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The Endogenous Finance of Global Dollar-Based Financial Fragility in the 2000s: A Minskian Approach*

Junji Tokunaga** and Gerald Epstein***

Abstract

Global financing patterns have been at the center of debates on the global financial crisis in recent years. The global imbalance view, a prominent hypothesis, attributes the financial crisis to excess saving over investment in emerging market countries which have run current account surplus since the end of the 1990s. The excess saving flowed into advanced countries running current account deficits, particularly the U.S., thus depressing long-term interest rates and fuelling a credit boom there in the 2000s. According to this view, the financial crisis was triggered by an external and exogenous shock that resulted from excess saving in emerging market countries, not the shadow banking system in advanced countries which was the epicenter of the financial crisis. Instead, we argue that a key cause of the global financial crisis was the dynamic expansion of balance sheets at large complex financial institutions (LCFIs)(Borio and Disyatat [2011] and Shin [2012]), driven by the endogenously elastic finance of global dollar funding in the global shadow banking system. The endogenously elastic finance of the global dollar contributed to the buildup of global financial fragility that led to the global financial crisis. Importantly, the supreme position of U.S. dollar as debt-financing currency, underpinned by the dominant role of the dollar in the development of new financial innovations and instruments, and was a driving force in this endogenously dynamic and ultimately destructive process.

JEL Codes: E12, F39, G15

Keywords: Endogenous money, financial fragility hypothesis, large complex financial institutions (LCFIs), shadow banking system, U.S. dollar

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1. Introduction

In the wake of the global financial crisis, many economists and policymakers have drawn attention to the role of global financing patterns as a key factor contributing to the global financial crisis. A prominent hypothesis is the global imbalances view, which focuses on the growing imbalance in world current account position since the end of 1990s. While emerging market countries, particularly in emerging Asian and oil-exporting countries, have run account surpluses, some advanced countries, such as the U.S., have expanded current account deficits.

This “global imbalances” view attributes the global financial crisis to an excess of saving over investment, mirroring current account surplus, in emerging market countries. The excess saving flowed into advanced countries, particularly the U.S., thus depressing long-term interest rates and fuelling a credit boom there. According to this view, the global financial crisis was triggered by an external and exogenous shock.

Recently, some mainstream economists and policymakers suggest that net capital flows, which mirror the global imbalances, are much less important than gross capital flows (inflow plus outflow), which entail global financial instability in the 2000s. The vast majority of gross capital flows were intermediated by a handful of large complex financial institutions (LCFIs) in the U.S. and Europe, which rapidly expanded their balance sheets in the global shadow banking system in the 2000s before the financial crisis. Therefore, it is important to analyze how LCFIs actively expanded their balance sheets in the 2000s, in order to understand the buildup of global financial fragility that led to the global financial crisis.

Minsky explains in the financial fragility hypothesis that financial institutions, particularly banks, play a critical role in the endogenous transformation of the financial system from robustness to fragility that leads to financial crises in a closed economy. In this regard, Minsky’s framework would have obvious applications to understand the buildup of global financial fragility that led to the financial crisis in the 2000s.

But little discussed, either in Minsky’s work or in the literature on gross versus net financial flows in the build up to the Great Financial Crisis, is the central role that the US dollar played in underpinning the explosion of global credit flows that ultimately contributed to the financial melt-down of 2008. This paper discusses how the endogenous finance of the global dollar in the global shadow banking system contributed to the buildup of global financial fragility that led to the global financial crisis in the 2000s, by extending Minsky’s approach in a closed economy into global context.¹

Moreover, we identify some important implications for understanding the essential nature of the global financial crisis, in comparison with the arguments of the global imbalance view. Firstly, the global financial crisis must be regarded as an outcome of the endogenously dynamic process of balance sheet expansion at LCFIs,

¹ Epstein [1989] explains the contradictions of the accumulation of U.S. external debt since the 1980s: It becomes a source of Miskian financial instability in global financial system, whereas playing a role of effective demand in the world economy.

driven by the endogenous finance of the global dollar in the global shadow banking system. Secondly, the dominant position of U.S. dollar as debt-financing currency, which is underpinned by the supreme role of the dollar in the development of new financial innovations and instruments, was a driving force in the endogenously dynamic process.

The rest of the paper is organized as follows. Section 2 draws attention to the expansion of gross capital flows in the 2000s, most of which were LCFI-intermediated. Section 3 briefly discusses the characteristics of Minsky's financial fragility hypothesis in order to support the arguments that follow. Section 4 analyzes how the endogenous finance of the global dollar system led to the expansion of balance sheets at LCFIs in the global shadow banking system in the 2000s. Section 5 demonstrates how the dominant position of U.S. dollar in the global shadow banking system supported the growth of the endogenous finance of the global dollar in the 2000s. Section 6 explains why the endogenous finance of global dollar flows in the global shadow banking system became highly elastic during 2004-07, leading up to the buildup of global financial fragility. The final section suggests some important implications of these dynamics for understanding the nature of the global financial crisis, in comparison with the arguments of the global imbalance view.

2. Global financing pattern in the 2000s

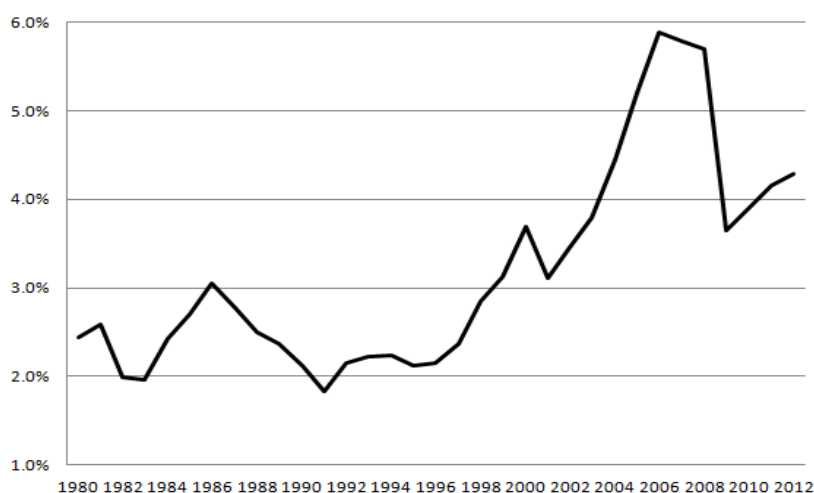
2.1 The growth of global imbalances

In the wake of the global financial crisis, many economists and policymakers have drawn attention to the role of global capital flows as a key factor contributing to the global financial crisis. A prominent view is the global imbalances hypothesis, which focuses on the growing imbalance in world current account position. Since the end of the 1990s, emerging market countries, predominantly in emerging Asian and oil-exporting countries, had run account surpluses, while some advanced countries, such as the U.S., had expanded current account deficits. A growing imbalance in world current account positions emerged in which emerging market countries were consistent providers of net capital flows, and the U.S. was a primary net consistent recipient. **Figure 1** demonstrates the absolute value of net capital flows, which mirrors the imbalances in world current accounts, as a percentage of world GDP since the 1980s. A sustained increase in net flows started in the second half of the 1990s, particularly the 2000s, and peaked to around 6.0 percent in 2006 before the start of the financial crisis.

The global imbalances view attributes the global financial crisis to a substantial excess of savings over investment in emerging market countries that mirrors their

current account surplus.² According to this view, these “excess savings” flowed into advanced countries that ran current account deficits, particularly the U.S., thus depressing long-term interest rates and fuelling the credit boom there. Accordingly, this global imbalances view conjectures that the main macroeconomic cause of the global financial crisis is an external and exogenous shock that resulted from excess savings in emerging market countries, not the shadow banking system in advanced countries that was the epicenter of the financial crisis.

Figure 1: Net capital flows (ratio of world GDP)



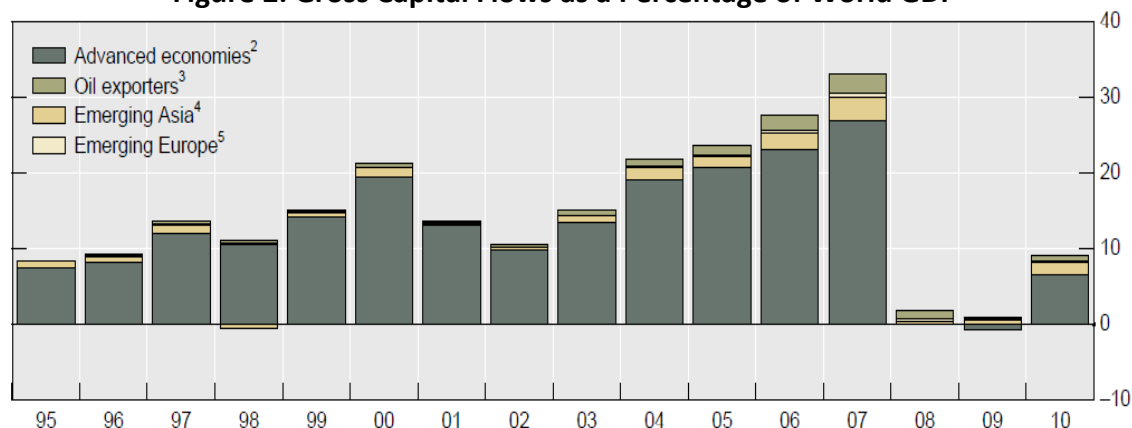
Source: IMF, World Economic Outlook database.

2.2 The expansion of gross capital flows

Recently, some mainstream economists and policymakers suggest that net capital flows, which mirrors the global imbalance, are much less important than gross capital flows (inflows and outflows) for understanding global financial instability in the 2000s, as emphasized by Borio and Disyatat [2011], Dorrucchi and McKay [2011], Obstd [2012] and Shin [2012]. **Figure 2** plots gross capital flows as a percentage of world GDP since the last half of the 1990s. Gross capital flows, most of which consist of flows among advanced economies, rose from about 10 percent in 2002 to over 30 percent in 2007 prior to the financial crisis, and collapsed during the financial crisis, while net capital flows increased from 3.1% in 2001 to 5.9% in 2007, as shown in **Figure 1**.

² Bernake [2005], the most prominent proponent of this view, refers to this phenomenon of excess savings as the emergence of the “global saving glut”. The global saving glut consists of excess domestic savings over investments in emerging Asian countries, oil-exporting countries and some advanced countries.

Figure 2: Gross Capital Flows as a Percentage of World GDP



Note 1: Gross flows equals sum of inflows and outflows of direct, portfolio and other investments.

Note 2: Australia, Canada, Denmark, the euro area, Japan, New Zealand, Sweden, the United Kingdom and the United States.

Note 3: Algeria, Angola, Azerbaijan, Bahrain, Democratic Republic of Congo, Ecuador, Equatorial Guinea, Gabon, Iran, Kazakhstan, Kuwait, Libya, Nigeria, Norway, Oman, Qatar, Russia, Saudi Arabia, Sudan, Syrian Arabic Republic, Trinidad and Tobago, the United Arab Emirates, Venezuela and Yemen.

Note 4: China, Chinese Taipei, India, Indonesia, Korea, Malaysia, the Philippines, Singapore, Thailand and the 20 smaller Asian countries.

Note 5: Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia.

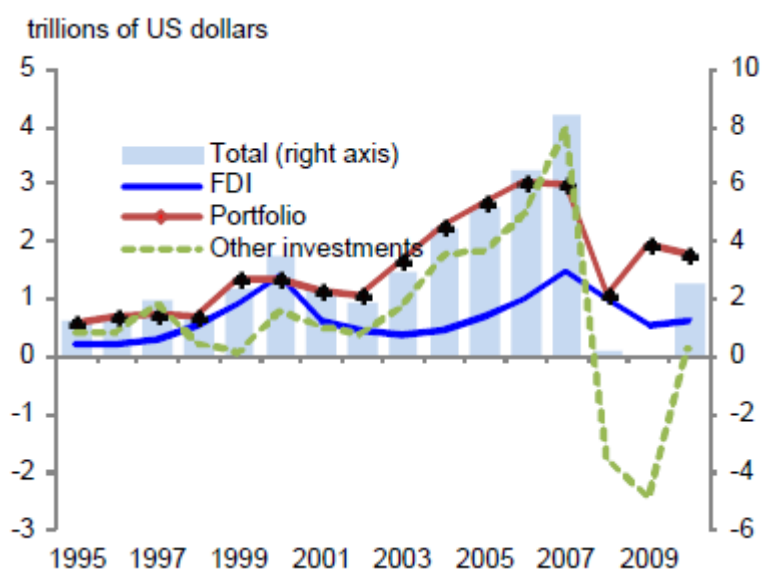
Source: Taken from Borio and Disyatat [2011], p.14.

Remarkably, gross debt-financing flows have driven the expansion of gross capital flows. **Figure 3** demonstrates the composition of gross capital inflows among advanced countries. Portfolio and other investment flows, which mainly reflect banking flows, were extremely volatile in comparison with foreign direct investment (FDI) and equity investment.³ Thus, it appears from the observations of global financing patterns presented in this section that gross capital flows, particularly gross debt-financing flows, were likely more important than net capital inflows that the global imbalances view draw attention to understanding the global financial crisis in the 2000s.⁴

³ IMF [2011a], p.32.

⁴ The U.S. played a central role in the expansion of gross capital flows. Mainstream economists and policymakers argue that the U.S. has been playing the role of “global financial intermediary” in gross capital flows since the latter 1990s. Gourinchas and Rey [2005] point out that the role of the U.S. changes from a ‘world banker’ to a ‘venture capitalist of the world’ since the 1990s. As Milesi-Ferreti, Strobbe, and Tamirisa [2010] analyze, U.S. gross capital inflows and outflows expanded vis-à-vis the euro area and offshore financial centers (OFCs) such as the U.K. and Caribbean offshore financial centers (pp.15-16).

**Figure 3: Composition of Gross Capital Inflows to Advanced Economies
(Trillions of U.S. dollars)**



Source: Taken from IMF [2011a], p.34.

The majority of gross capital flows were conducted by a handful of large, complex financial institutions (LCFIs) at the center of the global financial system.⁵ The process of financial deregulation and consolidations among financial conglomerates spurred a growing convergence between the activities of the banks and the other financial institutions since the 1990s. The development led to the emergence of LCFIs in the U.S. and Europe, which dominate the global financial markets for debt and equity securities, syndicated loans, securitizations, structured-finance products and OTC derivatives.⁶

Our analysis will suggest how gross capital flows had expanded in the 2000s, emphasizing the key role of the US dollar, as LCFIs increased their balance sheet on a global scale before the financial crisis in the following sections. But first we discuss Minsky’s financial fragility hypothesis which provides some important components of a framework for understanding this evolution.

⁵ IMF [2010b], p.8.

⁶ Wilmarth [2009], pp.994-95. By 2007, sixteen large complex financial institutions (LCFIs)—including the four largest U.S. banks (Bank of America, Chase, Citigroup and Wachovia), the five largest U.S. securities firms (Bear Stearns, Goldman, Lehman, Merrill and Morgan Stanley), and seven major foreign universal banks (Credit Suisse, Deutsche, Barclays, RBS, HSBC, BNP Paribas and Societe Generale) collectively dominate the global financial system (Wilmarth [2009], p.994). In addition, FSB [2011] identifies an initial group of “Systemically Important Financial Institutions” (SIFIs), namely 29 global systemically important banks (G-SIBs).

3. Minsky's financial fragility hypothesis

3.1 Endogenous finance

Since the global financial crisis, Minsky's financial fragility hypothesis has attracted a good deal of attention. Minsky's financial fragility hypothesis argues that financial institutions, particularly banks, play a critical role in the endogenous transformation of financial system as a whole from robustness to fragility that can lead to a financial crisis in a closed economy. In this respect, Minsky's framework would have obvious applications for understanding the global financial crisis in the 2000s.⁷ In what follows, we briefly discuss the characteristics of Minsky's financial fragility hypothesis in a closed economy, particularly the endogeneity of money, in order to help us frame the arguments that follow.⁸

Minsky primarily explains how nonfinancial corporations increase credit demand from banks in a closed economy, as the relationship between cash flows and liabilities changes. Minsky suggests three corporate balance sheet postures —hedge finance, speculative finance, and Ponzi finance—which lead to endogenous transformation from financial robustness to fragility (Minsky [1986/2008], pp.230-238). Firstly, hedge finance occurs when corporations expect that cash flow from their operations exceed their cash commitments. In this posture, corporations do not need to borrow cash commitments, due to the robustness of their balance sheets. Secondly, speculative finance occurs when cash flows from corporate operations would be enough to enable corporations to pay interest, even if its cash flow does not exceed its principal balance. Normally, this posture would lead corporations to borrow cash commitments in order to pay principal itself. Finally, Ponzi finance occurs when cash flows from corporate operations are not enough to pay principal and interest. Corporations involved in this posture would need to borrow cash commitments for repaying both principal and interest, resulting in significant debt accumulation. Thus, nonfinancial corporations increase credit demands from banks, as the deterioration of their balance sheets transforms them from hedge finance to speculative or Ponzi finance units. In response, banks accommodate credit demand from nonfinancial corporations, resulting in money supply growth in the financial system.

In short, the money supply is endogenously determined, not exogenously controlled by central bank such as the Federal Reserve (Minsky[1982], p.106; Minsky [1986/2008], pp.252-253).

⁷ Kindleberger [1978] and Wray [2006] extend Minsky's financial instability hypothesis in a closed economy into global context.

⁸ There exist many studies that summarize the characteristics of Minsky's financial fragility hypothesis in a closed economy. We here explain the characteristics of the hypothesis, based on Dymiski and Pollin [1992].

3.2 Endogenously elastic finance in an unregulated banking system

Importantly, banks, the central financial institution of the capitalist economy, not only passively accommodate credit demand from nonfinancial corporations, but also actively expand their balance sheets for maximizing their profits (Minsky [1986/2008], pp.256-257). In doing so, they develop asset and liability management (ALM) strategies by changing the composition of assets and liabilities (Minsky [1986/2008], pp.354). The pursuit of the ALM strategy might accelerate banks' tendencies to depend increasingly on short-term financing—that is, the endogenous finance of money—that enables them to increase leverage, leading to the expansion of their balance sheets.

In turn, the motivation to increase short-term financing encourages banks to develop new financial innovations and instruments that enable them to further increase short-term borrowing at relatively low-cost. "Profits made by banks increase as bankers discover ways of increasing the return on their assets or decreasing the cost of their liabilities. To do this, banks innovate by introducing new ways of financing business and raising funds: new instruments, new types of contracts, and new instruments regularly emerge in a financial system made up of profit-seeking units" (Minsky [1986/2008], p.81).

The development of new financial innovations and instruments facilitate the emergence of a liberalized and unregulated banking activity that is not channeled through the commercial and regulated banking system.⁹ Banks promote the creation of a number of different types of private money alternatives to insured deposits in liberalized and unregulated banking systems. "As banking innovation accelerated in the 1960's and 1970's, it became apparent that there are a number of different types of money, and the nature of the relevant money changes as institutions evolve." (Minsky [1986/2008], p.252) Specifically, Minsky refers to the development of certificates of deposits (CD), repurchase agreements (repos), and Eurodollar market borrowing as typical financial innovations and instruments (Minsky [1986/2008], pp. 82-87). The development of a number of different types of private money drives the endogenous supply of money to become more elastic in unregulated banking systems compared with the regulated banking system, owing to the increase in velocity of money (Minsky [1975/2008], p.120; Minsky [1982], p.141).

In short, banks develop new financial innovations and instruments that drive the endogenous finance of money to become more elastic in unregulated banking systems than in regulated banking, as banks aggressively pursue ALM strategies for maximizing profits.

3.3 Endogenously highly elastic finance during euphoric economy

Minsky argues that the secular success in financial markets, the persistent absence of serious financial difficulties, and the improvement of expectations would lead to the

⁹ Minsky labeled the liberalized and unregulated banking system as the "second banking system" (Minsky [1982], pp.141-142).

advent of a euphoric economy, “in which increasing short-term financing of long positions becomes a normal way of life” (Minsky [1986/2008], p.237). The euphoric economy would encourage banks to develop further new financial innovations and instruments that allow them to continue rapidly expanding their balance sheets (Minsky [1986/2008], p.281).

What needs to be emphasized is that the development of new financial innovations and instruments drives banks to issue more private short-term alternative instruments to insured deposits. The tendency toward more issuance of private money in unregulated banking systems leads the endogenous finance of money to become highly elastic during the euphoric economy in the sense that it further increases the velocity of money. During the euphoric economy, banks increasingly come to rely on collateralized short-term borrowing in the unregulated banking system, rather than borrowing based on cash-flows in the regulated banking system. Collateralized-based borrowing is more volatile than loans based on the value of the cash flows that are expected from income-earning operations in the commercial banking system, in that the viability of collateralized short-term borrowing depends on the expected market value of the pledged collateral assets (Minsky [1986/2008], pp.260-261). This dynamic process of the endogenously highly elastic finance of money allows banks to pursue excessive leverage and risk-taking for the purchase of long-term assets, resulting in the rapid expansion of their balance sheets.¹⁰ Thus, the euphoric economy encourages banks to expand rapidly their balance sheet, depending on the endogenously highly elastic finance of money.

Importantly, this dynamic process leads the financial system as a whole to become fragile. This is because it entails greater vulnerability to drastic changes in expected market values of collateral assets, supported by euphoric expectations and the underestimation of risk. As mentioned above, Minsky stresses that financial fragility, which is prerequisite for financial instability and financial crisis, is inherent in internal market processes in liberalized and unregulated banking systems (Minsky [1986/2008], p.280).

To summarize the characteristics of Minsky’s financial fragility hypothesis in a closed economy, the following points are worth noting.

Firstly, banks not only passively accommodate credit demand from nonfinancial corporations, but also actively expand their balance sheets for maximizing their profits under the pursuit of ALM.

Secondly, the expansion of balance sheets results in a greater reliance on creating a number of different types of private money—that is, the endogenous finance of money—in the liberalized and unregulated banking system, rather than in the traditional and regulated banking system.

¹⁰ According to Minsky, the endogenously highly elastic finance overwhelms the ability of the monetary authorities to pursue a tighter monetary policy during these euphoric episodes. “Under these circumstances (the euphoria-authors addition), a central bank will see its restriction of the rate of the money supply or the reserve base overwhelmed by the willingness of consumers, business firms, and financial institutions to decrease cash balances: increases in velocity overcome restrictions in quantity.” (Minsky [1982], p.141).

Thirdly, the euphoric economy encourages banks to rapidly expand their balance sheets by depending on the endogenously highly elastic finance of money in the unregulated banking system.

Finally, this dynamic process of balance sheet expansion at the banks drives the endogenous finance of money in the unregulated banking system and leads the financial system as a whole to become fragile. This is because it entails greater vulnerability to drastic changes in the expected market value of collateral assets, underpinned by euphoric expectations and the underestimation of risk.

We will extend these points to the global context of the 2000s in the following sections.

4. The endogenous finance of global dollar in the global shadow banking system

4.1 Financial intermediation through shadow banking system

We can apply these Minskian lessons to help us understand the role that LCFIs played in contributing to the financial crisis. By doing so, we extend the Minskian story to the open economy.

LCFIs engaged in global asset and liability management (ALM) strategies through actively raising and channeling funds both within and across borders.¹¹ Specifically, LCFIs followed a similar global ALM strategy based on an “originate to distribute” (OTD) model, in which financial intermediation is, largely, channeled into the liberalized and unregulated banking system, not into the traditional and regulated banking system. The new funding system was dubbed the “parallel banking system” by D’Arista and Schlesinger, (1994) but is now more commonly referred to as the “shadow banking system,” and is much less regulated than the traditional banking system. Key participants in the former are investment banks (that is, dealer banks), off-balance sheet vehicles, money market mutual funds (MMFs), and ABSs issuers, etc., while key participants in the latter are commercial banks, savings and loan associations(S&I) and credit unions. The size of the shadow banking system in the U.S. had steadily increased since the 1990s, and it actually surpassed traditional banking system in the years before the recent financial crisis.¹²

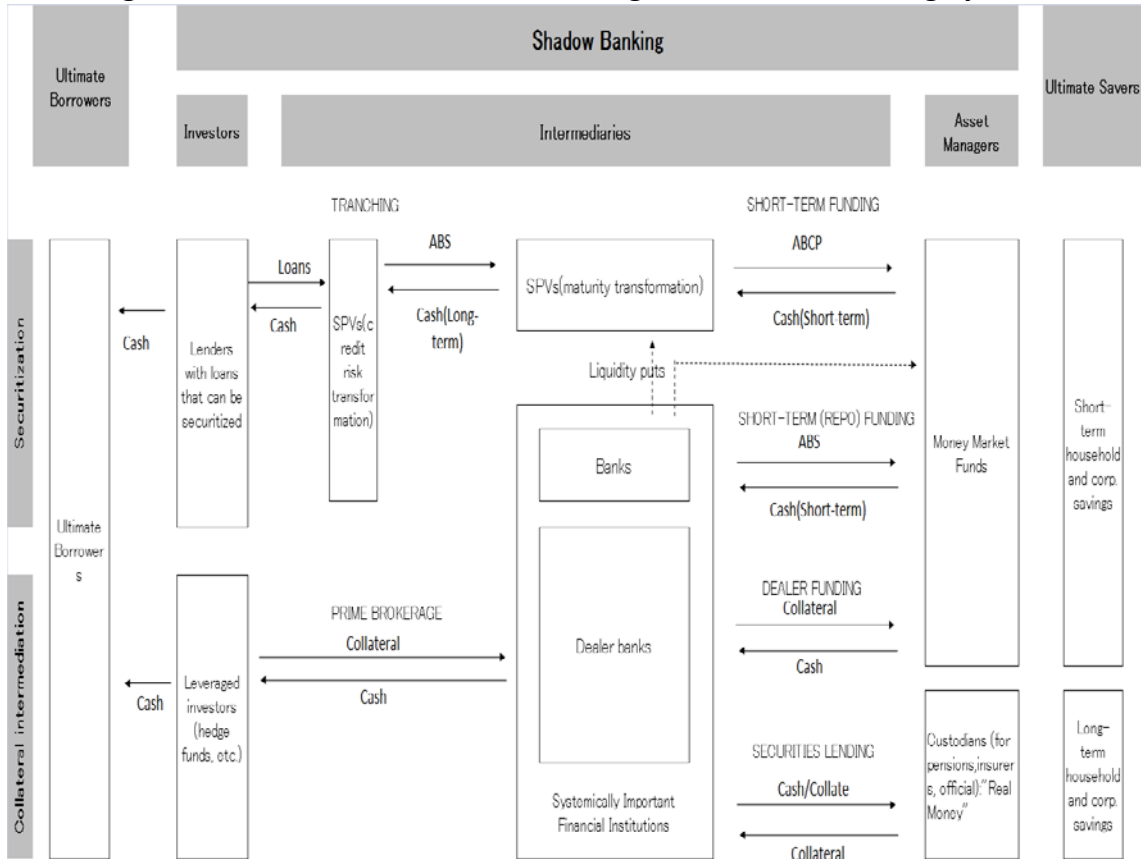
Claessens et al. [2012] point out two functions of the shadow banking system that are most important economically to those of the traditional banking system:

¹¹ IMF [2010b], p.8.

¹² Ponzar et al. [2010/2012] explain that the size of shadow banking liabilities in the U.S. had steadily increased since the 1990s in the U.S. The Financial Crisis Inquiry Commission [2011] argues that shadow banking system actually surpassed the traditional banking system in the U.S. in the years before the recent financial crisis. However, while measures of shadow banking differ considerably, the system is large and continues to grow (Claessens et al. [2012], p.18).

securitization and collateral intermediation. Financial intermediation through the shadow banking system is represented in **Figure 4**.

Figure 4: Financial Intermediation through the Shadow Banking System



Note: ABS=asset-backed securities; ABCP=asset-backed commercial paper.

Source: Reproduced from Claessens et al. [2012], p.20.

On the one hand, securitization is a process that, through tranching, repackages cash flows from underlying loans and creates both long-term and short-term assets that, in theory, are perceived as safe by market participants. This process is conducted, largely, through off-balance sheet vehicles such as special purpose vehicles (SPVs), structured investment vehicles (SIVs), and conduits which are used by LCFIs for securitization. Claessens et al. [2012] explains that the securitization process is divided into three transformations: credit risk transformation, maturity transformation, and liquidity transformation. The first step, credit risk transformation, is the tranching of cash flows from the underlying assets into a safe long-term “AAA”-rated (asset-backed securities, for example) mezzanine and equity bonds. The second step is maturity transformation, in which the long-term AAA security is sold to a vehicle funded in short-term wholesale money markets. The third step is liquidity transformation which is to make the safe, short-term and liquid instrument (asset-backed commercial paper

and repos etc., for example) through liquidity puts and by having money market funds holding the assets issue stable net asset value (NAV) claims to the ultimate savers.¹³

As illustrated in **Figure 4**, the securitization process to issue both long-term and short-term assets meets two demands. Firstly, this securitization function caters to the demand from banks and dealer banks that use long-term “AAA” assets as collateral for short-term borrowing in the wholesale market. Secondly, the securitization function responds to the demand for safe, short-term and liquid assets from institutional cash pools, which consist of large cash balances held by global non-financial corporations and asset managers. Asset managers do not only invest long-term, but also have a large demand for safe, short-term, liquid instruments.¹⁴ This institutional demand for safe, short-term, liquid instruments (that is, money) results in the development of “reverse maturity transformation that refers to the transformation of long-term savings into short-term savings. The reverse maturity transformation, in turn, gives rise to large, centrally managed cash pools—institutional cash pools.”¹⁵ Thus, institutional cash pools increasingly invest their large cash balances for safe, short-term and liquid assets created by LCFIs in the shadow banking system.

On the other hand, another important function of the shadow banking system is credit intermediation that supports a wide range of financial transactions, as illustrated in **Figure 4**. This involves the supply of primary collateral and the re-use of collateral, making the shadow banking system collateral-intensive. Asset managers also act as the ultimate source of collateral in the shadow banking system. They can be subdivided into two main groups: levered investors (hedge funds) and unlevered (or real money) investors (exchange traded funds, sovereign wealth funds, central banks, pension funds, insurance companies and mutual funds).¹⁶ Banks and dealer banks obtain collateral assets from asset managers through various means.

As Ponzar and Singh [2011] stress, in this nexus of asset managers and banks, collateral assets accumulate on large banks’ and dealer banks’ central collateral desks where they can be re-used to meet various demands, including demands from secured funding, securities lending, and hedging.¹⁷ In particular, the repo market is the most important in terms of secured funding, which represented the fastest growing component of the short-term wholesale funding in the 2000s prior to the global financial crisis. Repo is collateralized and secured funding, where the borrower pledges securities as collateral to the lender. Since repo transactions are collateralized, repo rates are lower than unsecured interbank rates.¹⁸ U.S. Treasury bonds, Agency bonds, and corporate bonds had been used as collateral for the repo market in the U.S until the mid - 1990s. Furthermore, a broad range of private debt instruments has been also used for collateral for repos: all types of private-label MBSs, all types of ABSs, and

¹³ Claessens et al. [2012], p.7.

¹⁴ Ponzar and Singh [2011], p.4.

¹⁵ Ponzar and Singh [2011], p.7.

¹⁶ Ponzar and Singh [2011], p.9.

¹⁷ Ponzar and Singh [2011] show an example that demonstrates how a single of collateral can underpin various financial transactions. (p.11)

¹⁸ Schinasi, et al. [2001], p.23.

tranches of structured products in the U.S. since last half of the 1990s.¹⁹ Large banks and dealer banks used long-term “AAA” assets, which were obtained from asset managers through various means, as collateral for short-term borrowings in the repo market.

So far, we have seen how financial intermediation through the shadow banking system develops, as LCFIs pursue global ALM strategies based on an “originate to distribute” (OTD) model. The key differences of mode in financial intermediation between the traditional and the shadow banking system are as below. Firstly, the development of securitization makes the chain of financial intermediation in the shadow banking sector much longer and more complex than in traditional banking system.²⁰ In the traditional banking system, financial intermediation, typically done by commercial banks, refers to the maturity transformation of short-term deposits from ultimate lenders into long-term loans toward ultimate borrowers on a single balance sheet.²¹ The long and multi-linked chain of financial intermediation in the shadow banking system results in further balance sheet expansion at LCFIs than in the traditional banking system, on the ground that it involved many categories of financial intermediaries and various financial transactions. Secondly, the collateral intermediation serves various supporting financial transactions, especially short-term financing in repo market. The development of short-term financing in the shadow banking system facilitates the endogenous finance of money to become more elastic, rather than the commercial and regulated banking system, in sense that it increases the velocity of money.

4.2 Development of global shadow banking system

As the LCFIs pursued global ALM strategies, financial intermediation through the shadow banking system was involved across borders. There is a lack of comprehensive data on cross-border transactions in the shadow banking system, although it is essential for understanding the global financial crisis. We here try to get rough picture of the global shadow banking system in the 2000s by gathering as much data and descriptions about it as possible.

On the asset side, LCFIs purchased safe, long-term “AAA” assets which are issued, largely, in the U.K. and Caribbean offshore markets, both on-balance and off-balance sheet. In more than half of all cases of ABS issuance, the ultimate parent company sponsoring the SPVs issuing the ABS was located in either the Cayman Islands or the U.K.²²

¹⁹ Acharya and Oucou [2011], p.330.

²⁰ Adrian and Shin [2010] explain that the development of the market-based financial system transferred the mode of financial intermediation from short-chain, as done in the traditional banking system, to long-chain intermediation (pp.1-5). And, Claessens et al. [2012] describe that in securitization the risks are transferred by a chain of multiple balance sheets and various sources of capital and puts, while banks transform risks on a single balance sheet in the traditional banking system (p.8).

²¹ Claessens et al. [2012], p.8.

²² ECB [2011], pp.50-51.

On the side of liabilities, LCFIs depended on short-term borrowings both offshore and onshore for purchasing long-term (“AAA”) assets. In particular, European banks came to rely heavily on short-term borrowings, of which the U.S.’ Money Market Mutual Fund (MMMF) was a key provider in the run-up to the financial crisis.²³ In fact, about half (50.5%) of the U.S.’ prime MMMF holdings of European bank paper (banks CDs, CP, repos, other) amounted to total Europe, and around one third (29.8%) was the euro area as of June, 2007.²⁴

Also, U.S. dealer banks increased their borrowing from hedge funds and other nonbanks in the U.K. and Caribbean financial centers from 2004 to mid-2007, as can be seen in the following quotations from Survey Current Business by U.S. Bureau of Economic Analysis (BEA):

“Liabilities of U.S. securities brokers (dealer banks: authors) increased \$172.1 billion in 2004, following an increase of \$165.3 billion in 2003. Sizable borrowing by U.S. brokers from foreign nonbanks reflected an increase in repurchase activity, in large part with international mutual funds and hedge funds in the Caribbean.” (Bach [2005], p.43)

“Liabilities of U.S. securities brokers increased \$32.7 billion in 2006, compared with an increase of \$13.0 billion in 2005. The increase was largely in the form of repurchase agreements with nonbanks in the United Kingdom.” (Bach [2007], p.42)

“Liabilities reported by U.S. banks and securities brokers increased \$510.9 billion in 2007, up from an increase of \$434.4 billion in 2006...Much of the increase resulted from borrowing in the first half of the year when U.S. securities brokers borrowed heavily through repurchase agreements.” (Bach [2008], p.44)

These quotations clearly show that U.S. dealer banks relied extensively on short-term funding through the globally integrated repo market before the financial crisis.²⁵

Overall, LCFIs borrowed short-term funds, in part, from the U.S., and then lent part of it back to invest in private long-term “AAA” assets in U.S., which can be called “round-tripping” transactions, as shown by He and McCauley [2012] and as explained

²³ As Baba et al [2009] point out, European banks appear to have relied on money market funds for about an eighth of their \$8 trillion in dollar funding in mid-2008 (p.67). Additionally, European banks relied on the foreign exchange swap market to fund dollars against European currencies, as well as borrowings from U.S. money market mutual funds, other commercial banks, and foreign central banks (McGuire and Peter [2009])

²⁴ IMF [2011a], pp.6-7.

²⁵ According to Palan et al [2010], the wholesale financial markets have been operating more or less globally integrated financial system since the 1960’s (p.20).

by Shin [2012].²⁶ These cross-border round-tripping transactions resulted in the expansion of balance sheets at LCFIs in the global shadow banking system.

In short, LCFIs expanded their balance sheets, depending on the endogenous finance of the global dollar in the global shadow banking system in the 2000s, as financial intermediation through the shadow banking system was involved across borders.

5. The dominant position of the U.S. dollar in the global shadow banking system

5.1 Currency asymmetry in U.S. dollar standard

The U.S., a nation that has a supreme international currency, enjoys an “exorbitant privilege” to finance a balance-of-payments deficit in its national currency, the U.S. dollar. The U.S. is only country whose external liabilities are denominated in largely its own currency, while other countries have to typically repay their liabilities denominated in mostly foreign currency. This currency asymmetry allows the U.S. to run its balance-of-payments deficits as “deficits without tears”²⁷.

In the Bretton Woods system, the U.S. would convert the dollars into gold at \$35 per ounce, while other developed nations such as Western Europe and Japan were required to fix the value of their national currencies against the dollar within plus or minus 1% of parity by intervening in their foreign exchange markets. On August 15th, 1971, President Nixon formally announced that the U.S. would no longer automatically convert gold to foreign central banks for dollars. As a consequence, foreign central banks in other advanced countries continued to hold the dollar instead of gold, whereas the U.S. has refused to repay its external debt by gold or foreign currency since the Nixon shock. The demise of the Bretton Woods system transferred the global currency system into a single-currency-based system, i.e. the U.S. dollar standard system. Currency asymmetry in the U.S. dollar standard system allows the U.S. to enjoy a kind of soft-budget constraint, and this external condition softens the U.S.’ domestic policy discipline.²⁸

Recently, some heterodox economists (Costabile [2010] [2011] and Bibow [2010]) explain how the currency asymmetry in U.S. dollar standard system basically resulted in the growing of global imbalance, leading up to the global financial crisis in the 2000s. Other countries have run current account surpluses and accumulated dollar-denominated assets in the U.S. in the 2000s. This dollar inflow back to the U.S., a

²⁶ He and McCauley [2012] and Shin [2012] show that European banks had played a critical role in the “round-tripping” transactions before the financial crisis.

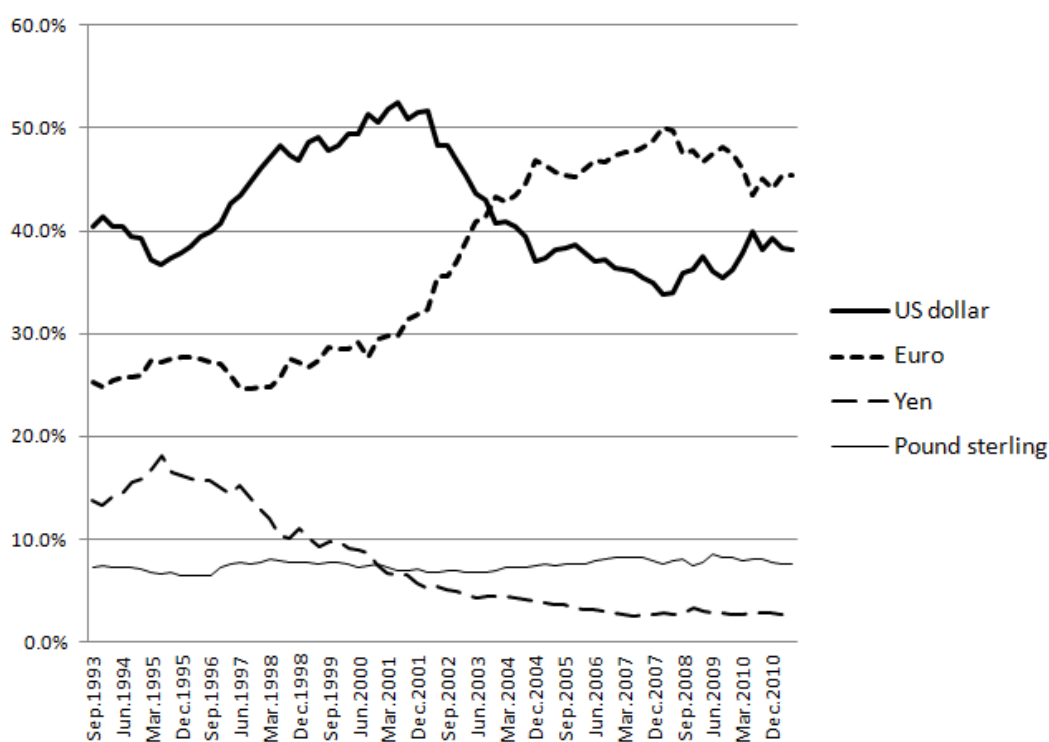
²⁷ Rueff [1972], p.192.

²⁸ Gang [2006], p .96.

supreme international currency country, facilitated the debt economy, which acted as the proximate cause of the financial crisis.²⁹

However, little attention has been paid to the fact that this currency asymmetry had declined since the last half of the 1980s, because the currency denomination in the international private debt-financing markets has become more diversified. In general, the currency denomination in international debt-financing market depends on the size, openness, and liquidity of the currency's financial markets and the stability of its currency.³⁰ It is certain that the accumulation of U.S. external debt, together with restrictive monetary policy by U.S. FRB in the beginning of the 1980s, undermined the dollar's stability. The development of liberalization and deregulation in advanced countries increased the attractiveness of debt-financing denominated in other advanced currencies, such as the Deutsche mark and the Japanese yen since the second half of the 1980s. In addition, with the creation of the euro in 1999, the dollar has its first potential rival for the status as the primary international currency since WWII.

Figure 5: International Debt securities by Currency of Issue



Note: These figures (the "global" measure) include both domestic and international debt securities.
Source: BIS Locational banking statistics.

Indeed, the dominance of the dollar in international debt-financing markets has declined, although the growth of debt issuance within European countries, including internal markets of the euro area, has been associated with a declining dollar share in

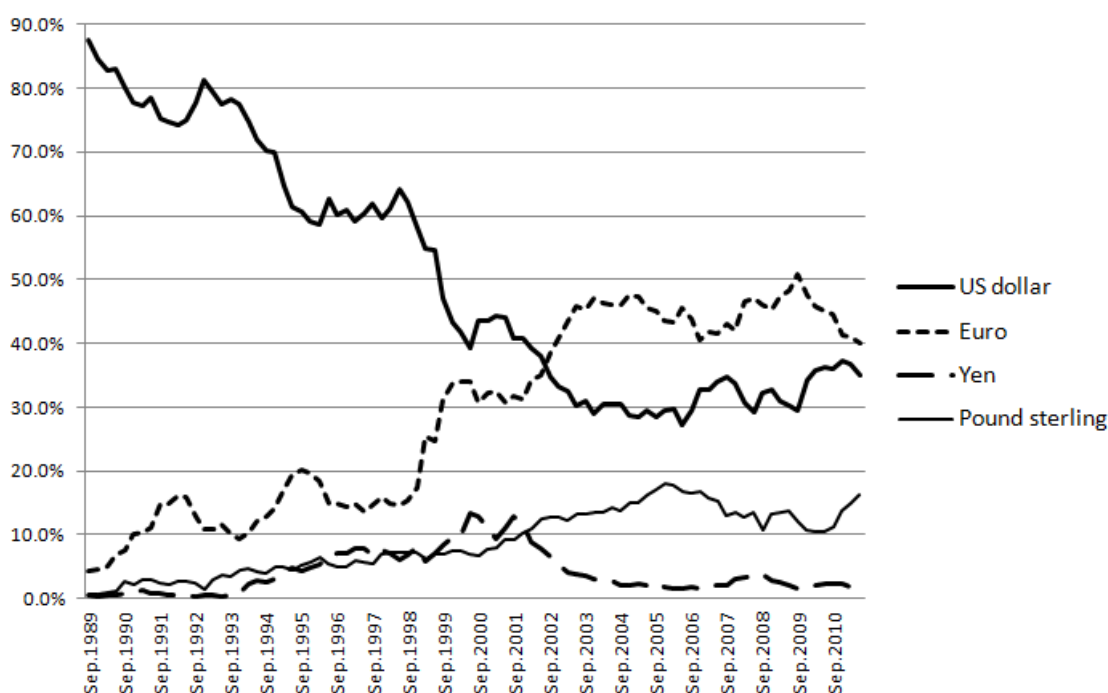
²⁹ Costabile [2010], p. 15.

³⁰ Pollard [2001], p.24.

all debt securities. **Figure 5** shows international debt securities by currency of issue. The percent of the dollar fell from 50.6% in December 2000 to 37.0 % in December 2004, while the euro rose from 29.5% to 46.8%, and the yen from 7.5% to 4.0%,. The sterling, in turn, fell slightly from 7.5% to 7.4%, respectively.

The decline of the role of the dollar is even more dramatic when one looks at the currency composition of international money market instruments as illustrated in **Figure 6**. The dollar fell from 84.4% in December 1989 to 28.7 % in December 2004, the euro rose from 4.6% to 47.5%, the yen from 0.4% to 2.1%, and the sterling from 0.7% to 15.1%, respectively.

Figure 6: International Money Market Instruments by Currency of Issue



Note: These figures (the "global" measure) include both domestic and international debt securities.

Source: BIS Locational banking statistics.

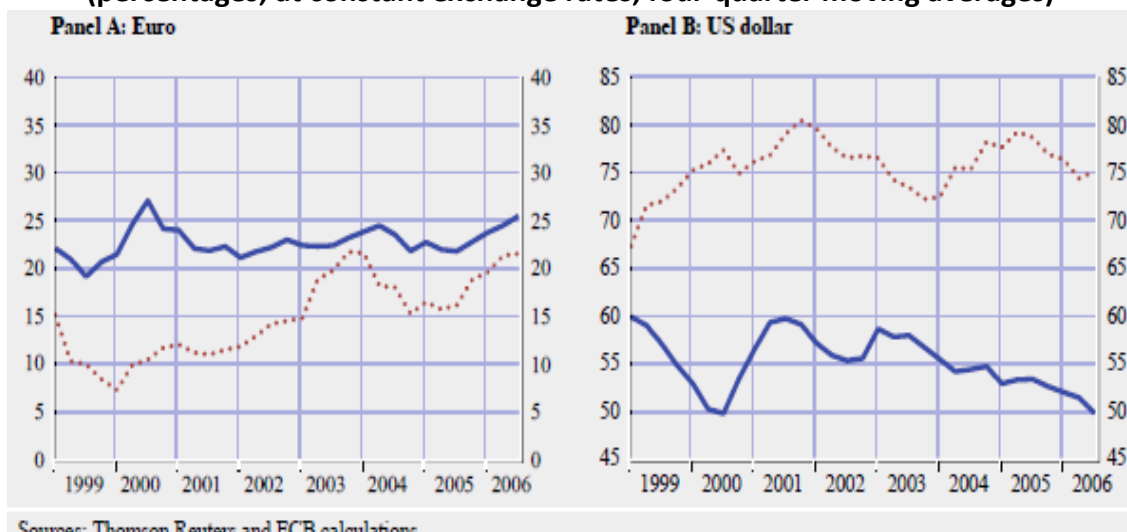
The decline in currency asymmetry in global financial markets, reflecting the declining role of the dollar as a debt-financing currency, might have had a depressive effect on the endogenous finance of global dollars in the 2000s. Paradoxically, the question which we have to consider here is why, instead, the endogenous finance of the global dollar expanded in the 2000s prior to the global financial crisis, despite the persistent decline in currency asymmetry since the second half of the 1980's. We will discuss this question in detail in the next subsection.

5.2 The supreme position of the U.S. dollar in new financial innovations and instruments

Importantly, the supreme position of U.S. dollar in new financial innovations and instruments contributed to halting the declining trend of the dollar as a debt-financing currency and reversed the falling role of the dollar in the 2000s.

First of all, an unprecedented increase in U.S. dollar-denominated ABS issuance contributed to the revival of the dollar as a debt-financing currency in the 2000s. Currency shares in ABS and non-convertible bond issuance is provided in **Figure 7**. The share of U.S. dollar in ABS issuance rose from around 65 percent in 1999 to 75-80 percent on the eve of the financial crisis (as shown in Panel B), while the share of euro increased gradually from around 15% to in 1999 to about 20 percent, respectively (as demonstrated in Panel A).

Figure 7: Currency shares in ABS and non-convertible bond issuance (percentages; at constant exchange rates; four-quarter moving averages)



Sources: Thomson Reuters and ECB calculations.

Source: Taken from ECB [2011], p.52. Red lines are ABS (asset backed Securities); Blue lines are non-convertible bonds.

ECB [2011] explains some factors underlying the decision on the currency denomination of ABS issuance as follows: Firstly, the origin of the underlying collateral, as well as investors' preferences, seems to be an important factor in the decision on the currency denomination of ABS issuance. In fact, substantial amounts of collateral are located in the U.S. Secondly, the development of new financial innovations and instruments plays an important role in influencing a currency's prominence in global financial markets. In particular, the securitization function can transform risky, long-term loans (subprime mortgage in the U.S., for example) into seemingly credit-risk free, dollar-denominated long-term debt securities such as ABS.

In addition, the dominant position of the dollar in credit default swaps (CDSs) is thought to support the prominence of U.S. dollar-denominated ABS issues. A CDS is a

swap contract in which the buyer of the CDS protection makes a series of payments to the seller of it, and receives a payoff if a credit instrument goes into default. CDSs function as a hedging credit risk associated with the underlying assets. LCFIs bought large amounts of CDSs on ABS and CDO written by insurance companies.³¹ **Table 1** demonstrates currency breakdown of credit derivatives from May 1 to July, 2010. While the percent of the dollar in total transactions amounted to 63%, its share reached 57% in total notional size.

Table 1: Currency breakdown of credit derivatives (from May 1 to July, 2010)

	Number of total transactions	%	Notional (USD billion equivalents)	%
U.S.dollar	182,921	63	3,670	57
Euro	102,010	35	2,740	42
Other	7,472	3	68	1
Total	292,403	100	6,480	100

Note: Reproduced from Chen, Fleming, Jackson, and Sarkar [2011], p. 7.

Secondly, the rapid growth of U.S. dollar-denominated safe, short-term and liquid assets facilitated the revival of the dollar as debt-financing currency in the 2000s.

Table 2 reports total asset-backed commercial paper (ABCP) outstanding by the location of the sponsor and the funding currency as of January 2007. In total, \$714 billion out of \$969 billion, or 73.7 percent, was issued in the dollar. Notably, most European banks financed their off-balance vehicles by issuing ABCP denominated in dollars rather than in euro.

³¹ IMF [2011a] presents a case study that global systemically important financial institutions (G-SIFIs) bought large amounts of credit default swaps (CDSs) on largely subprime mortgage collateralized debt obligations (CDOs) written by AIG Financial Products (AIGFP), which was a London branch of a French incorporated subsidiary (pp.8-13).

Table 2: ABCP outstanding by the location of the sponsor and the funding currency (as of January 2007)

Sponsor Location	Funding Currency								Total	
	U.S.dollar		Euro		Yen		Other			
	\$million	Percent	\$million	Percent	\$million	Percent	\$million	Percent	\$million	Percent
Belgium	30,473	86.6%	4,729	13.4%	0	0.0%	0	0.0%	35,202	100.0%
Denmark	1,796	100.0%	0	0.0%	0	0.0%	0	0.0%	1,796	100.0%
France	51,237	67.7%	23,670	31.3%	228	0.3%	557	0.7%	75,692	100.0%
Germany	139,068	68.0%	62,885	30.7%	0	0.0%	2,566	1.3%	204,519	100.0%
Italy	1,365	100.0%	0	0.0%	0	0.0%	0	0.0%	1,365	100.0%
Japan	18,107	44.4%	0	0.0%	22,713	55.6%	0	0.0%	40,820	100.0%
Netherlands	56,790	45.2%	65,859	52.4%	0	0.0%	3,116	2.5%	125,765	100.0%
Sweden	1,719	100.0%	0	0.0%	0	0.0%	0	0.0%	1,719	100.0%
Switzerland	13,082	100.0%	0	0.0%	0	0.0%	0	0.0%	13,082	100.0%
United Kingdom	92,842	58.6%	62,298	39.3%	0	0.0%	3,209	2.0%	158,349	100.0%
United States	302,054	99.0%	0	0.0%	0	0.0%	2,996	1.0%	305,050	100.0%
Total	714,871	73.7%	219,441	22.6%	22,941	2.4%	12,444	1.3%	969,697	100.0%

Note: The analysis is based on Moody's rating reports as of 1/1/2007. The data are restricted to ABCP sponsored by commercial banks.

Source: Reproduced from Acharya and Schnabl [2010], p.55.

Also, there are no official data on the currency denomination in the repo market, which is at the center of the globally integrated wholesale funding process. **Table 3** presents liabilities and equity of the domestic economy and amounts held by rest of world as of June 2007. Foreign holdings of Treasuries bonds made up the largest percentage of the amount outstanding (45%), the share of Agency bonds, corporate bonds (non asset-backed), and corporate ABS+ABCP (asset-backed commercial paper) reached 21%, 25%, and 22%, respectively, which were a higher share than total foreign holdings (13%). U.S. treasuries have played the role of “universally accepted collateral,” that is, the asset most widely accepted as collateral in repo markets.³² Taking the higher share of foreigners holding U.S. private debt securities into account, a broad range of private debt instruments, whose underlying assets are located in the U.S., has been also used for “universally accepted collateral” in the global repo market in the 2000s. It is, therefore, likely that the dollar has played the dominant role as collateral assets in the global repo market.

³² Schinasi et al. [2001], pp.4-5.

Table 3: Liabilities and equity held by rest of world (as of June 2007, \$ billions)

	Total	Held by ROW	ROW share of total
Total liabilities and equity	122,098	15,264	13%
of which			
Credit market instruments	44,419	6,942	16%
Treasury securities	4,904	2,194	45%
Agency- and GSE-backed sec.	6,784	1,413	21%
Corporate & municipal credit securities (non asset-backed)	8,236	2,045	25%
Corporate ABS + ABCP	4,565	990	22%
Other credit market instruments	19,929	300	2%
Checkable, time & savings deposits plus currency	8,757	605	7%
Corporate equities and fund shares	27,768	3,130	11%
Other	41,154	4,587	11%

Source: Reproduced from Beltran, Pounder, and Thomas [2008], p.24.

In summary, most of both long-term (ABS) and short-term debt instruments (ABCP and repos) created by LCFIs in the global shadow banking system were denominated in U.S. dollars. This resulted in the revival of the dollar as a debt-financing currency in the 2000s, despite the persistent decline in currency asymmetry since the second half of the 1980's. Importantly, the revival of the dollar as a debt-financing currency underpinned by the dominant role of U.S. dollar in new financial innovation and instruments, supported the endogenous finance of the global dollar in the 2000s.

6. The buildup of global financial fragility in the euphoric economy

6.1 The changes of financial conditions in the euphoric economy

As demonstrated in **Figure 2**, gross capital flows expanded rapidly from 2004 to 2007 in the run-up to the global financial crisis. The rapid expansion of gross capital flows reflected, in part, the overstretched nature of balance sheets at LCFIs, which was attributed to changes in both the credit demand-side (i.e., ultimate borrower) and the credit supply-side (i.e., ultimate lender) in the global shadow banking system during the period; these led to both the U.S. housing bubble and global safe assets shortage. We here discuss how these changes of financial condition influenced the balance sheets of LCFIs.

First of all, the U.S. housing bubble led LCFIs to hold "excess capacity" in their balance sheet. The U.S. economy had been experiencing a housing bubble since the beginning of the 2000s. Then the U.S. experienced a euphoric economy from 2004 to 2006, in that housing prices had rapidly surged during this period. The euphoric economy, characterized by an underestimation of market risk and credit risk, also led

to the rise in the value of collateral assets.³³ As Adrian and Shin [2010] point out, the rising values of collateral assets encouraged LCFIs to hold the excess capacity in their balance sheets. In response to the excess capacity, LCFIs actively adjusted their balance sheets in order to expand the overall size of their balance sheets. On the liabilities side, the rising values of collateral assets such as ABS and CDO allowed LCFIs to take on more short-term dollar financing in wholesale funding market, such as repos, thus leading to the further increase in leverage and risk-taking. On the asset side, LCFIs purchased long-term “AAA” assets whose underlying assets were located in the U.S. housing market, especially the subprime mortgage market, which were previously shut out of the credit market but drastically expanded during the euphoric economy from 2004 to 2006.³⁴ As a result, balance sheets at LCFIs became overstretched during the euphoric economy.³⁵

In turn, the deeper question is how LCFIs could attract short-term dollar financing that allowed them to overstretch their balance sheet. What is important here is that an enormous number of institutional cash pools played a critical role in the short-term dollar funding that expanded their balance sheets. As Ponzar [2011] points out, there was a virtually insatiable demand for dollar-denominated safe, short-term and liquid instruments from institutional cash pools, whose size had increased since the 1990s. The volume of institutional cash pools rose from \$100 billion in 1990 to over \$2.2 trillion at their peak in 2007.³⁶ The institutional cash pools sought to invest part of their abundant cash funds in alternative assets to insured deposits—that is, safe, short-term and liquid instruments, including short-term government guaranteed instruments and a broad range of privately-guaranteed instruments that were created in the shadow banking system.

Notably, there was an insufficient supply of short-term government-guaranteed instruments to serve as deposit alternatives, in comparison with the huge demand for dollar-denominated safe, short-term and liquid instruments from institutional cash pools. This shortage, which implies the excess demand for dollar-denominated safe, short-term and liquid assets, has been estimated to amount to \$1.1, \$1.6 and \$1.6 trillion in 2005, 2006 and 2007, respectively.³⁷ Thus, the global financial system experienced an imbalance between the global demand for dollar-denominated safe, short-term and liquid debt instruments and the limited supply of the assets—that is,

³³ IMF [2010c] points out that counterparty risks, credit risks of the new collateral, and an underestimation of market risks were all associated with the explosion of the collateralized short-term wholesale funding market (p.69).

³⁴ As Adrian and Shin [2010] note, models of risk and economic capital dictate active management of their overall value at risk (VaR) through adjustments of their balance sheets for financial intermediaries. Furthermore, Shin [2012] called the excess capacity in their balance sheet a “global banking glut”.

³⁵ Borio and Disyatat [2011] stress that the unsustainable expansion in credit and asset prices (“financial imbalances”) results from “overstretched balance sheets” that means too soft financial constraints on the private and official sector.

³⁶ Ponzar [2011], p.5.

³⁷ Ponzar [2011], pp.9-10.

the growing of the global safe assets shortage, as Caballero [2009] and Gourinchas [2011] stress.

In response to the excess demand for dollar-denominated safe, short-term and liquid assets, LCFIs endogenously created privately dollar-denominated money market instruments in the global shadow banking system. In other words, the creation of privately money market instruments indicates that LCFIs could elastically increase their short-term dollar financing—that is, the endogenously elastic finance of the global dollar—in the global shadow banking system.

Institutional cash pools rushed to invest some part of their cash in the holdings of privately money market instruments that were created by LCFIs in the global shadow banking system. In fact, during 2006-2008, the average institutional cash pool held about 20% of its portfolio in bank deposits; about 10% in short-term government-guaranteed instruments; and about 60% in short-term, privately-guaranteed instruments, which can further be split into 20% held in collateralized private money market instruments and nearly 40% in government-only and globally-diversified prime money market mutual funds.³⁸

In short, the changes in financial condition of both ultimate borrowers and ultimate lenders induced LCFIs to tend to overstretch their balance sheets during the euphoria economy, relying on an endogenously elastic finance of global dollars in the global shadow banking system.

6.2 The endogenously highly elastic finance of global dollars

Along with the development of the global shadow banking system, LCFIs opted to develop new financial innovations and instruments that enabled them to obtain cheaper short-term dollar financing in the global shadow banking system, in comparison with the global traditional banking system. This pushed LCFIs to depend on collateralized borrowing, such as repos, that has become a great source of short-term dollar funding for them. Thus, the development of the global shadow banking system drove the endogenous finance of global dollars to be more elastic in the 2000s.³⁹

The question we have to ask here is if the volume of short-term dollar financing by LCFIs in the global shadow banking system was much larger than the size of excess demand for dollar-denominated privately short-term instruments from institutional cash pools. For example, while the size of excess demand from the pools is estimated to be about \$1.6 trillion in 2007, secured funding operations reached \$10.0 trillion in 2007.⁴⁰ In order to accommodate the imbalance between credit supply and demand, LCFIs accelerated the supply of the global dollar to become more highly elastic.

³⁸ Ponzar [2011], pp.12-13.

³⁹ Borio and Disyatat [2011] point out that the international monetary system has the problem of “excess elasticity”: the system lacks sufficiently strong anchors to prevent the build-up of unsustainable booms in credit and asset prices that lead to financial crisis.

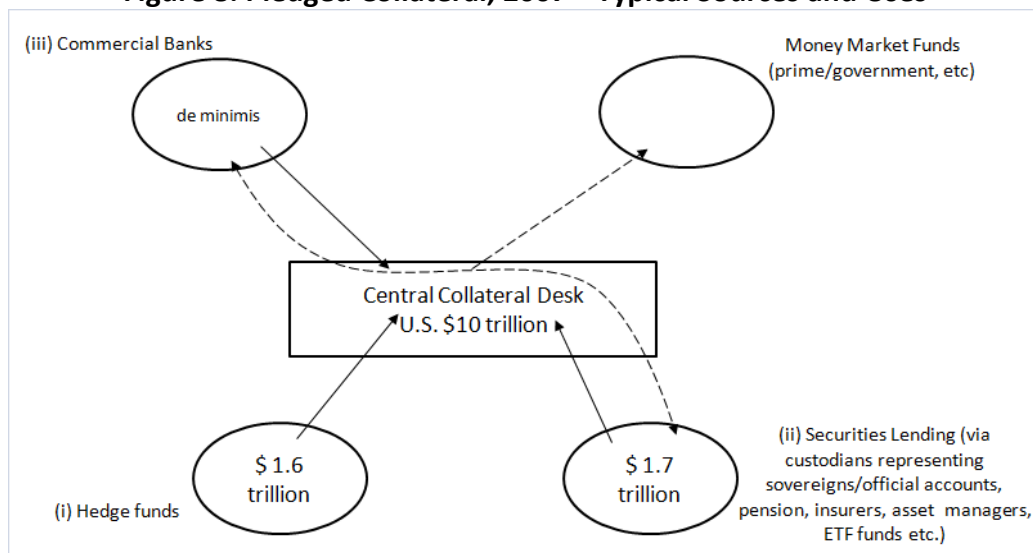
⁴⁰ Ponzar [2011], pp.9-10.

The development of new financial innovations and instruments has a critical role in the elastic finance of the global dollar supply during the euphoria economy. It can be presumed that the intensive re-use of scarce collateral (rehypothecation), as well as the rising values of collateral assets during the euphoria economy, allowed LCFIs to expand short-term dollar borrowing in the wholesale funding market as repos.

As **Figure 8** shows, the key providers of primary collateral to the large banks and dealers are hedge funds (\$1.6 trillion) and custodians on behalf of pensions, insurers, and official sector accounts (\$1.7 trillion). The supply of pledged collateral is typically received by the central collateral desk of the large banks and dealer banks that re-use the collateral. Aggregating across the largest U.S. and European banks (plus Nomura, Japan), the volume of source collateral that was re-pledged (or re-used) gives a total of about \$10 trillion at end-2007.⁴¹

Interestingly, Singh [2011] finds that the re-use of collateral allows this collateral to have ‘velocity’. Similar to the velocity of money, the velocity of collateral—is defined as the ratio between primary source collateral and total collateral received—can support multiple financial transactions in the global shadow banking system. Singh [2011] takes the total collateral received as of end-2007 (\$10 trillion) and compared to the primary sources of collateral (3.3 trillion = \$1.6 trillion + \$1.7 trillion), as appeared in **Figure 8**. Accordingly, the velocity of collateral = 3 (\$10 trillion / 3.3 trillion). Thus, the increase in velocity of collateral enabled LCFIs to accelerate, in part, the endogenously elastic finance of global dollars.⁴²

Figure 8: Pledged Collateral, 2007—Typical Sources and Uses



Note: Solid line indicates “suppliers”. Dashed line indicates “users”.

Source: Reproduced from Singh [2011], p.5.

⁴¹ Singh [2011], pp.13-14.

⁴² Borio and Disyatat [2011] explain that the current global financial system is excess elastic, in the sense that it can endogenously generate financing means. In addition, Dorrucchi and McKay [2011] stress that the present international monetary system (IMS) is highly flexible in nature compared with past systems, such as Bretton Woods’ fixed exchange rates.

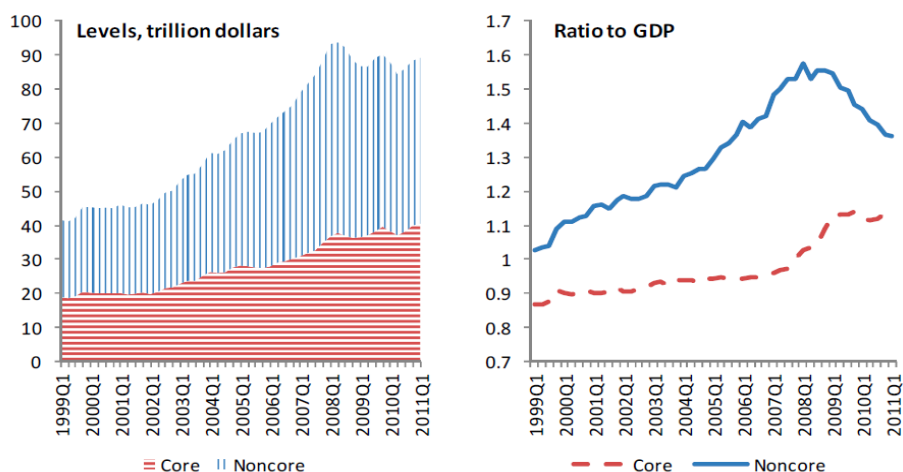
In conclusion, the intensive re-use of collateral, underpinned by the development of new financial innovations and instruments, helped LCFIs, in part, to facilitate the dollar to become highly elastic, leading to the dynamic balance sheet growth of LCFIs during the euphoric economy.

6.3 The buildup of global financial fragility

On the one hand, the dynamic process of balance sheet expansion at LCFIs, driven by the highly elastic finance of the global dollar, enhanced global financial intermediation by increasing global liquidity during the euphoric economy.

Since the 2000s, the development of the global shadow banking system has facilitated the rapid growth of the volume of credit funding that is not channeled through the traditional global banking system. This funding is defined as “noncore liabilities” in the shadow banking system, which is distinct from “core (deposit-based) liabilities” in the traditional banking system, as explained in Chen et al [2012]. **Figure 9** indicates that global liquidity development, which reflects the development of both the traditional (core) and shadow banking (non-core) system of the euro area, Japan, the U.K. and the U.S. since the end of 1990s. While the two components of global liquidity, which reflected the increase in both core and noncore liabilities, were roughly equal at the end of the 1990s, the non-core liabilities in the global shadow banking system had become more important thereafter.

Figure 9: Total G4 Liquidity in Trillion Dollars and As a Ratio to GDP



Sources: Haver and Fund Staff calculations.

Source: Taken from Chen et al. [2012], p.26.

On the other hand, it would be reasonable to conjecture that the dynamic process of balance sheet expansion at LCFIs contributed to the buildup of global financial fragility that led to the global financial crisis. Euphoric expectations, as well as underestimations of credit risk and market risks, from 2004 to mid-2007 allowed for the faster collateral expansion. This environment facilitated the global dollar expansion

that enabled LCFIs to pursue excessive leverage and risk-taking for purchasing long-term “AAA” assets, leading to the dynamic process of balance sheet growth at LCFIs during the euphoric economy.

It is important to emphasize that the endogenous highly-elastic finance of global dollar expansion entailed greater vulnerability to drastic changes in the market value of collateral assets and major adverse shocks, making LCFIs fragile in the face of value changes and shocks during the downturn. It turned out that a significant decline in collateral triggered a drastic contraction of balance sheets during the global financial crisis, when a drastic increase of market and credit risk was driven by the end of the euphoric economy.

In short, the dynamic process of balance sheet expansion at LCFIs in the global shadow banking system, driven by the endogenous highly elastic finance of global dollar during the euphoric economy, contributed to the buildup of the global financial fragility that led to the global financial crisis.

7. The nature of the global financial crisis

7.1 The endogenously dynamic process of balance sheet at LCFIs

In this section, we show how our approach is much better for understanding the nature of the global financial crisis than the arguments of the global imbalance view that many mainstream economists, policymakers, and even heterodox economists advocate.

Firstly, we argue that the global financial crisis was inherently caused by the dynamic process of balance sheet expansion at LCFIs, driven by the elastic growth of global dollar in the global shadow banking system. As discussed in Section 2, the global imbalances view attributes the emergence of global financial crisis to an excess of saving over investment in emerging market countries. According to that view, the financial crisis was triggered by an external and exogenous shock that resulted from excess saving in emerging market countries, not the shadow banking system in advanced countries which were epicenter of the financial crisis.⁴³ In this view, LCFIs have a negligible role in the global financial crisis in the 2000s.

Recall our discussion of the endogenously dynamic process of balance sheet expansion, which, driven by the endogenously elastic finance of global dollar supplies in the global shadow banking system, contributed to the buildup of global financial fragility that led to the global financial crisis. Accordingly, it is clear that the global financial crisis is strongly affected by the endogenous dynamics of balance sheet in the

⁴³ As Nesvetailova [2010] points out, mainstream economists tend not only to diagnose the root cause of the crisis as a behavioral problem of the market, fundamentally, human failure, but also to view the global financial crisis as an extraordinary moment in the smoothly functioning financial capitalism. Thus, financial instability hits the markets as an extraordinary, exogenous shock, according to mainstream economics. (pp.95-96).

global shadow banking system, rather than the emergence of excess savings in emerging market countries, as the global imbalances view stresses.

7.2 The dominant role of U.S. dollar as debt-financing currency

Secondly, the supreme position of U.S. dollar as debt-financing currency, underpinned by the dominant role of the dollar in the development of new financial innovations and instruments, was a driving force toward the buildup of global financial fragility that led to the global financial crisis.

As the global imbalances view points out, central banks in emerging Asian countries have resisted currency appreciation pressures through dollar-denominated foreign exchange reserve accumulation. Most of dollar reserve accumulation, which mirrors excess domestic savings in the region, was steered toward U.S. Treasuries and Agencies in the 2000s.⁴⁴ This clearly reflects the strong demand for the dollar-denominated assets as a good store of value, that is, reserve currency, for central banks in emerging market countries. In this story, it has been recognized that the dominant role of the U.S. dollar as reserve currency, a function of international currency in official use, was the driving force in the global financial crisis.

What needs to be emphasized in our discussion is that U.S. dollar recovered its dominant position as a debt-financing currency in the 2000s, despite the persistent decline in currency asymmetry since the second half of the 1980s. Most of both long-term and short-term debt instruments, which were underpinned by the development of new financial innovations and instruments in the shadow banking system, were denominated in the U.S. dollar, and contributed to the revival of the dollar as debt-financing currency. The revival of the dollar as debt-financing currency enabled LCFIs to accelerate the endogenous finance of global dollar to become highly elastic in the 2000s, in the sense that it eased the financial constraints of balance sheet in LCFIs. This easing led to the dynamic process of balance sheet expansion, contributing to the buildup of global financial fragility that led to the global financial crisis.

Therefore, it can be concluded that the dominant role of the dollar as a debt-financing currency, underpinned by the development of new financial innovations and instruments in the global shadow banking system, was also a driving force for the global financial crisis.

⁴⁴ China used its current account surpluses almost entirely for acquiring assets in the U.S., more than 80 percent of which consisted of U.S. Treasuries and Agencies from 2003 to 2007. (Bernanke et al [2011], p.6).

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