-go scheme.¹

To capture the heterogeneity in the coverage of the pay-as-you-go systems, we study a two-country OLG model with production in which one country has a pay-as-you-go system while the other does not.² Cross-sectional evidence supports the idea that countries with pay-as-you-go systems tend to have lower saving rates, especially the more extensive is the coverage (Samwick, 2000). Yet, the implications for global imbalances of the fact that East Asian countries save more to finance old age consumption because of their poor pay-as-you-go systems are still unexplored. One of the contributions of this paper is to fill this gap in the literature.

In Sections 2 and 3, we present the model and characterize the direction of capital flows and trade at and outside steady states. First, we show that the emerging country always lends to the developed country, as the young of the former country save relatively more in the absence of the pay-as-you-go system.³ Yet, the pattern of trade in the consumption good does depend on the long-run efficiency of the world economy. We prove that the direction of trade depends on how the population growth rate compares with the interest rate, and this is also the case outside steady states. The emerging country runs a trade surplus only as long as the world economy is beyond the golden rule level of capital (capital overaccumulation). Otherwise, the emerging country runs a trade deficit despite the fact that it is the lender country. Only in the coincidental case of the golden rule, trade happens to be balanced.

The main implication of these results is that we would not observe the current pattern of trade if there was not an excess of savings in the world economy. In this sense, this paper provides a formal argument in favor of the “global saving glut hypothesis”. Caballero et al. (2008) argue that the saving glut story can be interpreted within their framework, by allowing for different saving rates across countries. However, as saving rates are exogenous, a higher saving rate in East Asia does not imply that these countries save too much. In this paper, a global excess of savings can arise endogenously, as a long-term consequence of the financial integration between the United States and countries whose saving rate is higher due to their poor pay-as-you-go-system. Differently from Caballero et al. (2008), the OLG structure allows us to relate the amount of savings in the economy to the golden rule benchmark.

Another interesting aspect of the trade balance result is that the developed country runs a trade deficit in the capital overaccumulation case because aggregate consumption is higher than in the other country. The reason is that there is sufficient growth in the economy to compensate interest payments to the emerging country. It is often claimed that global imbalances are due to the fact that emerging countries are consuming too little. This model shows that this is nothing but equilibrium behavior.

¹ The fact that the Chinese coverage rate is extremely low is also documented in Asher et al. (2005). Peter Diamond was one of the leading economists who participated at this study on social security reforms in China. See also Boersch and Finke (2008), OECD (2011) and Song and Tao Yang (2010).

² In reality, neither the US coverage rate is 100% nor the Chinese coverage rate is 0%. Such simplification is only adopted to avoid heavy notation.

³ Geide-Stevenson (1998) found a similar result in a two-country Diamond model in which the pay-as-you-go tax is proportional rather than lump-sum. Her analysis is limited to steady states, in this paper we also study the dynamics of capital flows and trade imbalances.

Our findings are related to two seminal papers of Gale (1971), Gale (1974). Gale made the important point that countries can run permanent trade imbalances in general equilibrium models. His intuition was that this is especially possible in OLG economies. Gale had discovered that the sign of the balance of trade depends on efficiency properties in a Solow model with heterogeneous agents and in a pure exchange OLG economy with inside money. The paper is also related to Polemarchakis and Salto (2002), who found that trade is balanced at the golden rule in a pure exchange OLG economy with outside money. The seminal paper on international capital mobility in a Diamond setting is Buiter (1981), in which countries are heterogeneous in the discount factors.

In Section 4, we study the dynamics of capital flows and global imbalances for plausible initial conditions of the autarkic economies. It turns out that the model is able to account for the dynamics and the timing of global imbalances, as well as the dynamics of real interest rates and net foreign asset positions. First, the model can rationalize the fact that the US current account and real interest rates deteriorated gradually (Figs. D.1 and D.7). Second, the model can explain why the accumulation of net foreign liabilities started in the early 1980s (Fig. D.6), well before the emergence of global imbalances.⁴

The model provides intuitive explanations for these facts. Because of their higher saving rates, emerging countries started to lend abroad soon after they opened to trade with the US. The decline of real interest rates can be read as a consequence of capital accumulation in the world economy (Fig. D.7). Global imbalances arose as soon as interest rates fell below the long-run growth rate, implying that the world economy is saving too much.

We also ask whether it is plausible that the world economy is experiencing a saving glut. According to the model, this requires that the long-run growth rate of the world economy is higher than the real interest rate. We find evidence of this in the data. This is hardly surprising, since US real interest rates have hit a historic low in the past decade.

Finally, we provide empirical evidence to support the predictions of the model. In a cross-section of countries, we find a statistically significant negative association between the coverage rate of pay-as-you-go systems and the saving rate, consistently with earlier work of Samwick (2000). In this paper, we also document the fact that a higher coverage rate is associated with a lower current account balance.

This paper is mainly related to the body of literature which puts emphasis on differences in institutions as the main determinant of global imbalances, e.g. Caballero et al. (2008), Mendoza et al. (2009) and Angeletos and Panousi (2011). The focus of these papers is on financial markets' different stages of development, and yet the sense of our analysis is similar as the type of pension system enforced in a country affects saving and investment possibilities. Caballero et al. (2008) explain global imbalances as the result of a negative shock to emerging countries' level of financial development, while our view is that global imbalances arose as the outcome of the financial integration between the US and emerging economies. In this respect, this paper is closer to Mendoza et al. (2009) and Angeletos and Panousi (2011).

Differently from the above papers, this paper contributes to the debate on whether and how the imbalances should be addressed from a policy point of view. While there is widespread agreement that global imbalances must be reduced, this is advocated on the basis of a variety of arguments.⁵ In Mendoza et al. (2009) and Angeletos and Panousi (2011), global imbalances are a temporary phenomenon, meant to disappear in the long-run. In Caballero et al. (2008), global imbalances are a benign aspect of the world economy. In an OLG economy, the presence of excess savings means that there is room for policy interventions. It is often claimed that East Asian countries should introduce policies to boost domestic demand, in view of correcting the imbalances. If we accept that the world economy is overaccumulating capital, long-term

⁴ See Section 4 for a comparison with the literature on these stylized facts.

⁵ See a recent collection of papers written by central bankers on the topic (Global Imbalances and Financial Stability, 2011).

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