



The Revised U.S. Treasury Securities Standard System

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Abstract

Michael Hudson has suggested that the global financial system since the post-Bretton Woods system could be regarded as the 'US Treasury bill standard' system, in the sense that monetary authorities in developed countries were, effectively, forced to buy US Treasury securities in the 1970s. Analogous to his view, the global financial system in the 2000s, characterized by emerging Asian official ownership of US Treasuries, could be called by 'the revised US Treasury securities standard system'. The revised US Treasury securities standard system in the 2000s depends on not only foreign official demand for US Treasuries, but also, most importantly, a new type of market-driven demand for US Treasuries as 'the globally accepted collateral' in the unregulated shadow banking system. How are the official and private demands for US Treasuries fundamentally linked? In order to consider the question, the paper proposes the development of 'the US Treasury securities-repo market nexus' in the 2000s. The notion captures the role of US Treasury securities, whose market value and creditworthiness are sustained by emerging Asian official ownership, serving as the globally accepted collateral for creating new type of USD-denominated short-term liabilities, that is repo liabilities, to non-US residents. Importantly, the procyclical leverage during the US housing bubble intensified the market-driven demand for US Treasuries as globally accepted collateral, which induced large broker-dealers in the US and Europe, the center of the shadow banking system, to develop new financial instruments and financial innovations in the creation and intermediation of the globally accepted collateral. This development amplified the volatility in the issuance of USD-denominated repo liabilities by the broker-dealers vis-à-vis offshore financial centers (OFCs) such as the UK and the Caribbean, contributing to the explosion of USD-denominated financialization in the global context in the 2000s prior to the Global Financial Crisis (GFC). However, since the GFC, the lack of dynamics in the procyclical leverage led to the structural stagnation in USD-denominated financialization in the global context in the 2010s.

Keywords: Collateral asset, repo market, shadow banking system, US dollar, and US Treasury securities.

JEL codes: F30, G01 G15, G23.

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I. Introduction

The US Treasury securities market has been the deepest and most liquid government market for private investors and monetary authorities in the world. In fact, foreign ownership of US Treasuries has increasingly risen since the 1970s, especially in the 2000s. The rise of emerging Asian countries as major foreign official ownership of US Treasuries was attributed with the structural imbalances in current account across the Pacific in the 2000s. While emerging Asian countries had current account surpluses, the US had current account deficits. The imbalance in current account might have led to the appreciation of the currencies of the surplus countries in emerging Asia that did not want to place their domestic exporters at a competitive disadvantage in world trade. In response, monetary authorities in emerging Asian countries, particularly China, have intervened to absorb the surplus dollars, most of which were used to acquire US Treasuries in the 2000s.

The appetite for US Treasuries from foreign official investors were already highlighted in the 1970s. Monetary authorities in developed countries such as Western Europe and Japan had intervened to absorb the surplus dollars, most of which were forcibly steered toward official investments on US Treasury bonds in the 1970s. Based on this finding, Michael Hudson suggested that the global financial system since the post-Bretton Woods system could be regarded as the 'US Treasury bill standard' system. (Hudson (1972/2003); Hudson (1977/2005)) Analogous to his view, the global financial system in the 2000s, characterized by emerging Asian official ownership of US Treasuries, could be called by 'the revised US Treasury securities standard system'.

What is a new demand for US Treasuries in the revised US Treasury securities standard system in the 2000s? The revised US Treasury securities standard system in the 2000s depends on not only foreign official demand for US Treasuries, but also, most importantly, a new type of market-driven demand for US Treasuries as 'the globally accepted collateral' in the unregulated shadow banking system.

How are the official and private demands for US Treasuries fundamentally linked? In order to consider the question, the paper proposes the development of 'the US Treasury securities-repo market nexus' in the 2000s. The notion captures the role of US Treasury securities, whose market value and creditworthiness are sustained by emerging Asian official ownership, serving as the globally accepted collateral for creating new type of USD-denominated short-term liabilities, that is the repo liabilities, to non-US residents. The issuance of repo liabilities in the shadow banking system has more dynamic in credit expansion than the commercial banking system, although they do not serve as final

means of payment.

Importantly, the procyclical leverage during the US housing bubble intensified the market-driven demand for US Treasuries as the globally accepted collateral, which induced large broker-dealers in the US and Europe, the center of the shadow banking system, to develop new financial instruments and financial innovations in the creation and intermediation of the globally accepted collateral. This development amplified the volatility in the issuance of USD-denominated repo liabilities by the broker-dealers vis-à-vis offshore financial centers (OFCs) such as the UK and the Caribbean, contributing to the explosion of financialization in the global context in the 2000s.

Following the introduction, Section II overviews the US Treasury securities standard system in the 1970s. Section III describes the revised US Treasury securities standard system in the 2000s. Section IV analyzes the development of the US Treasury securities-repo market nexus in the 2000s. Section V discusses that the intensification in the market-driven demand for US Treasuries as the globally accepted collateral during the US housing bubble amplified the volatility in the issuance of repo liabilities by the broker-dealers vis-à-vis OFCs. Section VI explains the revised US Treasury securities standard system since the Global Financial Crisis (GFC) of 2007-09. And, the last section (Section VII) considers two questions: What is the difference between the revised US Treasury securities standard system in the 2000s and the past system in the 1970s? And, how does the revised US Treasury securities standard system change in the 2010s?

II. US Treasury securities standard system in the 1970s

In this section, we overview Hudson's US Treasury securities standard system in the 1970s. In doing so, it is necessary to go back to examine the external discipline of US balance-of-payments deficits before and after the demise of Bretton Woods (BW) system.

In the BW system, the US would convert the dollars into gold at \$35 per ounce with foreign monetary authorities, while major developed nations were required to fix the value of their national currencies against the dollar within plus or minus 1% of parity by intervening in foreign exchange markets. Under the fixed foreign exchange system, the US played a special role as an ultimate supplier or absorber of dollar reserves through its policy of converting gold with them. (Solomon (1982), 211) In the 1960s, while the US government pursued not only expansionary fiscal spending for social welfare at home to facilitate US import more, it increased its military overseas spending in relation to the Cold War in Southwestern Asia and elsewhere in the world. Along with the US official spending, US private sector, including US multinationals and US large banks, expanded their external investments and lendings toward Western Europe. The expansion of US domestic and external spending was accompanied with the deterioration in the US balance-of-payments deficits, by which advanced countries encountered the problem of the surplus dollars in the 1960s, not the shortage dollars in the 1950s. The pile of the surplus dollars not only could drive massive flows from the dollar to other major currencies that would finally be changed to gold with the US on a large scale. In order to prevent the rapid reduction of US gold holding, it was desirable for the US to adjust its balance-of-payments deficits soon or later. But the US balance-of-payments deficits had increasingly risen in the 1960s.

Instead, how did the US and other advanced countries cope with the surplus dollars in the 1960s? First, the US and other developed countries cooperated to enforce some measures and arrangements for defense of the US legal gold parity at \$35 an ounce. Second, foreign monetary authorities in developed countries---specifically the surplus countries of Western Europe and Japan---intervened to absorb the surplus dollars in foreign exchange markets. Most of the surplus dollars held by developed countries were used for purchasing US Treasury bonds, rather than exchanging them to gold with the US. Despite the measures and arrangements to handle the surplus dollars, the US balance-of-payments deficits deteriorated, and then the US gold holding decreased in the 1960s. Between 1958, when was the beginning of era of the surplus dollars, and 1971, the rise in official foreign liabilities was \$42 billion, and the loss of US gold reserves totaled \$12.6 billion. (Gilbert (1980), 125)

Finally, on August 15th, 1971, President Nixon formally announced that the US would no longer convert its gold to foreign monetary authorities for the surplus dollars, that is the Nixon Shock. By doing so, the US lacked, practically, the external discipline of its balance-of-payments deficits. Thereafter, major advanced countries shifted from fixed to floating exchange rate in 1973. In the 1970s, the US official encouraged the devaluation of the dollar, in order not only to reduce the value of foreign official holdings of dollar reserve, but also to restore US competitiveness in manufacturing sector. It was expected that the US 'benign neglect' policy for its balance-of-payments deficits would diminish the international role of the dollar as reserve currency.

In spite of the US benign neglect policy, the dominate role of the dollar as reserve currency had been maintained in the 1970s. Why? At that time, other developed countries faced two ways. First, they could keep their international competitiveness by preventing the appreciation of their own currencies to the dollar through purchasing the surplus dollars, which were likely to cause an expansion in domestic money supply that that would bring about inflation or asset bubble there. Second, they could accept appreciation of their own currency, which would hurt their international competitiveness. (Helleiner (1995), 112-13) Their main choice was the former. Specifically, foreign monetary authorities in Western Europe and Japan had continued to intervene countercyclically to absorb the surplus dollars, most of which were, effectively, steered for official investments on US Treasury bonds.¹ Michal Hudson suggested that the global financial system since the post-Bretton Woods system, characterized by foreign official ownership of US Treasuries, could be regarded as the 'US Treasury bill standard' system. (Hudson (1972/2003); Hudson (1977/2005)),

In summary, monetary authorities in developed countries intervened countercyclically to absorb the surplus dollars, which resulted from the US balance-of-payments deficits, in order to stabilize the value of dollar in cooperation with the US. US Treasuries acted here as "an exploitative financial device" (Hudson (1972/2003), xv) to suck up the surplus dollars held by developed countries. Therefore, it can be analyzed that the US Treasury securities as foreign exchange reserve in the 1970s functioned to absorb countercyclically the surplus dollars, contributing to sustain the US Treasury securities standard system in the 1970s.

¹ As a background, foreign official ownership of the US public debt had increased, and its share reached at a peak of more than 80 percent in total of foreign holding in the 1970s. (Brain Hager (2016), 117-8)

III. The revised US Treasury securities standard system in the 2000s

III.I Emerging Asian countries as major holders of US Treasury securities

In addition to foreign official investors, foreign private investors have also increased their holdings of US Treasury securities since the 1980s, and amounted to a peak in the second half of 1990s. But a reversal emerged in the 2000s, and foreign official holdings of US Treasuries reached a peak of \$570 billion in 2009, while foreign private ownership was -15 billion, respectively, as illustrated in **Figure 1**

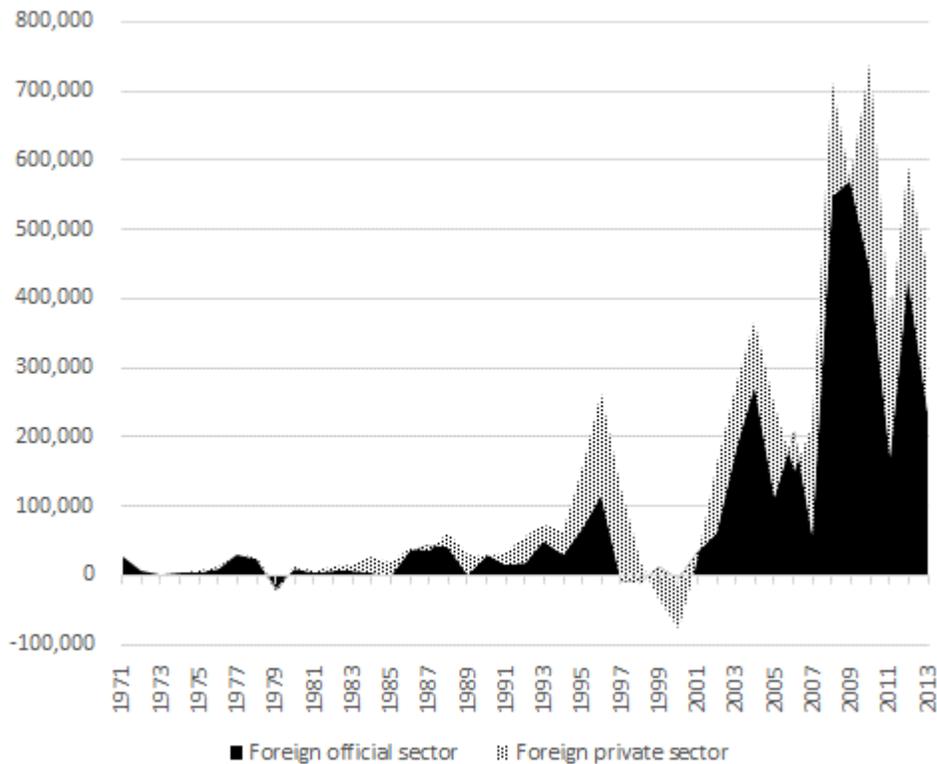


Figure 1 Foreign Official and Foreign Private Holdings of US Treasury Securities (millions of dollars)

Source: US Bureau of Economic Analysis.

Considering the importance of emerging Asian official holding of US Treasuries in the 2000s, Michael Hudson begins the second edition of *Super Imperialism* in 2002 as below:

“As of summer 2002 the US Treasury is pursuing the same strategy of “benign neglect” for its balance-of-payments deficits that I did thirty years ago...No one anticipated that America’s federal budget deficit during the 1990s would be financed by China, Japan and other Asian countries rather than by American taxpayers and domestic investors. Yet this international exploitation was implicit in the U.S. Treasury bill standard.” (Hudson (1972/2003), i, xii).

The emergence of emerging Asian countries as major foreign official investors toward US Treasuries was attributed with the structural increases of the imbalances in current account across the Pacific in the 2000s. While emerging Asian countries had current account surpluses, the US had current account deficits. The imbalance across the Pacific might lead to the appreciation of own currencies in the surplus countries in emerging Asia, which did not want to place their domestic exporters at a competitive disadvantage in world trade. In response, monetary authorities in emerging Asian countries have discretionarily intervened to absorb the surplus dollars, most of which were used for acquiring US Treasuries. As a result, China became a major investor of holding US Treasuries. At yearend of 2008, China surpassed Japan to become the largest holder of US Treasury securities with total holdings at \$807.5 billion, compared with \$668.9 billion held by Japan, the second-largest holder. (Nguyen (2009), 15) Hao (2016) calls the seemingly insatiable demand for US assets as “China’s addiction to US Treasuries”.

What is difference on foreign official ownerships of US Treasuries between major developed countries in the 1970s and emerging Asian countries in the 2000s? Although monetary authorities in developed nations such as Western Europe and Japan have no consensus on how the global financial system might be reformed or replaced since the BW system (Eichengreen (2008), 128), these countries have implicitly shared an understanding that they intervened jointly to absorb the surplus dollars in order to stabilize the value of dollar in cooperation with the US since the 1970s. For example, the US-led international cooperation in Group of five (G5) worked remarkably on the Plaza agreement in 1985 and the Louvre agreement in 1987. (Kindleberger (1978/2005), 273) On the contrary, monetary authorities in emerging Asian countries have intervened more discretionarily to absorb the surplus dollars, compared to the jointly coordinated intervention by developed countries for maintaining the US-centered global financial system.

Analogous to Hudson’s view in the 1970s, one can say that the global financial system

in the 2000s, characterized by emerging Asian official ownership of US Treasuries, could be called by 'the revised US Treasury securities standard system'.

III.II US Treasury securities as the globally accepted collateral

Crucially, the revised US Treasury securities standard system in the 2000s depends on not only foreign official demand for US Treasury securities, but also, most importantly, a new type of market-driven demand for US Treasuries as 'the globally accepted collateral' in the unregulated shadow banking system in the 2000s.

Collateral assets act as core element of private market's self-regulation in the unregulated shadow banking system (Riles (2011), 159), as Krarup (2019, 250) states. Whereas bank deposits in the commercial banking system are regulated by monetary authorities and protected by deposit insurance, the new type of short-term instruments such as repo liabilities issued in the shadow banking system are, more or less, unregulated. Instead of the public backstops in the commercial banking system, collateral assets could function in mitigating counterparty credit risk, acting as a liquid store value with which firms can manage their funding, and enabling financial institutions to fund purchases of financial assets. (Baranova et al. (2016), 2) With respect the last role, the use of collateral makes borrowings in repo market, the most important wholesale market for financial institutions and private investors, less costly and less risky than borrowing from unsecured money markets.

What sustains the role of US Treasury securities as the globally accepted collateral? The main reason is that the US Treasury securities market has been the deepest and most liquid government market for private sectors and monetary authorities in the world, strengthening the securities' unique roles in US domestic and global financial markets: the primary means of financing the US federal government, an important market for the US Federal Reserve (Fed)'s implementation of monetary policy, a significant investment instrument and hedging vehicle for global investors, a risk-free benchmark and index for financial instruments, domestic and international safe-heaven, and foreign exchange reserves held by other countries. (Schinasi et al. (2001); Gordon and Muir (2015); US Department of the Treasury et al. (2015)) The unique roles contribute to foreign official and private demand for US Treasury securities, resulting in the higher involvement by non-US residents in the US Treasury bonds market than other advanced countries. (Schinasi et al. (2001)) The average share of foreign ownership of US Treasuries was 4.58 percent in the 1960s, 15.51 percent in the 1970s, 14.24 percent in the 1980s, 20.96 percent in the 1990s,

and jumped to 36.21 percent in the 2000s, respectively, in total holding of US Treasury securities. In 2013, the share reached a peak of 42.44 percent. (The data from US financial Account of the United States) This strong demand from non-US residents implies that US Treasury securities are seen as the safest collateral assets for financial institutions and private investors in the world, which can be converted to cashes and deposits with the lowest haircut in repo market in all states of market. Owing to the overwhelming advantage of US Treasuries as collateral assets which government bonds in other advanced countries do not have, US Treasury securities can be deemed as the globally accepted collateral in the shadow banking system.

In short, in addition to emerging Asian official demand for US Treasuries as foreign exchange reserve, new type of the market-driven demand for US Treasuries as the globally accepted collateral in the shadow banking system reinforced the revised US Treasuries standard system in the 2000s.

IV. The development of ‘the US Treasury securities-repo market nexus’ in the 2000s

How are the official and private demands for US Treasury securities fundamentally linked in the 2000s?

Interestingly, Sarai (2009, 80) suggests that ‘the Treasury-money market nexus’, in which US Treasury securities are regarded as ideal assets to link the high degree of liquidity with the expansion of repo market.² The volume of the repo market is increasingly recognized to be just as important a driver of credit creation in the regulated commercial banking as money itself just before the GFC of 2007-09. (Singh and Stella (2012)) Total repo activity in the US reached its peak before the GFC, ranging from \$5 to \$10 trillion (Baklanova et al. (2015), 1). Notably, the volume of short-term money funding through the repo market is, ultimately, tied to the market value and creditworthiness of collateral assets such as US Treasury securities. Hence, we would call the short-term money funding through the repo market which is linked to US Treasury securities market as ‘the US Treasury securities-repo market nexus’. In what follows, we analyze how the US Treasury securities-repo market nexus developed in the 2000s, in order to analyze the official and private demands for US Treasuries in the revised US Treasury securities standard system are fundamentally linked.

On the one hand, emerging Asian official accumulation of US Treasuries bolsters their market value and creditworthiness as the most important safe assets over the world. Since the end of 1990s, emerging Asian countries have rapidly accumulated US Treasuries, led by the increase in current account surplus and the desire to hold foreign exchange reserves for countering the recurrent of finance crisis as Asian crisis in 1997-98. Their heavy purchases of US Treasuries lowered the US long-term bond yields. Warnock and Warnock (2009) estimate that absent substantial foreign inflows into US government bonds 10-year Treasury yields would be 80 basis points higher. The outstanding of US domestic private and foreign private holdings of US Treasuries has been flat in the 2000s before the GFC (Goda et al. (2013), 114-115), in comparison with the ballooning in US public debt during the period. Other things being equal, the leveling off in US domestic private and foreign private holdings of US Treasuries might decrease potentially the market value and

² Some studies stress the connection between capital market developments and repo market amplified the supply of liquidity in the shadow banking system in the 2000s before the GFC. (For instance, Adrian and Shin (2010); Mehrling et al. (2013)) Furthermore, Garbor (2016) provides the concept of ‘the repo trinity’, which connects financial stability with liquid government bond markets and free repo markets.

creditworthiness of US Treasuries, raising significantly the costs of borrowing from US private sectors as well as the costs incurred by the US federal government to finance its public debt. Thus, the significant purchase of US Treasuries by emerging Asian official investors served to counter negative impacts on a market value and creditworthiness of the securities in the 2000s.

On the other hand, US Treasuries function as the globally accepted collateral for creating new type of short-term liabilities in repo market (i.e. the repo liabilities), as an alternative to bank deposits. (Singh (2012)) A handful of large broker-dealers, the legal description of the entities at the center of investment banking (Bayoumi (2017/2018), 59), in the US and Europe serves increasingly to intermediate collateral assets across borders on a large scale. (Pozsar (2014); Singh (2017)) In intermediating collateral assets for secured funding such as repos, the pathways that collateral takes are two-way flows: when there is cash funding in one direction from ultimate lenders to ultimate borrowers, there is a flow of collateral in other direction. (Aguiar et al (2016), 8-10) Importantly, large broker-dealers play a central role for financial intermediation of the globally accepted collateral across borders.

How did large broker-dealers function to intermediate the globally accepted collateral in the 2000's prior to the GFC? While key providers of primary collateral to the broker-dealers were hedge funds and custodian on behalf of pensions, insurers, and official sector accounts (Singh (2011)), key providers of cash funding was US' Money Market Mutual Funds (MMMFs) which accumulate 'the institutional cash pools', consisting large cash balances from global nonfinancial corporations and asset managers. (Pozsar (2011)) Driven by structural and historical changes linked to the increasing inequality in income, the massive accumulation of cash pools by multinationals, and the growing of pensions and insurance, the volume of institutional cash pools rose from \$100 billion in 1990 to over \$2.2 trillion at their peak in 2007. (Pozsar (2011), 5-6) US' MMMFs sought to invest part of their abundant cash funds in alternative assets to insured bank deposits---that is, safe, short-term and liquid instruments---including short-term government guaranteed instruments, particularly US Treasury securities and US Agency securities. However, the supply of US Treasuries and US Agencies are exogenously limited by US federal government and US government-sponsored enterprises (GSEs). This shortage, which implies the excess demand for dollar-denominated safe, short-term and liquid money market instruments, has been estimated to amount to \$1.1, \$1.6 and \$1.6 trillion in 2005, 2006 and 2007, respectively. (Pozsar (2011), 9-10). In response to the excess demand, large broker-dealers

created endogenously USD-denominated short-term liabilities through the repo market.

What does the issuance of repo liabilities make difference to credit expansion in the unregulated shadow banking system, compared to credit creation of bank deposits in regulated commercial banking system? An interesting recent body of literature discuss the importance of repo liabilities as shadow money. (Gabor and Vestergaard (2016) (2018); Murau (2017); Nersisyan and Dantas (2017); Sagambati (2019)) One the one hand, commercial banks create short-term liabilities, that is bank deposits, ex nihilo through new loans and mortgages, which function as final means of payment in modern financial system. In order to create bank deposits, commercial banks must hold a very small amount of high-powered money at central bank, owing to their subject to domestic banking regulations such as reserve requirements. On the other hand, repo is the most important wholesale market for the broker-dealers to issue short-term liabilities, based on the market value and creditworthiness of collateral assets. Specifically, the broker-dealers issue collateralized promise with the MMMFs to repurchase collateral asset at a future agreed date, that is a repurchase agreement, at the same time that they borrow cash (bank deposit) from the MMMFs during the term. Notably, the issuance of repo liability drives the money supply to become more elastic in the shadow banking systems, compared with the commercial banking system. (Tokunaga and Epstein (2018)) In this respect, the issuance of repo liabilities in the shadow banking system has more dynamic in credit expansion than the commercial banking, though it does not serve as final means of payment (Michell (2017), 361; Tropeano (2018), 80-82; Caverzasi et al. (2019), 1045).

In turn, what is indispensable for the broker-dealers which create repo liabilities on the liabilities side is to find sources of collateral assets on the assets side. As explained before, the broker-dealers received primary collateral assets from hedge funds and custodian, insurers, and official sector accounts. Singh and Stella (2012) define the scope of very small base for credit expansion in the shadow banking system as below: First, deposits are held at the central bank, that is high-powered money (D); Second, good collateral in all states of nature, can be converted to D at no haircut (C1); Finally, C2 is collateral that under normal market condition is 'good', but otherwise can lose value. The sum of D and C1 held by banks could function as the 'ultimate liquidity'. Grounded on their definition, in term of the US shadow banking system, while US Treasury securities could be regarded as C1, which is the globally accepted collateral that can be converted into high-powered money in all states of financial markets, C2 includes US Agency securities and a

broad range of the private-label US debt securities, issued by securitization.³

Put it different way, the issuance of repo liabilities indicates that large broker-dealers in the US and Europe relied on cheaper dollar borrowings from the US' MMMFs. Along with the increased demand from the MMMFs in the 2000s, the yield on short-term debt instruments is lower than would otherwise be expected by the added increased safety and liquidity of these instruments. The yield differences are called by the money premium, which gives the private sectors incentives to fund themselves by issuing short-term money instruments. (Scott (2016), 235) It is likely that the money premium allowed the large broker-dealers to issue a large amount of repo liabilities, enabling them to borrow massive cheaper short-term dollar funds in the 2000s before the GFC.

To return to the question posed at the beginning of this section, the market-driven demand for US Treasury securities as the globally accepted collateral, whose market value and creditworthiness were sustained by emerging Asian official ownership, enabled the large broker-dealers to expand cheaper short-term dollar borrowings through the repo market in the 2000s, given the US Treasury securities-repo market nexus.

³ Singh and Stella (2012, 7) refer that US Agency bonds could be safe assets due to an explicit guarantee ex-post during the GFC. However, we do not here include US Agency securities in C1, due to the loss of value of the securities during the GFC of 2007-09.

V. The explosion of USD-denominated financialization in the global context

V.I. The procyclical leverage during the US housing bubble

The US economy experienced a housing bubble from 2004 to 2006, in that housing prices surged rapidly during this period. The US housing bubble led large broker-dealers to have surplus equity, in the sense that its equity is larger than the amount required to meet its Value-at-Risk (VAR) constraint, driven by the rising market values of collateral assets during the period. (Adrian and Shin (2010); Shin (2010)) In response to the surplus capacity at their balance sheets, the broker-dealers took aggressively on more short-term dollar financing in the wholesale funding market such as repos, thus leading to their excessive leverage. Because their leverage was so high during the US housing bubble, leverage at the broker-dealers could be regarded as procyclical. (Adrian and Shin (2010), 17) Thus, the procyclical leverage drove the broker-dealers to depend heavily on repo-based short-term dollar borrowing, overstretching their balance sheets during the housing bubble.

In turn, the procyclical leverage could enhance the market-driven demand for US Treasuries as the globally accepted collateral, given the US Treasury securities-repo market nexus. Based on the definition of the ultimate liquidity by Singh and Stella (2012), the imbalances between the strong demands for C1, which is good collateral in all states of nature, and its limited supply of US Treasury securities by the US federal government increased during the housing bubble. In response, large broker-dealers took three ways. First, they pursued 'the global financial plumbing' of the collateral assets in global bilateral collateral market. (Singh (2017)) The size of global bilateral collateral market, where the global money and collateral exchange takes place, was US\$10 trillion in 2007. (Singh (2017), 10) Only a small number of large broker-dealers, for example large 10-15 banks, have the capabilities to regularly move collateral assets across borders on a large scale.⁴(Singh (2017), 15) Second, they created the private-label securitized collateral assets, based on US housing loans, especially the subprime mortgages, including mortgage-backed securities (MBSs), asset-backed securities ABSs (ABSs), and collateralized debt obligations (CDOs). The creation of the private-label securitized collateral assets would enhance the volume of C2, which is good collateral under normal market condition. Finally, they reused intensively collateral assets (i.e. rehypothecated) for responding to huge demand for

⁴ Major broker-dealers in the collateral industry include Goldman Sachs, Morgan Stanley, JPMorgan, Bank of America/Merrill, and Citibank in the U.S. In Europe and elsewhere, important collateral dealers are Deutsche Bank, UBS, Barclays, Credit Suisse, Société Générale, BNP Paribas, HSBC, Royal Bank of Scotland, and Nomura in Japan. (Singh (2019), 8)

collateral assets. Singh (2011) finds that the velocity of collateral---defined as the ratio between primary source collateral and total collateral received---can support multiple repo transactions. The total collateral received as of end-2007 (\$10 trillion) and compares it to the primary sources of collateral (\$3.3 trillion). Thus, the velocity of collateral was equal to about 3 ($=\$10 \text{ trillion}/3.3 \text{ trillion}$). (Singh (2011, 13)) The development in new financial instruments and financial innovations in the creation and intermediation of the globally accepted collateral in the shadow banking system amplified the procyclical borrowing to very small base of the ultimate liquidity in US domestic financial intermediaries during the US housing bubble. **Figure 2** is shown in the ultimate liquidity leverage.

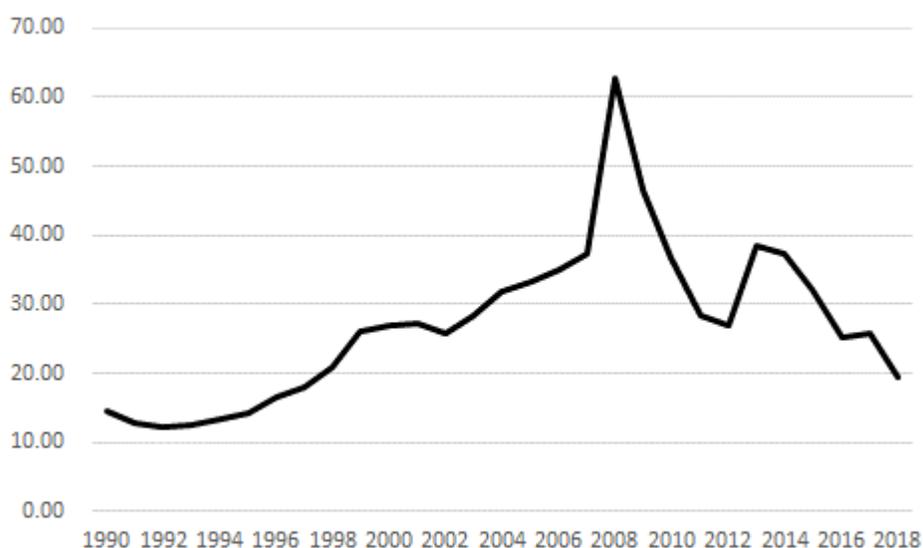


Figure 2 Ultimate Liquidity Leverage in US Domestic Financial Intermediaries

Note 1: Based on Singh and Stella (2012), Figure 3.

Note 2: The ultimate liquidity leverage = total liabilities of domestic financial sectors / bank deposits held at central bank + US Treasury securities.

Source: US financial Account of the United States.

The ultimate liquidity leverage increased suddenly around 35 percent in 2004-07 from about 27 percent in 2001-03, and skyrocketed to 62.76 percent in 2008.

In short, the development of new financial instruments and financial innovations in the creation and intermediation of the globally accepted collateral promoted the large

broker-dealers to pursue the procyclical leverage through repo market, overstretching their balance sheets during the US housing bubble.

V.II. The rapid creation of repo liabilities to non-US residents during the US housing bubble

Remarkably, the overstretched nature of balance sheets at the broker-dealers, driven by procyclical leverage during the US housing bubble, were accompanied with the rapid expansion of external balance sheets at banks and other financial firms in the US (henceforth, US financial firms), including mainly US-owned banks, US-owned broker-dealers, foreign-owned banks, and foreign-owned broker-dealers, in the 2000s prior to the GFC. Many economists and policymakers have discussed that the rapid expansion in gross capital flows in the 2000s is important for understanding the buildup of global financial instability that led to the GFC. (For instance, Borio and Disyatat (2011); Shin (2012); Tokunaga and Epstein (2018)) Gross cross-border banking positions to non-US residents reported by US financial firms were substantial in the 2000s. At the end of 2007, gross claims reached about \$3.8 trillion, and about \$4.2 trillion in gross liabilities. (Bertaut and Pounder (2009), A156) This implies that US financial firms increased simultaneously both assets and liabilities at their external balance sheets. We can see the simultaneous increase in both external assets and liabilities at US financial firms' balance sheets in the 2000s, in the following quotation from Survey of Current Business published by the US Bureau of Economic Analysis (BEA)

“(In 2004: author), these large outflows (US external assets: author) from U.S. banks and U.S. securities brokers were nearly matched by large inflows (US external liabilities: author) to U.S. banks and U.S. securities brokers; most of the inflows and outflows were channeled through the United Kingdom and the Caribbean.” (Bach (2005), 40)

As the quotations shows, US financial firms had expanded round-tripping banking flows vis-à-vis the UK, the largest eurodollar-offshore financial markets, and the Caribbean offshore financial centers (OFCs) in the 2000s prior to the GFC. Around 80 percent of gross external positions on assets and liabilities reported by US financial firms are financial firms' own accounts, whereas the remaining 20 percent are custody accounts, in which US financial firms hold short-term securities and deposits on behalf of their customers. (Bertaut and Pounder (2009), A156)

What we here highlight is the rapid expansion of external short-term liabilities issued by US financial firms in the 2000s. The external issuance of the short-term liabilities by US financial firms indicates that the US dollar as international money is supplied from the US financial system to non-US residents. Example of these external liabilities are deposits of non-US residents placed at banks in the US, loans made by banks abroad to banks in the US, and repurchase agreements, which are collateralized short-term loans made by non-US residents to US residents. (Weinberg, Whitaker and Tenentes (2009), 64) In what follows, we focus on how US financial firms, especially the broker-dealers, created their short-term liabilities to non-US residents in the 2000s prior to the GFC, based on time series data of “liabilities to foreigners reported by banks and other financial firms in the US” by US Fed, and articles about US international transactions and US international position from Survey of Current Business by the US BEA. We identify two main characteristics in term of type of US financial firms’ own liabilities in the 2000s, presented in **Figure 3**.

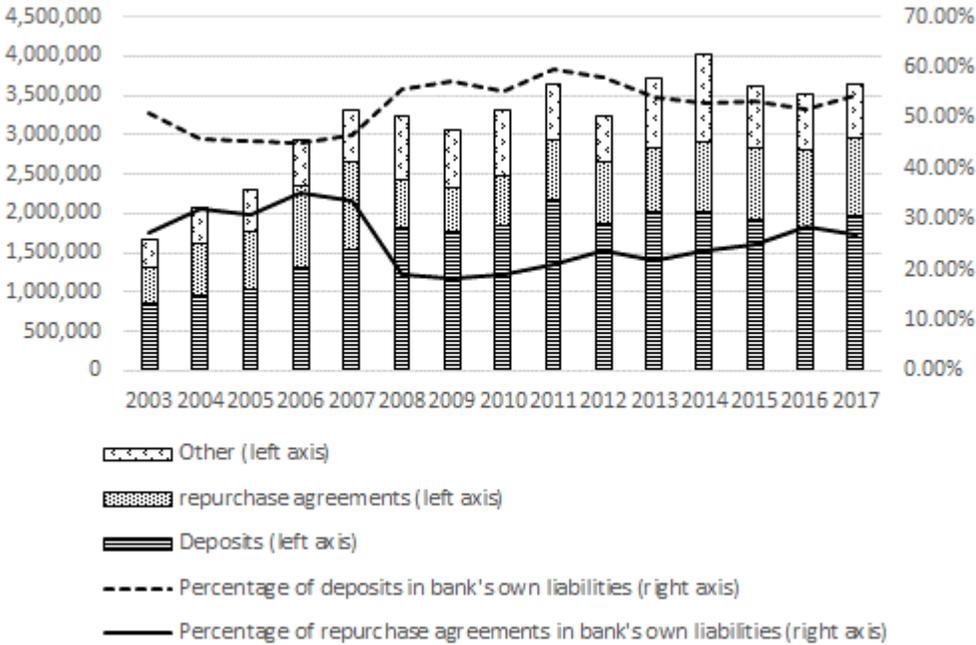


Figure 3 Type of Financial Firms’ own Liabilities in the US (millions of dollars, percentage, end of period)

Note: Before December 2013, reporting firms include all types of depository institutions as well as some bank holding companies and brokers and dealers. In addition, data include all other nonbank financial firms since December 2013. Excludes bonds and notes of maturities longer than one year.

Source: Board of Governors of Federal Reserve System.

First, US financial firms have borrowed a large amount of short-term dollar funds by placement of deposits through interoffice transfer with own foreign office in OFCs.⁵ The share of “deposits” reached 44.98 percent in US financial firms’ own liabilities in 2006. Second, more notably, a new type of the issuance of short-term instruments, that is repurchase agreement could increasingly be recognized as the important component in US financial firms’ own liabilities in the 2000s. The outstanding of repurchase agreement increased abruptly from \$151 billion in 2001, when its data became available, to about \$1 trillion in 2006. The share of repurchase agreement in financial firms’ own liabilities amounted to 35.19 percent in 2006. We can confirm that US broker-dealers increased repo-based borrowing on own accounts from hedge funds and other nonbanks in the UK and the Caribbean in the 2000s, as can be seen in the following quotations from Survey Current Business:

“(In 2004: author) U.S. financial institutions borrowed large amounts of funds from offshore sources...the large increase in liabilities was related to the sizable increase in repurchase activity in the securities markets, including activity with hedge funds in the Caribbean...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), 42-43)

“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), 42)

In turn, relating to the area and country of liabilities to non-US residents, the Caribbean counted up 43.36 percent, the UK 23.08 percent, other Europe excluding the UK 15.42 percent, Asia 10.98 percent and Latin America 4.07 percent, respectively, in 2006.

⁵ This tendency already appeared in the 1970s. By 1970s, US banks were the most powerful participants in the London’ eurodollar market. To the point where it became almost an extension of the New York money market. (Burn (2006), 29)

(Figure 4)

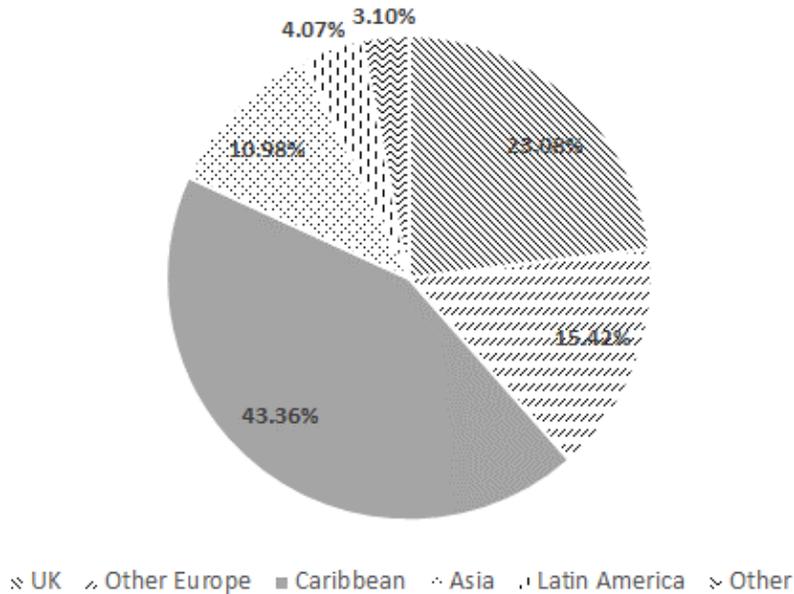


Figure 4 Area or Country in Financial Firms' own Liabilities in the US as End of 2006 (percentage)

Note: Reporting firms include all types of depository institutions as well as some bank holding companies and brokers and dealers.

Source: The data from Board of Governors of Federal Reserve System.

The sum of the Caribbean and the UK accounted for about 57 percent in total liabilities. With respect to the latter, US nonbanks such as broker-dealers and hedge funds had increasingly relied on repo-based dollar borrowing from London, where most of the eurodollars are recycled on a global scale, since the mid-1990s. (McGuire (2004)) Thus, US broker-dealers relied extensively on repo-based short-term dollar funding vis-à-vis OFCs in the 2000s before the GFC.

In the end of the section, we overview again the expansion of US financial firms' liabilities to non-US residents, driven by the increase in the creation of repo liabilities by US broker-dealers in the 2000s prior to the GFC. **Figure 5** illustrates the outstanding of liabilities to foreigners by US financial firms, world GDP and world export of goods and

services since 1971 (Index:1971=1), in the Nixon Shock, when the US lacked the external discipline of its balance-of-payments deficits.

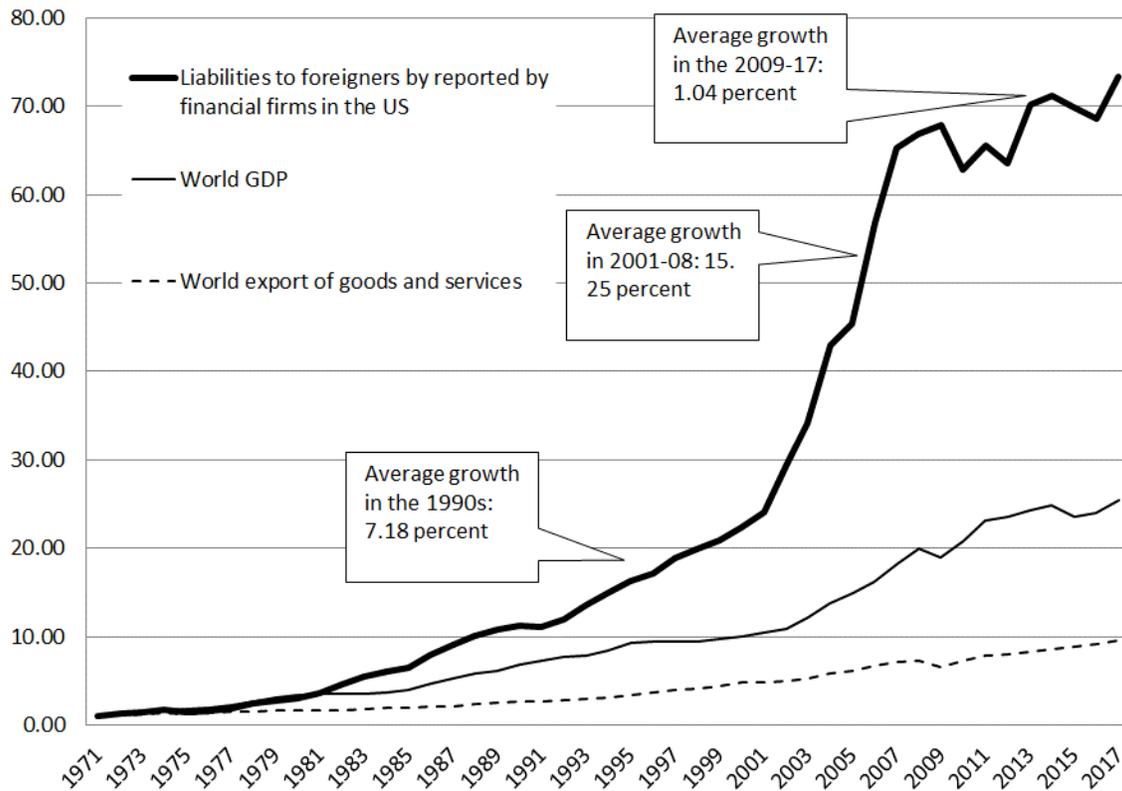


Figure 5 The outstanding of liabilities to foreigners reported by financial firms in the US (Index:1971=1)

Note: Before December 2013, reporting firms include all types of depository institutions as well as some bank holding companies and brokers and dealers. In addition, data include all other nonbank financial firms since December 2013. Excludes bonds and notes of maturities longer than one year.

Source: Board of Governors of Federal Reserve System; World Bank.

Overall, the outstanding of liabilities to non-US residents had gradually increased until the 1990s. Most surprisingly, it had drastically risen since 2000, and reaching from 22.29 in 2000 to 66.86 in 2008. The average growth rate of liabilities to foreigners in 2001-08 was 15.23 percent, in comparison with 7.18 percent in the 1990s. Remarkably, the divergence of the outstanding of liabilities to non-US residents from the size of world economic growth,

which is embodied in world GDP and world export of goods and services, had broaden since the 1980s, especially the 2000s prior to the GFC.

In consequence, the drastically increased divergence of US financial firms' external liabilities from the volume of world economic growth in the 2000s could be considered as the explosion of USD-denominated financialization in the global context. Because the volume of supply of US dollar as international money from the US financial system to non-US residents transcended the size of world economic growth on a gigantic scale in the 2000s before the GFC.⁶

⁶ The routes of supply of US dollar as global money to the world include not only the issuance of dollar liabilities to non-US residents from US financial system, as we here discuss, but also the lending and borrowing between non-US residents each other. With respect to the latter, offshore dollar credit reached about \$8 trillion, whereas its euro and yen counterparts amounted to \$2.5 trillion and \$0.6 trillion, respectively, in the middle of 2014. (McCauley et al. (2015, 1))

V. The revised US Treasury securities standard system since the Global Financial Crisis

V.I. The lack of dynamics in the procyclical leverage at the broker-dealers

In this section, we explain the revised US Treasury securities standard system since the Global Financial Crisis (GFC) of 2007-09. The heightened pressure in securities markets and the collapse of short-term wholesale funding markets had negative impacts on the balance sheets at US financial firms during the GFC. Specifically, external assets and liabilities reported by US financial firms decreased suddenly since the second quarter of 2008 after the rapid increases in the previous consecutive quarters, as a result of a sharp retrenchment in international lending and borrowing by them. The average growth of US financial firms' own liabilities was -3.60 percent in 2008-09, compared with 18.60 percent in 2004-07. (The data from Board of Governors of Federal Reserve System; See again **Figure 3**) US broker-dealers' own liabilities fell sharply in third quarter of 2008 when the bankruptcies of Lehman Brothers and American International Group (AIG) hit the world financial markets. Especially, repurchase agreement transactions collapsed abruptly in 2008 and 2009, amounting to -43.81 percent and -9.90 percent, respectively. (The data from Board of Governors of Federal Reserve System; see also **Figure 3**) Because market participants in the repo market stopped suddenly lending each other and the haircuts increased strongly. We can confirm the collapse in short-term borrowings through the repo market by US broker-dealers from the quotation from Survey of Current Business as below:

“As with banks' own claims, there were substantial changes in banks' own liabilities in September (of 2008: author). U.S.-owned brokers' liabilities fell sharply, mostly reflecting brokers' repayments of funds at the maturity of repurchase agreements, which are an important short-term borrowing instrument for brokers. New borrowing was limited by the bankruptcy of a major U.S. investment bank and funding difficulties at other U.S. investment banks.” (Weinberg and Sauers (2009), 33)

Next, relating to the area and country of liabilities to non-US residents, the Caribbean and the UK has decreased since the GFC. While the share of the former fell into 27.10 percent in 2017 after reaching a peak of 43.36 percent in 2006, the latter dropped into 19.63 percent in 2017 after amounting to a peak of 23.08 percent in 2006. (The data from Board of Governors of Federal Reserve System) Thus, US broker-dealers' own liabilities decreased vis-à-vis OFCs since the GFC.

Why did the deleveraging of the balance sheets at the broker-dealers bring about, given the US Treasury securities-repo market nexus? First, the market values of the US private-label securitized debt securities and US Agency bonds as collateral assets collapsed suddenly after the GFC. When the sharp fall in the collateral assets, driven by the end of the US housing bubble, forced large broker-dealers to ‘run’ on repos, a large portion of the US privately-securitized debt securities and US Agencies were no longer accepted as good collateral, that is C2, based on Singh and Stella (2012). The falling down in the US privately-securitized debt securities and US Agencies, as well as Italian and Spanish government bonds, led to the dramatic fall in the quantity of global safe assets during the GFC. The outstanding of global safe assets decreased from \$20,548 billion in 2007 to \$12,262 billion in 2011, and the ratio to world of GDP fell down from 36.9 percent to 18.1 percent, respectively. **(Table 1)**

	Billions of US\$		% of world GDP	
	2007	2011	2007	2011
US Federal government debt held by the public	5,136	10,692	9.2	15.8
Held by the Federal Reserve	736	1,700	1.3	2.5
Held by private investors	4,401	8,992	7.9	13.3
GSE obligations	2,910	2,023	5.2	3.0
Agency- and GSE-backed mortgage pools	4,464	6,283	8.0	9.3
Private-issue ABS	3,901	1,277	7.0	1.9
German and French government debt	2,492	3,270	4.5	4.8
Italian and Spanish government debt	2,380	3,143	4.3	4.7
Safe assets	20,548	12,262	36.9	18.1

Table 1 A List of Safe Assets: Pre-and Post-Crisis

Source: Reproduced from Caballero et al. (2012), 32.

Data from Barclays Capital, Federal Reserve Flow of Funds, Haver Analytics, and Barclays Capital.

Note: Numbers are struck through if they are believed to have lost their “safe haven” status after 2007. GSE means “government-sponsored enterprise.” ABS means “asset-backed security.”

Due to the plunge in the supply of safe assets during the GFC, most of C2’ market value was lost. The sudden collapse of C2’ market value reduced the volume of repo-based short-term dollar borrowings that could be raised by large broker-dealers. It turned out

that the drying-up in the short-term dollar borrowings in repos, led by a significant decline in C2' market value as collateral, triggered a drastic contraction of their balance sheets during the GFC. Second, the decline in the reuse of collateral assets contributed to the deleveraging of the balance sheets at the broker-dealers. As explained before, the velocity of collateral reached a peak of 3.0 in 2007. But the rate has persistently fallen since the GFC, and the velocity of collateral was only 1.8 (= volume of pledged collateral (\$6.1 trillion) / primary collateral sources (\$3.3 trillion)) in 2016. The continuous decline in the velocity of collateral in the 2010s results, partly, from the broker-dealers optimize their balance sheet in the aftermath of new financial regulations to overcome balance sheet constraints. (Singh and Goel (2019), 15)

In short, because the development in new financial instruments and financial innovations in the creation and intermediation of the globally accepted collateral has stagnated, the procyclical leverage at the broker-dealers lacked its dynamics in the 2010s.

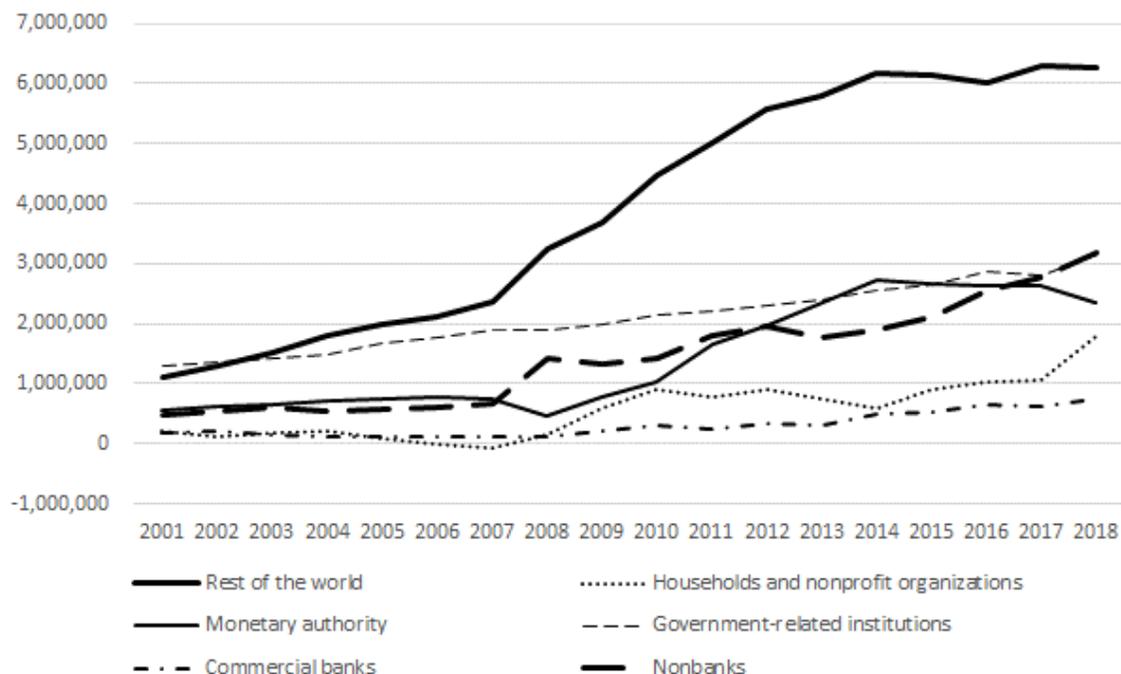
V.II. The maintenance of the US Treasury securities-repo market nexus

In contrast, with the onset of the GFC, foreign investors purchased drastically US Treasury securities. First of all, monetary authorities in Asian countries, especially China, have continued to use their surplus dollars for investing toward US Treasury securities as foreign exchange reserve since the GFC. China and Japan have remained the largest country holders, at \$1,192 and \$1,033 billion respectively, or over one-third of total foreign holdings of Treasuries as of June 29, 2018. (Department of the Treasury, Federal Reserve Bank of New York, and Board of Governors of the Federal Reserve System (2019), 20) In addition, more importantly, foreign private investors have strongly purchased US Treasuries as the globally accepted collateral since the GFC.⁷ There were two reasons. First, because the deleveraging of the balance sheets at the broker-dealers resulted in that only C1---US Treasury securities---could function as the globally accepted collateral for short-term funding in repo market in the 2010s. Second, the turnarounds in financial policy and

⁷ The flight to US Treasuries appeared also in US financial firms' custody liabilities during the GFC. The custodian banking services provide two main services: specialized reporting services and banking services for investors and investment firms. The latter includes collateral management. (Chan et al. (2007), 11-12) For instance, institutional investors, which manage the institutional cash pools, select custodian banks based on their ability to help enhance the return on their investment portfolio, via services in securities lending, tri-party repo and cash management. (Chan et al. (2007), 26) The share of U.S. Treasury bills and certificates in US financial firms' custody liabilities jumped from 26.71 percent in 2007 to 55.83 percent in 2008, and rising to 66.19 percent in 2013. (The data from Board of Governors of Federal Reserve System)

regulation since the GFC were instrumental to enhance the market-driven demand for US Treasury securities as the globally accepted collateral. The quantitative easing (QE) in developed countries reduce availability of good collateral such as US Treasury securities in exchange for excess reserves at central banks. (Singh and Goel (2019), 11) The drastic fall in supply of good collateral, led by the QE, intensified the imbalances between supply and demand for US Treasuries, as the demand for them surged. This increase in the imbalance implies generates excessive demand for US Treasuries in the 2010s. And then, the new financial regulation frameworks enhance the demand for US Treasury securities. For example, two new regulatory liquidity ratios for banks under the Basel III frameworks are implemented in the 2010s. The first is the liquidity coverage ratio (LCR) in 2015, which is based on the concept of holding a stock of liquid assets to resist a high degree of stress for a 30-days. The second is the net stable funding ratio (NSFR) in 2018, which is based on managing the potential mismatch between asset and liability maturities up to a one-year period. In order to expand the liquidity buffers, banks have increased their holding of government bonds such as US Treasuries, enabling them to increase the LCR. The ratio of the LCR at banks amounted to around 150 percent in 2016 and 2017. (IMF (2018), 64-66)

As foreign official and private ownerships of US Treasury securities have risen since the GFC, the involvement by non-US residents in the US Treasury securities market has rapidly increased. Major holders of US Treasury securities in 2001-18 is demonstrated in **Figure 6**.



**Figure 6 Major Holders of US Treasury Securities
(Outstanding, millions of dollars, end of period)**

Note: Government-related institutions: state and local governments, federal government retirement funds, state and local government employee defined benefit retirement funds, and government-sponsored enterprises. Commercial banks: US-chartered depository institutions, foreign banking offices in the US, Banks in US-affiliated areas, and credit unions. Nonbanks: Property-casualty insurance companies, life insurance companies, private pension funds, money market funds, mutual funds, closed-end funds, exchange-traded funds, issuers of asset-backed securities, security brokers and dealers, and holding companies.

Source: US financial Account of the United States.

Rest of the world (ROW)' holding of US Treasuries have abruptly increased since the GFC, especially between 2008 to 2014. The outstanding of the ROW expanded from \$2,376.4 billion in 2007 to \$6,158.0 billion in 2014. What is more, monetary authority, that is the US Fed, has accumulated a large amount of US Treasuries by introducing the QE, through which the Fed absorbs US Treasuries from the market in exchange of excess reserves at the Fed. The outstanding of monetary authority rose from \$475.9 billion in 2008 to \$2,736.2 billion in 2014. The share of the ROW and monetary authority in total of holdings was 41.85

percent and 18.60 percent, respectively, in 2014. Thus, the heavy purchase of non-US residents and the Fed could sustain a market value and creditworthiness of US Treasury securities in the 2010s.

US Treasuries continue to serve as the globally accepted collateral which enables financial institutions and private investors to borrow cheaper short-term dollar funds in the 2010s. US Treasuries account for high share in collateral assets in US repo market. First, US Treasury securities are the dominant form of collateral for US bilateral repo market. US Treasury securities posted in US bilateral repos amounted to 79.02 percent, whereas all other assets made up 20.98 percent as of October 2014. (Copeland et al. (2014)) Second, the total value of the triparty repo market was approximately \$1.6 billion with approximately 81 percent involving US Treasuries and US agencies as of October 2013. (Scott (2016), 55) In short, the US Treasury securities-repo market nexus maintains in the 2010s.

However, the lack of dynamics in the procyclical leverage through repo market, led by the decline in new financial instruments and financial innovations in the creation and intermediation of the globally accepted collateral, facilitates the USD-denominated financialization in the global context to be sluggish in the 2010s. Looking back to **Figure 5**, the growth of outstanding of liabilities to non-US residents has stagnated and been relatively flat in the 2010s, compared to the explosion in the previous decade. The growth of liabilities to non-US residents was -7.57 percent in 2010, -3.00 percent in 2012, -1.84 percent in 2015, and -1.76 percent in 2016. And, the average growth rate of the liabilities to non-US residents fell into only 1.04 percent in 2009-17, in comparison with 15.23 percent in 2001-08. Hence, the lack of dynamics in the procyclical leverage led US financial firms to decrease USD-denominated short-term liabilities, particularly repo liabilities, to non-residents, as opposed to their rapid increase in the 2000s. Accordingly, it could be interpreted that the USD-denominated financialization in the global context faces a structural break in the 2010s, though the US Treasury securities-repo market nexus retains in the 2010s.

VI. Implications

In the last section, we consider two questions. What is the difference between the revised US Treasury securities standard system in the 2000s and the past system in the 1970s? And, how does the revised US Treasury securities standard system change in the 2010s?

First, we have argued that the US Treasury securities served as the globally accepted collateral for creating new type of USD-denominated short-term liabilities, that is repo liabilities, to non-US residents, given the US Treasury securities-repo market nexus in the 2000s.

In case of the US Treasury securities standard system in the 1970s, monetary authorities in developed countries intervened countercyclically to absorb the surplus dollars, in order to stabilize the value of dollar in cooperation with the US. This countercyclically official intervention in foreign exchange markets by major advanced countries worked well to sustain the US-centered global financial system, despite the absence of systemic cooperation in the BW system.

Considering our discussions on the revised US Treasury securities standard system in the 2000s, the intensification in the market-driven demand for US Treasury securities as the globally accepted collateral amplified the procyclicality in the creation of repo liabilities by US broker-dealers to non-US residents during the US housing bubble. Therefore, it is conceivable that the market-driven demand for US Treasury securities as the globally accepted collateral drove the surplus dollars to expand to non-US residents, rather than absorbing them from non-US residents, thus contributing to the explosion of financialization in the global context that led to the buildup of global financial instability in the 2000s.

Second, we analyzed that the procyclical leverage during the US housing bubble allowed large broker-dealers in the US and Europe to create repo liabilities to non-US residents, given the US Treasury securities-repo market nexus. Notably, the drastically increased divergence of US financial firms' external liabilities from the volume of world economic growth in the 2000s could be considered as the explosion of USD-denominated financialization in the global context. This development enabled Wall Street financial institutions to achieve high financial profits in the 2000s prior to the GFC.

In contrast, the procyclical leverage at the broker-dealers lacked its dynamics in the 2010s, owing to the stagnation in development in new financial instruments and financial innovations in the creation and intermediation of the globally accepted collateral. This lack

of dynamic in the procyclicality facilitated US financial firms to depress short-term liabilities to non-residents, resulting in the stagnation in the development of USD-denominated financialization in the global context in the 2010s. This underdevelopment of USD-denominated financialization in the global context is accompanied with the difficulties of attaining high financial profits at Wall Street financial institutions in the 2010s. The return on assets (ROA) and the return on equity (ROE) of US financial institutions had been so high from the early 1990s, and the middle of the 2000s was exceptionally high. After collapse of their high financial profit during the GFC, it recovered briefly in the early 2010s but has never returned to the previous levels. (Lapavitsas and Mendieta-Muñoz (2018), 497) Accordingly, the structural stagnating in the USD-denominated financialization in the global context can be considered that Wall Street financial institutions cannot still rebuild new business model which could enable them to achieve high financial profits as they did , depending heavily on cheaper dollar borrowings, in the 2000s, though the revised US Treasury securities standard system continues in the 2010s.

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