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Paper title:
Dealer Banks and the Elastic Creation of Dollar Liabilities: Rethinking Financial Intermediation in the Global Financial System

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Abstract:
Heterodox economists have traditionally focused on the endogeneity of money by commercial banks which create new credit money without pre-existing funds. Since the Global Financial Crisis (GFC) of 2007-09, it has been debated among many heterodox scholars about how nonbank financial institutions (NBFIs)' creation of short-term liabilities, which are called often by 'shadow money', is integrated with the endogenous money theory emphasizing the importance of commercial banks' credit creation. Most of heterodox scholar stresses that NBFIs play a passive role as financial intermediaries. Extending the stylized interpretation of the passive role of NBFIs as financial intermediaries in closed economy into a global context would suggest that NBFIs' creation of short-term dollar liabilities across the US border and outside the US (i.e., global dollar supply) may be characterized as passively international financial intermediation denominated in the US dollar. However, the gained importance of NBFIs' creation of the global dollar in the shadow banking system, most of which is conducted by global systemically important banks (G-SIBs), cannot be regarded as mere passive role of international financial intermediation. Instead, we argue how dynamic global dealer banks, central subsidiaries of G-SIBs, create endogenously the global dollar more elastic in the shadow banking system, which is largely unexplained by heterodox academic literature. Notably, the endogenous finance of the global dollar became highly elastic during the US housing bubble (2004-06). Particular importance in our arguments is placed on the endogenous finance of the global dollar by dealer banks in the shadow banking system is driven by the global collateral plumbing of US Treasury securities as universal collateral assets, determining the dynamic nature of the global dollar creation in the shadow banking system, which is very far from the passive nature of international financial intermediation common in the heterodox academic literature.

1.Introdunction

Traditionally, heterodox economists have focused on the endogeneity of money by commercial banks as the most important financial institutions which create endogenously short-term liabilities, i.e. bank deposits, for non-financial corporations and households without pre-existing funds or savings. The expansion of short-term liabilities issued by nonbank financial institutions (NBFIs) in the shadow banking system presents a challenge for the endogenous money theory emphasizing the significance of commercial banks' credit creation. Since the Global Financial Crisis (GFC) of 2007-09, it has been debated among many heterodox scholars, especially post-Keynesian and money circuits economists, about how NBFIs' creation of short-term liabilities, which are called often 'shadow money', is integrated with the endogeneity of money by commercial banks emphasizing the importance of commercial banks' credit creation. Most of heterodox scholar considered the role of NBFIs as passively financial intermediation, in the sense that their activities contribute to transferring the ownership of existing bank deposits issued by commercial banks between lenders and borrowers.

Extending the stylized interpretation of the passive role of NBFIs' financial intermediation in closed economy into a global context would suggest that NBFIs' creation of short-term dollar liabilities across the US border and outside the US (i.e., global dollar supply) might be regarded as passively international financial intermediation denominated in the dollar, in that their transactions facilitates transferring the ownership of existing dollar deposits held in large US commercial banks. However, the gained importance of NBFIs' creation of the global dollar in the shadow banking system, most of which are conducted by global systemically important banks (G-SIBs), cannot be regarded as mere passive role of international financial intermediation denominated in the dollar.

Compared to the volume of studies covering the endogenous finance of money emphasizing the importance of commercial banks in domestic economy, heterodox academic literature is relatively young in its exploration of how NBFIs create endogenously the global dollar in the shadow banking system. To fill the void, we argue how dynamic global dealer banks, central subsidiaries of G-SIBs, create endogenously the global dollar more elastic in the shadow banking system[1].

The rest of the paper is organized as follows. Section 2 briefly provides heterodox interpretation on the passive role of NBFIs functioning as international financial intermediaries in shadow banking system. Section 3 argues how dynamic global dealer banks create endogenously the global dollar more elastic in the shadow banking system than the one of commercial banks. Building on the discussion, this chapter also analyzes how the evolution in the global collateral plumbing at dealer banks drove the endogenous financing of the global dollar in the shadow banking system to become highly elastic during the US housing bubble (2004-06). Section 4 draws our conclusions.

[1] Many materials of this paper are drawn on Tokunaga (2026).

2. Heterodox interpretation on the passive role of NBFIs in the shadow banking system

2.1 NBFIs' passive role as financial intermarries

Traditionally, heterodox economists, especially post-Keynesian and money circuit scholars, have argued the endogeneity of money: commercial banks are the most important financial institutions which create endogenously short-term liabilities, i.e. bank deposits, for non-financial corporations and households without pre-existing funds or savings[2]. Bank deposits issued by commercial banks, which are backstopped by central bank credits, serve as major means of settlements of financial obligations and transactions between corporations and households. By contrast, nonbank financial institutions (NBFIs) are just financial intermediaries to borrow existing bank deposits from borrowers and, then, lend them out to lenders. Hence, only commercial banks create endogenously new money 'ex-nihilo', unlikely NBFIs functioning as mere passively financial intermediaries which contribute to an increase in the rate at which existing bank deposits are transferred, i.e., the velocity of money.

The expansion of short-term liabilities created by NBFIs in the shadow banking system presents a challenge for the endogenous money theory emphasizing the significance of commercial banks' credit creation. Since the Global Financial Crisis (GFC) of 2007-09, it has been debated among some heterodox scholars about how NBFIs' creation of short-term liabilities, which are called often 'shadow money', is integrated with the endogenous money theory emphasizing the importance of commercial banks' credit creation. While some scholars emphasize that shadow money creation by NBFIs has active nature (Nersisyan and Dantas (2017); Sgambati (2018)), most of heterodox scholar considers that NBFIs play a passive role as financial intermediaries, in that their activities contributes to transferring the ownership of existing bank deposits held in commercial banks between lenders and borrowers. (Michell (2017), p.361; Bouguelli (2020); Caverzasi, Botta, and Capelli (2019), p.1045; Sissoko (2024))

Extending the stylized interpretation of the passive role of NBFIs' financial intermediation in closed economy into a global context would suggest that NBFIs' issuance of short-term dollar liabilities by might be regarded as just passively international financial intermediation denominated in the US dollar, in that their transactions contribute to transferring the ownership of existing dollar deposits held in large US commercial banks across the borders. However, the gained importance of NBFIs' creation of the global dollar in the shadow banking system, most of which are conducted by global systemically important banks (G-SIBs), cannot be regarded as mere passive role of international financial intermediation denominated in the dollar (Tokunaga and Epstein (2014) (2018); Nersisyan and Dantas (2017); Tropeano (2025)).

Compared to the volume of studies covering the endogenous finance of money in domestic and closed economy, heterodox academic literature is relatively young in its exploration of how NBFIs create endogenously short-term dollar liabilities (i.e., global dollar supply) in the shadow banking system. To fill the void, we argue how dynamic global dealer banks, central subsidiaries of G-SIBs, create endogenously the global dollar more elastic in the shadow banking system in the following chapters.

2.2 Dealer banks in the shadow banking system

The shadow banking system has developed since the 1990s, especially the 2000s. The size of the US shadow banking system had increased since the early 1990s, especially the 2000s, prior to the GFC. The size of the shadow banking assets rose from $2,630 billion in 1990 to $26,097 billion in 2007. Though its size was smaller than the traditional banking system in the first half of the 1990s, the shadow banking assets had surpassed that of the traditional banking assets since the middle of the 1990s. Finally, the

[2] For example, Kaldor (1982); Wary (1990); Pollin (1990); Palley (1996); Rochon (1999).

shadow banking assets reached almost twice the size of the traditional banking assets in 2007 just before the GFC[3].

A hundful of global systemically important banks (G-SIBs) including US commercial banks, US dealer banks, and European banks has been dominate players in the shadow banking system. In financial intermediation through the shadow banking system, dealer banks as central subsidiaries of G-SIBs play a critical role in collateral intermediation, in which dealers act as middlemen between borrowers and lenders by transferring simultaneously cash and collateral assets, contributing to the rapid growth of the repurchase agreements (repos) markets.

Dealer banks are generally involved in gross balance sheets positions called 'matched book' intermediation in the repo markets. **Figure 1** is a stylized t-account of the matched book intermediation, which helps us to understand how dealer banks create endogenously short-term repo liabilities using US Treasury securities as collateral assets.

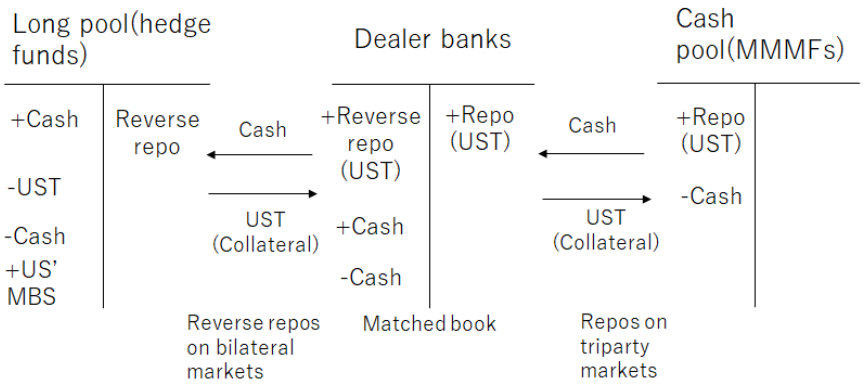


Figure 1: A Stylized T-account of the Matched Book Intermediation at Dealer Banks

Notes: UST=US Treasury securities, MMMFs=Money market mutual funds

Sources: Own elaboration on Stigum (1989), p.285; Stigum and Crescenzi (2007), p.562; Mehrling et al. (2013), p.3; Pozsar (2013) (2014) (2015); Garbor and Vestergaard (2016), pp.19-21; CGFS (2017), pp.5-6; Carlson and Macchiavelli (2018); Sissoko (2019), p.8; Wullweber (2020), p.10; Özgür (2021), p.9; Afonso et al. (2021), pp.4-7.

On one hand, hedge funds borrow cash by delivering US Treasury securities as collateral assets through the reverse repos on bilateral repo markets, and dealer banks lend the cash to them. The hedge funds, in turn, buy the MBS with the cash. On the other hand, the dealer bank can fund its lending by borrowing cash from the cash pool including money market mutual funds (MMMFs) through repos on triparty repo markets, using the US Treasury securities as collateral assets. With respect to the latter, the dealer bank accommodates credit demand for safe, short-term liquid instruments (i.e., repo liabilities) from the cash pool. In other words, the dealer banks issue endogenously short-term dollar liabilities through repos.

2.3 Global repurchase agreements

Repos are heavily traded in global financial system (Di Luigi, Perrella and Ruggieri 2024), in which global dealer banks create endogenously short-term dollar liabilities in international sphere. Today, the international repo market is huge, representing $8-10 trillion of collateral assets (Howell [2020], p.91). First, US dealer banks created endogenously cross-border repo liabilities vis-à-vis other nonbank financial institutions (NBFIs)' clients, including mutual funds and hedge funds in offshore financial

[3] Own estimation on US flows of funds accounts of the United States.

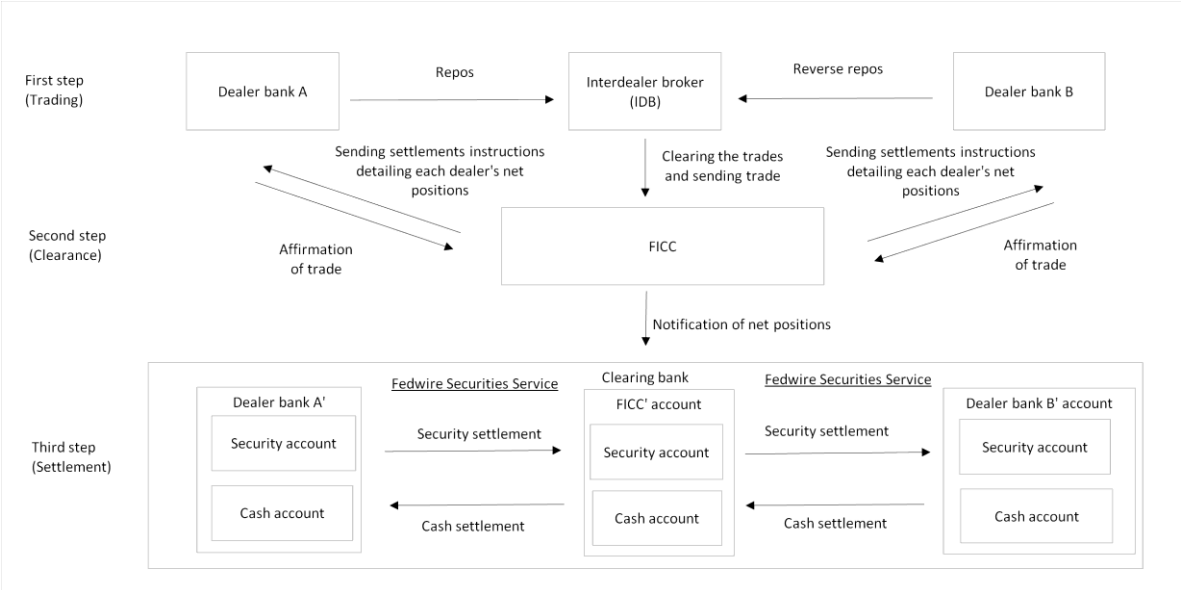
centers (OFCs) such as the UK and the Caribbean financial centers in the 2000s before the GFC (Bach (2005), p.43; Bach (2007), p.42; Bach (2008), p.44).

In addition to the creation of cross-border repo liabilities vis-à-vis NBFIs' clients in OFCs, global dealer banks rapidly expanded their gross internal repo borrowing vis-à-vis their own foreign subsidiaries in the run-up to the GFC. More specifically, US primary dealers took collateral assets posted by their US clients and financed it at the globally cheapest markets like the UK without leverage limit in the pre-GFC period (Gupta [2021], p.10). As a result, internal liabilities of US primary dealers nearly quadrupled over the pre-GFC period to $1.2 trillion in the quarter of 2007 (Gupta [2021], p.12).

Against this backdrop, outstanding cross-border repo liabilities issued by US financial institutions increased abruptly from $151 billion in 2001, when its data became available, to about $1 trillion in 2006[4]. Thus, the issuance of cross-border repo liabilities by global dealer banks became one of the largest components in the endogenous finance of short-term dollar liabilities across the US border and outside the US (i.e., global dollar supply) in the 2000s before the GFC.

It has been acknowledged that commercial banks in a few international currency countries create short-term bank deposits for non-residents, called often foreign balances, which perform as international currency for settling various financial obligations and transactions involving foreign exchange transactions. In the case of international settlements denominated in US dollar involving foreign exchange transactions, dollar balances issued by US commercial banks serve as international money, underpinned through Fedwire and privately large-value payments platforms including Clearing House Interbank Payment System (CHIPS) and major messaging networks such as Society for Worldwide Interbank Financial Telecommunication (SWIFT) (Faudot (2018)). How does the issuance of cross-border repo liabilities by dealer banks is intergraded with the dollar balances by US commercial banks?

To begin with, we understand how dealer banks are involved in trading, clearing, and settlement through repos in a closed and domestic economy. Consider now trading, clearing and settlement in general collateral finance (GCF) repos, which are a popular service for dealer banks in US repo markets. **Figure 2** is a stylized example of the GCF repo between dealer bank A and dealer bank B.



[4] Data from Board of Governors of Federal Reserve System website.

Figure 2: A Stylized Example of GCF Repo Trading, Clearance and Settlement

Sources: Translated and reproduced from Nakajima and Shukuwa (2008), Figure 5-14, p.148. Part of this figure is revised on Agueci et. al. (2014), pp.12-15.

In the first step (trading), dealer bank A and dealer bank B negotiate, anonymously, through an interbank dealer (IDB). In the second step (clearance), the IDB then sends settlement instructions to the Fixed Income Clearing Corporation (FICC) as a central counterparty (CCP) which becomes the legal counterparty to both dealer bank A and dealer bank B. In the third step (settlement), the FICC provides netting services in the process, and net position of cash and securities as collateral assets is settled via a clearing bank. At the end of each trading day, the FICC computes the amounts of cash and securities that dealer bank A promised to deliver and the amount that was promised to another dealer bank B. The difference between these two amounts (i.e., each position of the dealer banks), is settled through the Fedwire Securities Service, which is a real time delivery versus payment (DVP) securities settlement system at the US Fed. Direct participation is restricted to depository institutions, typically commercial banks under the Fedwire Securities Service; dealer banks cannot debit or credit a reserve account at the Fed. Instead, dealer banks have come to rely on commercial banks to act as their clearing banks to settle the DVP-securities settlement on the Fedwire Securities Service (SIFMA 1999). Two clearing banks, Bank of New York Mellon and JP Morgan Chase, settled the GCF repo transactions. Because JP Morgan Chase closed its tri-party business by the end of 2017, Bank of New York Mellon is the only provider of this service. The clearing bank receives instructions from the FICC to settle each dealer bank's net positions, and then settles the net position not only by transferring securities from the dealer bank A's security account to the dealer bank B's security account, but also by simultaneously transferring cash from the dealer bank B's cash account to the dealer bank A's cash account. As such, dealer banks serve as intermediating given cash, which are held as pre-existing deposit balances created by their clearing bank, in exchange for pledged securities as collateral assets. In this regard, dealer banks appear to play a passive role of financial intermediaries in US repo markets.

Extending the stylized interpretation of the passive role of financial intermediation by dealer banks in US repo markets into a global context would suggest that the creation of cross-border repo liabilities by global dealers may be characterized as mere passively international financial intermediation denominated in the dollar, because their activities contribute to transferring the ownership of existing dollar deposits across the borders in exchange for securities as collateral on a global scale, which is consistent with heterodox interpretation on the passive role of NBFIs as financial intermarries.

3. The endogenously elastic finance of the global dollar by dealer banks in the shadow banking system

3.1 Global collateral plumbing

However, the stylized interpretation regarding the role of global dealer banks as passively international financial intermediation denominated in the dollar lacks understanding how dynamic global dealer banks function as an engine for mining and intermediating collateral assets on a global scale, i.e., global collateral plumbing[5]. Specifically, dealer banks pursue the global financial plumbing of the collateral assets in the international bilateral collateral market. The size of the global bilateral collateral market, where the global money and collateral exchange takes place, was US$10 trillion in 2007 (Singh [2017], p.10). Only a small number of large banks and dealer banks (for example 10-15 large banks) play a central role in the global financial plumbing, with many different types of entities within G-SIBs and outside them, as can be seen in the following important quotations from Singh and Goel (2019):

"The financial system that includes banks, hedge funds, pension funds, insurers, sovereign wealth funds (SWFs), etc. be represented by entities A to Z. Only a small number (say XYZ) have the capabilities to regularly move financial collateral across borders on a large scale. XYZ also happen to be the large 10-15 banks. Major dealers active in the collateral industry include Goldman Sachs, Morgan Stanley, JP Morgan, Bank of America/Merrill, and Citibank in the US. In Europe and elsewhere, important collateral dealers are Deutsche Bank, UBS, Barclays, Credit Suisse, Société Générale, BNP Paribas, HSBC, Royal Bank of Scotland (with a declining share), and Nomura. Recently Canadian banks have also entered this market." (p.8; Underline is by author)

"The remaining financial entities, from A to Z, that demand and supply collateral need to connect with each other via XYZ. Entry into this market is not prohibited but is extremely expensive and difficult, as it requires having a global footprint and global clients…For example, a Chilean pension fund may want Indonesian bonds for six months, and W (for example, a hedge fund, or a securities lender in Hong Kong) may be holding these bonds and is willing to rent out to A for six months for a small fee. But W does not know there is demand from A. Only via XYZ can A connect to W. Since XYZ sits in the middle of the web, they have the ability to optimize in ways that give them an advantage. The Indonesian bonds may come into their possession because XYZ loaned W money, or because XYZ have a derivative with W, or through a security lending agreement. Such securities that need to move cross-borders under a "repo," or "security lending," or related transaction need to be legally perfected…" (p.8; Underlines are by author)

In addition, the optimization of global collateral plumbing allows dealer banks to reuse collateral assets (i.e., rehypothecation) provided by clients. Specifically, a client provides a security as collateral asset in exchange for cash and grants the dealers the right to repledge this collateral. The dealers can then reuse this security as collateral to another client to source the cash through repo on the US triparty market (Kirk et al. [2014], pp.132-134). Thus, the flexibilities of the rehypothecation allow dealer banks to generate elastically internal dollar financing without the need to attract additional funding from the external financial markets (Kirk et al. [2014], pp.134-136). Thus, the development of global collateral plumbing, one of the most remarkable financial innovations and evolutions in the shadow banking system, enabled global dealers to endogenously create more elastic short-term global

[5] Murau (2017) refers to the collateral exchange in repos as merely a by-product of credit creation (p.809). But it is apparent that collateral flow is not simply the opposite of funding but has its own special characteristics (Aguiar et al. (2016)).

dollar liabilities through repos, although the global dollar liabilities created endogenously in this way is not ex-nihilo as traditional and commercial banks' credit creation[6].

3.2 The unparalleled status of US Treasury securities as universal collateral assets

Notably, US Treasury securities as global safest assets have been a dominate position in the repo markets. The Securities Industry and Financial Markets Association (SIFMA) (2022) provides detailed data of the collateral asset category in US repo markets as of December 9th, 2021. US Treasury securities accounted for the largest share of collateral assets in all segments of US repo markets. In the bilateral repo market, average daily outstandings amounted to $2.5 trillion, of which the collateral asset class was Treasury securities 67.7 percent, while mortgage-backed security (MBS) was 15.6 percent and Treasuries inflation-protected securities (TIPS) 7.3 percent. In the bilateral reverse repo market, average daily outstanding reached $1.8 trillion, of which the collateral asset category was Treasury securities 79.3 percent, TIPS 9.7 percent, and MBS 9.6 percent. General collateral finance (GCF) repo average daily par amount was $78.5 billion, of which the collateral asset class was Treasury securities 63.7 percent and MBS 36.3 percent. In the tri-party repo markets, the collateral asset category was Treasury securities 70.1 percent and Agency MBS and collateralized mortgage obligations (CMOs) 18.0 percent[7]. Thus, US Treasury securities are recognized as universal collateral assets, which market participants worldwide used for repos in all market conditions[8].

3.3 The enhancement of the global collateral plumbing during the US housing bubble

During the US housing bubble (2004-06), global dealer banks intensified the global collateral plumbing of US Treasury securities. Specifically, the intensive evolution of the global collateral plumbing at the central desk of global dealers supported not only the mining and intermediating of collateral assets but also the reuse of collateral (i.e., rehypothecation), allowing global dealers to create endogenously the global dollar. Singh (2011) finds that the re-use of collateral allows the collateral to have 'velocity.' Similar to the velocity of money, the velocity of collateral---defined as the ratio between primary source collateral and total collateral received---supported multiple financial transactions in the shadow banking system. As of the end of 2007, the total collateral received by central collateral desks of banks and dealer banks was estimated to be $10 trillion, and the primary sources of collateral from hedge funds ($1.6) and securities lending ($1.7) were $3.3 trillion ($1.6 plus $1.7). Accordingly, the velocity of collateral is equal to about 3 ($10 trillion/$3.3 trillion).

Importantly, the enhancement of the rehypothecation was partly conducted across geographical borders, which created 'the global rehypothecation chain of collateral' (Gupta [2021], p.20). As Gupta (2021) mentions, dealer banks typically maintained 'global settlement systems', in which dealers typically intermediate collateral from their US clients to their own foreign subsidiaries for internally borrowing dollar funding. This system was implemented by internally rehypothecating US client's collateral from dealer banks to their foreign siblings in offshore financial centers (OFCs) such as London where cheaper offshore Eurodollar funding was available.

What attracted G-SIBs including dealer banks to depend largely on offshore Eurodollar borrowing in London? One of the main reasons is that the UK has not had rigid quantitative regulatory caps on

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[6] Howell (2020) and Wullweber (2020) emphasize that the shadow banking makes credit creation more elastic than the traditional banking without creating much new lending.

[7] Data from SIFMA (2022).

[8] The role of US Treasury securities in repo markets is regarded as 'universally accepted collateral' (Schinasi, Kramer, and Smith [2001], pp.4-5) or 'the most sought-after collateral assets' (Awrey [2017], p.975). In addition, Ryan and Toomey (2021) consider US Treasuries as "a bedrock of the global financial system."

collateral rehypothecation equivalent to those applicable to dealer banks regulated by the Securities and Exchange Commission (SEC) in the US. In the US, the SEC Rule 15c3-3 prevents dealer banks from using its customer's securities to finance its proprietary activities. Under this rule, dealer banks may use/rehypothecate an amount up to 140 percent of the customer's debt balance. By contrast, there was no limit on rehypothecation in the UK, attracting G-SIBs to rely on the reuse of collateral used in OFCs (Singh [2020], pp.18-19). As a consequence, US banks and large European banks achieved a collateral multiplication of 400 percent, amounting to roughly $4.5 trillion in additional funding in London (Tooze [2018/2019], pp.81-82).

The dynamics in global rehypothecation of US Treasury securities as collateral assets via OFCs drove the endogenous finance of the global dollar by global dealers in the shadow banking system to become highly elastic in the run-up to the GFC. **Figure 3** illustrates the outstanding external liabilities to foreigners by US financial institutions relative to the size of world GDP since Nixon Shock in 1971, when the US dollar-centric international monetary system transformed from the gold-dollar standard system under the BW system into the US dollar standard system in the floating exchange rate system.

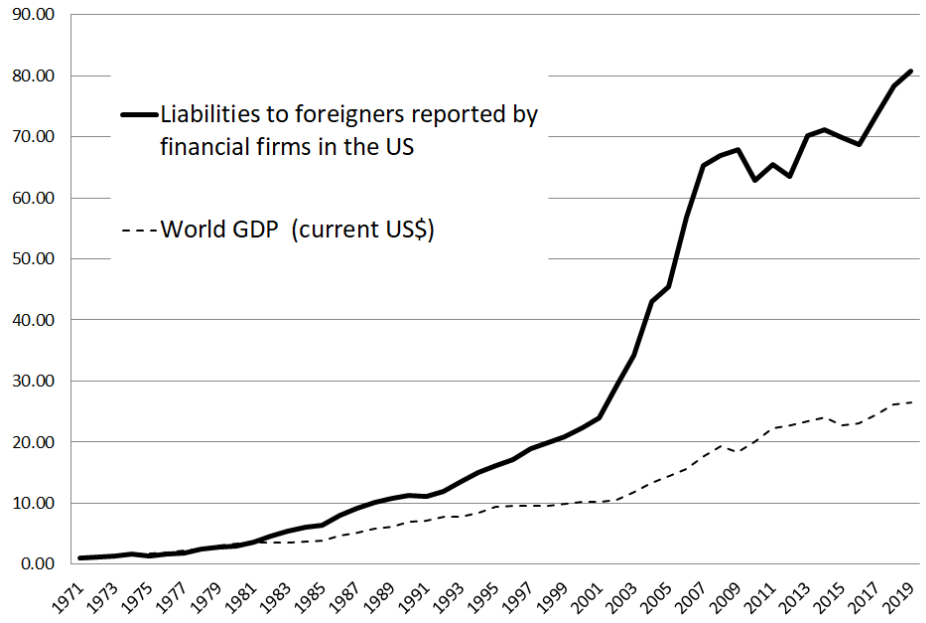

Figure 3: The Explosion of the Outstanding External Liabilities to Foreigners by US Financial Institutions Relative to the Size of World GDP (Index: 1971=1)

Notes: 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, excluding bonds and notes of maturities longer than one year.
Sources: Own estimation on Board of Governors of Federal Reserve System, *Federal Reserve Bulletin*, various issues; World Bank database.

Although the figure's time-series data contains all types of US financial institutions' external liabilities, it can be used as a proxy of the growth of global dollar supply from the US financial system, including US shadow banking system, to the rest of the world in the long run. The volume of global dollar supply from US financial institutions vis-à-vis non-residents had moderately increased until the late 1990s, amounting to 22.29 in 2000. Most surprisingly, it skyrocketed in the 2000s, especially during the US housing bubble, reaching from 34.15 in 2003 to more than 65.28 in 2007, while the size of world GDP

increased from 11.38 to 17.63, respectively. As such, the explosion of global dollar creation from the US financial system during the US housing bubble implies that the endogenous finance of the global dollar supply in the shadow banking system became highly elastic during the period.

Overall, the endogenously elastic finance of the global dollar by global dealer banks in the shadow banking system is driven by the global collateral plumbing of US Treasury securities as universal collateral assets, determining the dynamic nature of the global dollar creation, which is largely unexplored by heterodox literature regarding the passive role of NBFIs activities.

4. Conclusions

Most of heterodox scholar stresses that nonbank financial institutions (NBFIs) play a passive role as financial intermediaries. Extending the stylized interpretation of the passive role of NBFIs' financial intermediation in closed economy into a global context would suggest that NBFIs' creation of the global dollar may be characterized as passively international financial intermediation.

However, the stylized interpretation lacks understanding how dynamic global dealer banks create endogenously the global dollar more elastic in the shadow banking system. Notably, the endogenous finance of the global dollar became highly elastic during the US housing bubble (2004-06).

Particular importance in our arguments is placed on the endogenous finance of the global dollar by dealer banks in the shadow banking system is driven by the global collateral plumbing of US Treasury securities as universal collateral assets, determining the dynamic nature of the global dollar creation in modern international financial markets, which is very far from the passive nature of global financial intermediation denominated in the dollar common in heterodox academic literature on the role of NBFIs.

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