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NEW RISKS TO GLOBAL FINANCIAL STABILITY

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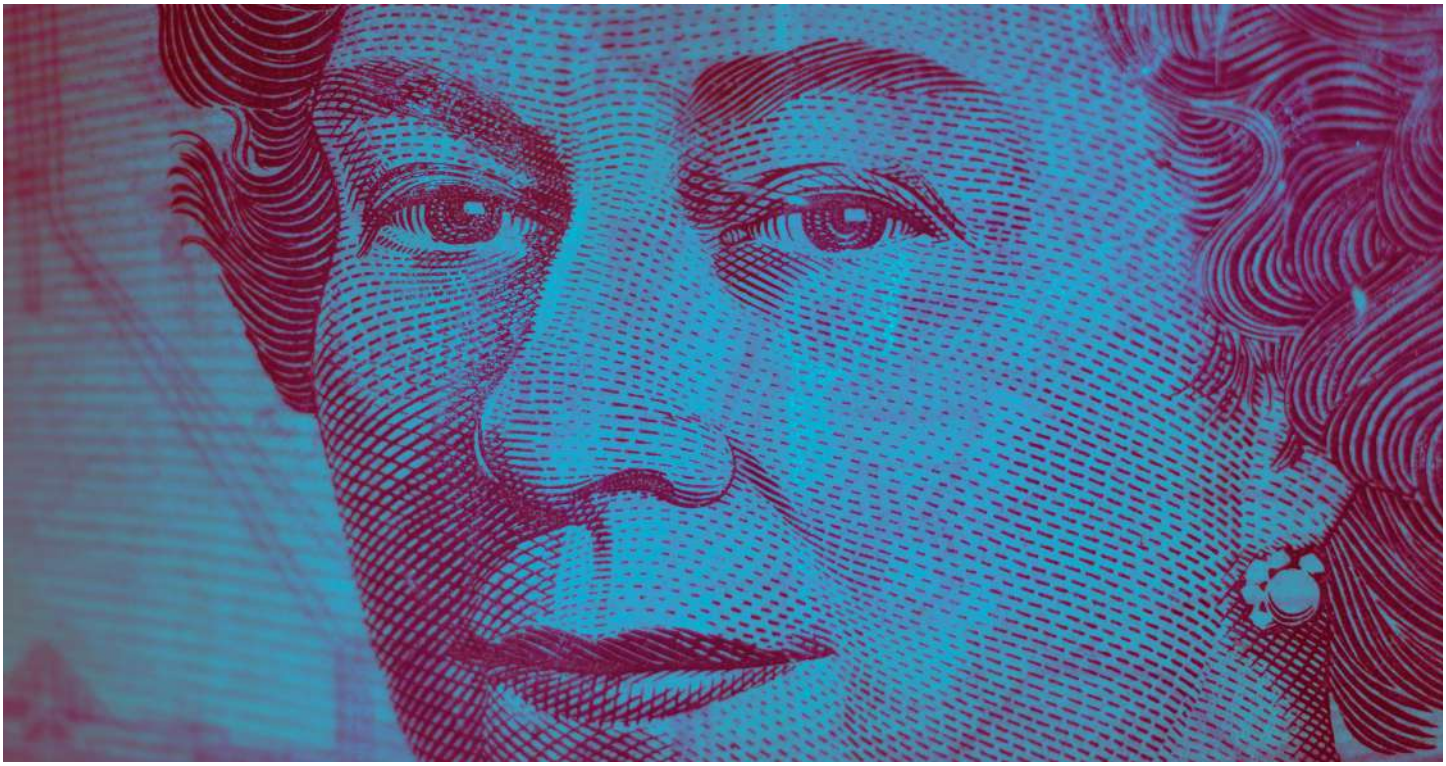
In its 2011 report "Global Liquidity—Concept, Measurement, and Policy Implications," the Committee on the Global Financial System (CGFS) presented a comprehensive analysis of global liquidity problems and how to guard against a global liquidity crisis—especially one comparable in scale to the 2008 financial crisis.[1] It recommended policy responses along three lines of defense: prevention of excess liquidity; strengthening domestic policy measures; and cooperative provision of central-bank liquidity. These are well-targeted and useful recommendations, and have contributed to the promotion of global financial stability.

Nevertheless, economic and financial developments since 2011 suggest that a review and update of the CGFS analysis and recommendations can be useful for identifying new and evolving areas of vulnerabilities and preparing for the next financial crisis—not just guarding against a repeat of the previous one.

Basically, the post-2008 financial regulatory reform has strengthened the banking system, bringing the bank-generated liquidity expansion under control. However, central-bank liquidity has been growing significantly for more than a decade, and financial mediation has moved from banks to non-bank financial institutions, and from lending to capital-market transactions—creating new financial imbalances and distortions, and posing new areas of vulnerability that require appropriate policy responses.

The Global Business & Economics Program (GBE) works to strengthen the already deep economic integration between Europe and the United States as well as promote transatlantic leadership in the global economy. GBE is committed to finding multilateral solutions to today's most pressing global economic opportunities and risks. Key challenges the program addresses include fostering broad-based economic growth, advancing understanding of the impact of economic sanctions, and defining the future shape of the rules-based international trade order.

1 Committee on the Global Financial System, "Global Liquidity—Concept, Measurement and Policy Implications," Bank for International Settlements, November 2011, https://www.bis.org/publ/cgfs45.pdf.



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I. PREVENTION OF EXCESS LIQUIDITY

One of the keys to guarding against liquidity crises is to prevent the build-up of excess liquidity, usually understood as private-sector liquidity and measured as the deviation from trend of bank-credit growth relative to nominal gross-domestic-product (GDP) growth, i.e. credit gaps. The recommended policy is to strengthen the financial regulatory framework and its implementation, to prevent excessive private-sector liquidity growth. By this yardstick, developments since the 2008 financial crisis have been positive: regulatory reforms anchored around the Basel III post-crisis framework have been largely accomplished, helping to improve the quantity and quality of banks' capital, as well as their liquidity positions and funding practices—leading to a noticeable deleveraging in the banking system.

Specifically, private-sector credit gaps have been under control in major economies since the 2008 crisis. In fact, according to the Bank for International Settlements (BIS), credit gaps in the United States and the euro area have been negative—credit has been expanding much slower than nominal GDP growth, relative to trend.[2] In the United States, the credit gap has moved in the right direction, from -15.6 percent of GDP in 2013 to -6.6 percent in 2018. However, it has moved the wrong way in the euro area—from -8.7 percent of GDP in 2013 to -13.1 percent last year—posing a significant challenge to growth prospects there. China, which engineered a huge fiscal stimulation and credit expansion to support its economy during the Great Recession, has seen its credit gap narrowing significantly, from +18.3% of GDP in 2013 to basically balanced now.

Moreover, bank funding structure has visibly improved. According to the International Monetary Fund (IMF), for Group of Three (G3) banks (in the United States, Europe, and Japan), the ratio of core funding (mainly sticky retail deposits) to non-core funding (mainly wholesale funding) has increased from 0.65 in 2007 to almost 1.1 at present.

However, while banks are by and large stronger, and have not generated excessive liquidity growth, liquidity creation has shifted to other actors and markets.

2 "Credit-to-GDP Gaps," Bank for International Settlements (BIS), last updated September 22, 2019, https://www.bis.org/statistics/c_gaps.htm.

Most notable has been the enormous growth of public liquidity via the expansion of the balance sheets of major central banks around the world, as a result of their quantitative-easing (QE) programs. The four major central banks (CBs)—the US Federal Reserve (Fed), European Central Bank (ECB), Bank of Japan (BOJ), and People's Bank of China (PBOC)—have accumulated assets worth $19.4 trillion at present, accounting for more than 100 percent of Japan's GDP, about 40 percent of that of the euro area or of China, and about 20 percent of the US GDP. First conceived as extraordinary, but necessary, measures to fight the 2008 financial crisis and its aftermath, the huge provision of CB liquidity has gone on for more than a decade, and the global economy and financial markets seem to need it on an ongoing basis.

Such significant expansion of CB liquidity via asset purchases—together with low-for-long interest-rate policies and a regulatory environment that encourages the holding of high-quality and liquid assets by financial institutions—has led to tremendous demand for such assets relative to available supply, pushing a significant amount of $17 trillion in bonds (including $1 trillion in corporate bonds) into negative-nominal-yield territory. This has complicated the task of long-term-saving institutions, such as pension funds and life-insurance companies, and made it more difficult for many banks, especially in Europe, to be profitable. It also undermines the pricing mechanism for credit risks and actuarial calculations. Moreover, this has unleashed a powerful search for yield, leading to excessive risk taking and overvaluation in various market segments—particularly in the corporate debt markets (see sections below). Just as importantly, such permissive financing conditions have kept "zombie companies" (those not profitable enough to pay interest) alive, undermining the Schumpeterian creative-destruction process, which can reinvigorate the economy.[3] This has sapped the dynamism of the economy (for example, as reflected in the decline in the birth and death rates of US companies), and has probably contributed to the stagnation of productivity growth.[4] In short, policymakers need to better understand this new phenomenon, and find ways to combat the downside risks.

Another area of vulnerability in the banking system is the fact that banks and other financial institutions outside the United States have built up a substantial amount of US-dollar (USD) liabilities, estimated to be up to $15 trillion.[5] Those institutions have largely relied on short-term interbank and currency-swap markets for funding, thus becoming vulnerable to changes in market sentiment and risk appetite. In fact, the persistence of large negative cross-currency-basis swap spreads suggests that such non-US institutions have to pay a premium to access USD funding. More importantly, when they run into funding distresses, they don't have recourse to a lender of last resort that can provide emergency USD liquidity on a scale commensurate with the potential funding need.

To compound the problem, non-banks outside the United States, the euro area, or Japan, have also increased their foreign-currency debt (with more in bond than bank financing). According to the BIS, the non-bank foreign-currency debt amounts to $11.8 trillion, or 14 percent of world GDP, for the USD at the end of 2018, as well as 4.5 percent for the euro and 0.5 percent for the yen.

Many of the issues mentioned above have also been discussed by André Icard and Philip Turner in "A New Global Liquidity Crunch?"[6] However, an important development that warrants more analysis—and the focus of this section—is the disintermediation of the banking system by non-bank financial institutions and through capital markets. Non-bank financials—such as mutual funds and exchange-traded funds (ETFs), insurance companies, pension funds, sovereign wealth funds, and endowments—have exceeded banks in terms of assets, with an estimated $135 trillion versus $127 trillion held by banks.[7] They have increasingly replaced

3 Joseph Schumpeter described the process whereby bankruptcies of unprofitable companies clear the deck and set the stage for channeling resources to new and promising companies.

4 "Dynamism in Retreat: Consequences for Regions, Markets and Workers," Economic Innovation Group, February 2017, https://eig.org/wp-content/uploads/2017/02/Dynamism-in-Retreat.pdf.

5 Stephen G. Cecchetti and Kermit L. Schoenholtz, "The Dollar is Now Everyone's Problem," *Money$Banking*, September 20, 2014, https://www.moneyandbanking.com/commentary/2014/9/29/the-dollar-is-now-everyones-problem.

6 André Icard and Philip Turner, "A New Global Liquidity Crunch?" Robert Triffin International, October 17, 2019, http://www.triffininternational.eu/images/global_liquidity/17October2019_RTI-RBWC_Washington_SLIDES.pdf.

7 "Banks in the Changing World of Financial Intermediation," McKinsey & Company, November 2018, https://www.mckinsey.com/industries/financial-services/our-insights/banks-in-the-changing-world-of-financial-intermediation.

Global markets in corporate bonds and leveraged loans have grown very rapidly in the past decade. *Photo credit: Unsplash/Markus Spiske*

banks in funding companies, both by directly lending to them (including in the leveraged loan market) and by buying corporate bonds. The global markets in corporate bonds and leveraged loans have grown very rapidly in the past decade or so, and has exhibited signs of vulnerability in various market segments. In particular, those non-bank institutions have relied substantially on the short-term repurchase (repo) market to help fund their securities portfolios, which exposes them to any events draining cash from the private sector. This will be discussed in detail below.

A. RISKS OF BBB CORPORATE BOND DOWNGRADE AND SELL-OFFS

After the 2008 financial crisis, the global non-financial corporate sector has significantly stepped up its borrowing activity, boosting the outstanding amount of debt to $72.6 trillion (or 91.4 percent of world GDP) as of the first quarter of 2019, according to the Institute of International Finance. This level of debt well exceeds that of the government sector's $67 trillion (or 87.2 percent of GDP), reflecting rising leverage by the corporate sector—whose debt-to-EBITDA (earnings before interest, tax, depreciation, and amortization) ratio has increased to 4.8 times at the end of 2018, compared with four times in 2011, according to Standard & Poor's (S&P) Global.[8]

Of particular note is the shift from bank lending to capital-market financing, with the volume of annual corporate bond issuance having doubled from the average of $860 billion before the 2008 crisis.

At the same time, the quality of the corporate bond market has deteriorated steadily, despite the fact that large international corporations have been profitable. According to the Organisation for Economic Cooperation and Development (OECD), the share of BBB-rated bonds—just one grade above high-yield (HY) or junk status—is now about 54 percent of the global investment-grade (IG) corporate bond market

8 "Next Debt Crisis: Will Liquidity Hold?" S&P Global, March 2019, https://www.spglobal.com/_assets/documents/corporate/global-debt_will-liquidity-hold-v11mar2019.pdf.

(or about $7 trillion out of $13 trillion).[9] Specifically for the United States, BBB bonds amount to $3.2 trillion, or about 53 percent of the US IG corporate bond market.

Historically, the rate of migration from BBB to HY bond status (BB or lower) averages 4 percent within a one-year time horizon, with a maximum rate of 10 percent.[10] In 2009, during the latest recession, the migration rate rose to 7.5 percent. If this were to happen again in the next recession, there could be a potential supply of up to $525 billion of newly downgraded junk bonds within one year. This would have a significant "cliff effect" on the corporate bond market.

Since most corporate bond investors have a strict IG mandate—especially among the fast-growing passive, indexed mutual funds and ETFs—most of the new HY bonds will be liquidated by these investors. On the other side of the market, investors in HY bonds are relatively limited, holding an outstanding amount of $1.2 trillion of US names, and about the same amount of European and emerging-market names—and are normally able to absorb about $275–300 billion of new annual issuance. Therefore, the potential volume of additional, newly downgraded HY bonds will likely overwhelm the absorption capacity of the natural buyers of such securities. In an already illiquid corporate bond market, such a substantial imbalance will cause sharp downward price movements, especially from the historically high current levels, and probably in disorderly market conditions. In a recessionary environment, such sharply negative price swings will have significant contagion effects by intensifying investor risk aversion, to the detriment of other financial markets.

Because this is a realization of a cliff effect built up over many years, it is difficult to guard against—as compared to the redemption risk, which can be mitigated by investment funds holding a higher share of cash to meet redemption demand without forced selling.

B. RISKS IN THE LEVERAGED-LOAN MARKET

Until recently, prospects of rising interest rates shifted investor demand from the fixed-rate HY bond market to the floating-rate leveraged-loan (LL) market. According to Dealogic, the US LL market had grown to $1.5 trillion in outstanding value at the end of 2018, larger than the US HY bond market at $1.2 trillion. About 80 percent of the LL market comprises covenant-lite loans, which afford little or no protection to investors. In addition, the European corporate LL market has been estimated at about €250-€400 billion in size, also with a growing share of covenant-lite loans.

In terms of distribution, more than 88 percent of US leveraged loans are held by non-banks, according to the US Office of Financial Research. US banks account for only 4.9 percent of the LL market, with comparable amounts held by non-US banks. Of the non-bank portion, 65 percent are held by collateralized loan obligations (CLOs).[11] Another 27.9 percent are held by loan and high-yield mutual funds, and 5.8 percent by insurance companies. The relatively small share of bank LL holding has prompted observations that the LL market now poses less risk to the banking system, and, thus, carries less systemic risk.

However, the insufficient transparency in the LL and CLO markets suggests that several risks need to be monitored and addressed.

First, banks are still the largest originators of leveraged loans, with new issuance estimated at $300 billion this year. In addition to the 8 percent of the LL market, banks account for 17.6 percent of the US domestic holding of CLOs issued out of the Cayman Islands—estimated to be $393 billion out of a total outstanding of $457 billion. Other financial institutions, including bank holding companies, hold another 10.2 percent.[12] Adding the outstanding amount of CLOs issued domestically in the United States, the total size of the US CLO market amounts to $616 billion, 88 percent of which is held by US domestic investors and 12 percent by foreign investors.

9 Serdar Çelik, Gül Demirtaş, and Mats Isaksson, "Corporate Bond Markets in a Time of Unconventional Monetary Policy," Organization for Economic Cooperation and Development, February 25, 2019, http://www.oecd.org/corporate/Corporate-Bond-Markets-in-a-Time-of-Unconventional-Monetary-Policy.pdf.

10 Ibid.

11 Colin Teichholtz, et al., "OFR FRAC Working Group: Leveraged Lending & CLOs," US Office of Financial Research, July 11, 2019, https://www.financialresearch.gov/frac/files/OFR_FRAC-meeting_Leveraged_Lending_CLOs_07_09_2019.pdf.

12 Emily Liu and Tim Schmidt-Eisenlohr, "Who Owns US CLO Securities?" Board of Governors of the Federal Reserve System, July 19, 2019, https://www.federalreserve.gov/default.htm.

Banks also extend credit to CLOs and other players to facilitate their operations. As a result, banks are still exposed to the credit risk of LLs and CLOs—both as holders of those instruments and lenders to other buyers—as well as pipeline and inventory risks as originators of leveraged loans. Indeed, in its July 2019 Financial Stability Report, the Bank of England concluded that global banks are exposed, in various forms, to more than half of the global leveraged-loan and CLO markets.[13]

Second, there is still insufficient understanding about the risk of price erosion of senior tranches of CLOs. Some have argued that CLOs had been much more resilient than collateralized debt obligations (CDOs) based on subprime mortgage loans during the 2008 financial crisis, and that current CLOs have been over-collateralized with better documentation. Still, the fact remains that CLO tranches—including AAA-rated senior tranches protected by junior tranches that absorb first losses—can experience sharp and sudden price erosion if there is a high level of correlation in defaults among the very weak and highly leveraged corporate borrowers that make up the LL and CLO markets, especially in the event of a deep recession.

Third, many US retail mutual funds hold significant amounts of LLs (accounting for 27.9 percent of the non-bank holding of the market) and CLOs (accounting for 18.9 percent of the total)—in contrast to Europe, where such instruments are not compliant with Undertakings for Collective Investment in Transferable Securities (UCIT), and not available to retail investors. The US mutual funds offer daily liquidity to retail investors who are facing very illiquid markets for LLs and CLOs—with many trades taking up to twenty days to settle. Such a liquidity mismatch suggests potential risk of large redemption demand by investors, potentially forcing fire sales by the funds and exacerbating falling markets.

Overall, there is an urgent need to collect more granular data about the LL and CLO markets, particularly in terms of who holds such instruments and how they manage their exposures. Moreover, mutual-fund managers should be encouraged to strengthen liquidity risk management, especially by holding sufficient cash to meet potential redemption demand and including "gatekeeping" features in funds' contracts.

C. HIGHLY LEVERAGED SMALL-CAP CORPORATE BORROWERS

While corporations have increased their leverage since the financial crisis, different segments of the market—differentiated by market capitalization—face different degrees of vulnerability.

According to the Institute of International Finance (IIF), large-cap companies in the United States—those with market capitalization above $5 billion, comprising six hundred and twenty-eight companies out of the 2,951 listed on all domestic exchanges—have seen their median interest coverage ratio (ICR), as measured by the EBIT/interest expenses ratio, declining from around 10 times (x) before the 2008 crisis to around 6x at present[14].

Mid-cap companies—those with market caps between $1 and 5 billion, numbering eight hundred and sixty units—have experienced a similar fall in their median ICR, from around 6x to 4x over the same time period.

Most concerning are the small-cap companies—those with less than $1 billion in market cap, but accounting for 1,463 firms, or half the universe of listed companies—having their median ICR falling visibly from 2–4x before the crisis to 0x–negative at present. In particular, about half of the small-cap companies are loss-making, yet still able to refinance their debt. Those are clearly "zombie" companies, kept alive by the low-interest-rate environment engendering a strong search for yields by investors. If a recession materializes, or when interest rates rise, these companies will be severely distressed, with many facing bankruptcy. Even though each of them is small, if enough of them fail at the same time, such an event will constitute a major shock to the financial system—somewhat similar to the US savings-and-loan crisis in the early 1980s.

Because these small-cap non-financial companies are not subject to any form of prudential supervision, there is not much financial regulators can do to address this

13 "Financial Stability Report," Bank of England, July 2019, https://www.bankofengland.co.uk/-/media/boe/files/financial-stability-report/2019/july-2019.pdf?la=en&hash=976688AB50462983447A8908BE079743A3E3905F.

14 "Growing Risk in the US Corporate Sector," Institute of International Finance, January 8, 2019, https://www.iif.com/Publications/Members-Only-Content-Sign-in?returnurl=/publications/id/3206.

Certain countries have high levels of foreign exchange debt and have already suffered from sharp increases in their debt burdens through a depreciation of their currencies. *Photo credit: Unsplash/Christine Roy*

risk—except by encouraging banks and other financial institutions to strengthen their credit risk-management practices and limit their exposures to such borrowers.

D. FOREIGN-EXCHANGE DEBT OF EMERGING-MARKET BORROWERS

Emerging-market (EM) indebtedness reached a record $69 trillion, or 216 percent of that market's GDP, in the first quarter of 2019, according to the IIF. Borrowing by EM non-financial corporations (NFC)—whose debt amounts to $30.1 trillion, twice the debt level of other sectors of the EM economy—has increased very quickly over the past decade. Of particular concern is the rapid increase in China's NFC debt, which has grown by $15.4 trillion since 2009. Thanks to the official effort to slow down the pace of shadow-banking lending, the share of China's NFC debt to GDP has declined from 158.3 percent in the first quarter of 2018 to 155.6 percent—still the highest ratio in the world, dwarfing the average ratio of 90.7 percent in mature-market countries. This remains a major challenge to Chinese authorities, and has complicated their efforts to support a slowing economy.

Another concern is the growing share of weak EM corporate borrowers that have ICRs of less than 2x. For example, such companies hold almost 50 percent of the corporate assets in Brazil, and about 20 percent in Turkey, India, and Indonesia. Those pockets of weakness will experience severe stress when financial conditions become more challenging.

While EM governments and corporations have borrowed more in local currencies in the past decade, their foreign-currency debt has reached about $8.5 trillion, or 31.2 percent of GDP—historically high, though not at a record ratio. China accounts for $1.7 trillion of the EM total. The foreign-exchange (FX) debt is mainly denominated in USD, except in Eastern European countries where the euro dominates. As a result, many EM countries are vulnerable to shifts in international investor sentiment, leading to sudden stops of capital inflows and a weakening of their currencies.

Certain countries have high levels of FX debt and have already suffered from sharp increases in their debt burdens through a depreciation of their currencies. These include Argentina (whose government sector has FX debt at 71.3 percent of GDP) and Turkey (whose NFC-sector FX debt is at 41.1 percent). The NFC sectors of other countries are also vulnerable to the sudden stop of capital inflow and weakening of their currencies: Hungary (32 percent of GDP), the Czech Republic (25.1

percent), Chile (36.9 percent), Mexico (18.7 percent), Brazil (15.8 percent), Malaysia (17.9 percent), South Korea (18.4 percent), and South Africa (17.2 percent).

E. STRESS IN REPO MARKET: NOT A SHORTAGE OF LIQUIDITY, BUT ITS MALDISTRIBUTION

During the four-day period from September 17–20, 2019, the US repo market—the lifeblood helping many market participants fund their securities holdings—experienced severe stress, forcing the overnight repo rate to jump from around 2.25 percent at the top of the Federal Reserve's target range (just before the Fed cut rates) up to 10 percent. To calm the market, the Fed had to add liquidity via overnight repo operations—the first time since 2009—for up to $75 billion from September 17–23, and thereafter until October 10, for at least $75 billion. The Fed also promised three fourteen-day repo operations for at least $30 billion each between September 24-27, and "to conduct repo operations as necessary to help maintain the federal funds rate in the target range"—which was recently lowered to 1.75–2 percent.

According to many market participants, the repo-market funding squeeze was triggered by the coincidence of the third-quarter corporate tax payments and institutions' settlements for recent US Treasury auctions. These payments boosted the Treasury General Account at the Fed by $119 billion, draining cash from the private sector. This had a large impact, as it occurred against the backdrop of the Fed having shrunk its balance sheet by about $800 billion since the beginning of 2015, as well as the substantial use by foreign central banks of the Fed reverse-repo facility—the foreign repo pool has since approached $300 billion.[15] These activities have supposedly caused a shortage of USD liquidity, which helped trigger the cash squeeze. Consequently, in order to avoid such episodes of funding stress, the Fed should restart QE by again buying treasuries and other securities to inject liquidity to the financial system.

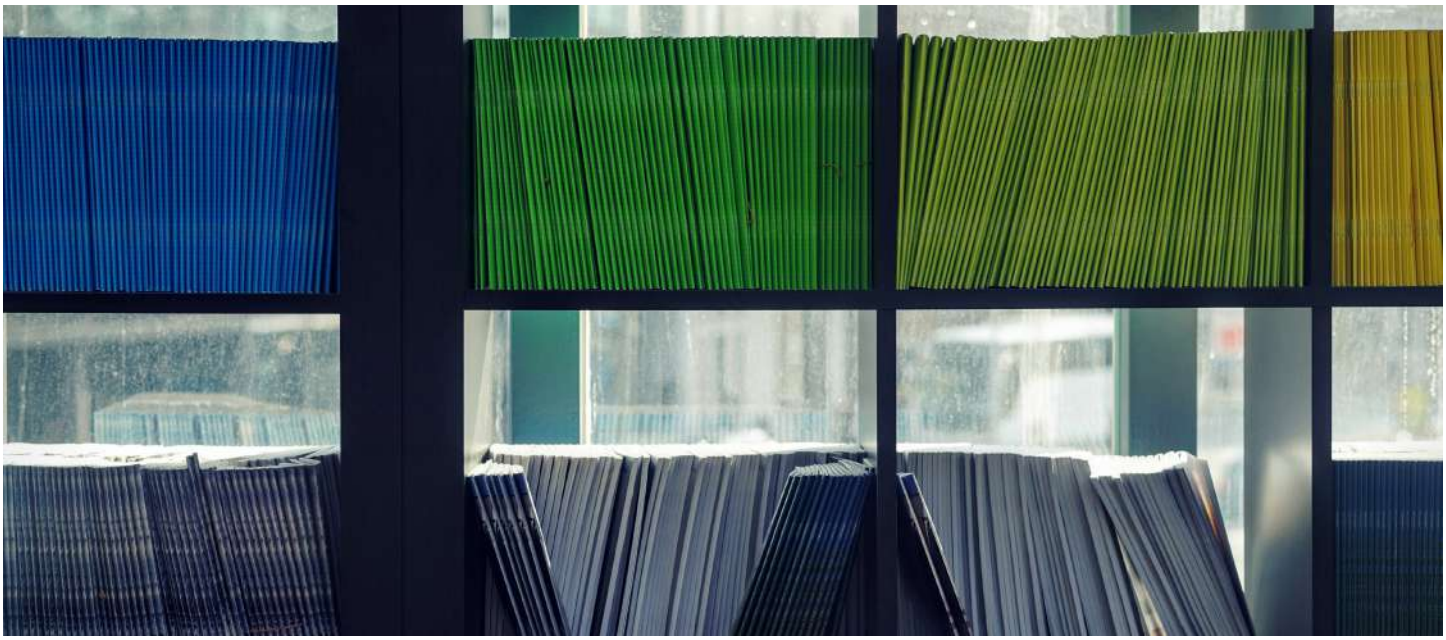
While the above explanations and proposed remedy are technically correct, they miss the larger point: the problem is not a shortage of liquidity, but its poor distribution. During its phase of quantitative easing (2009–2015) the Fed boosted its balance sheet from around $870 billion to $4.5 trillion; then, in the quantitative-tightening phase (2015–2019) the Fed has shrunk its balance sheet down to $3.8 trillion. Most of the rise and fall in the central-bank liquidity ended up as excess reserves of US banks—rising from practically zero before the 2008 financial crisis to a peak of $2.7 trillion in mid-2014, and down to $1.4 trillion at present. This is less than in the peak period, but still more than banks are required to have. Moreover, because excess reserves get paid interest by the Fed (i.e., interest on excess reserves—IOER—which was set at the top of the Fed funds target range until June 2018, and below that since then) and banks face increased capital and liquidity charges on their short-term exposures under Basel III, they have much less incentive to lend or participate in the repo market (or, for that matter, in the non-collateralized interbank market, where the decline in bank participation has been even more noticeable).

Indeed, the share of banks in the repo market has collapsed, from more than 17 percent to about 5 percent, contributing to a reduction of the repo market's size from $4.3 trillion before the crisis to $2.3 trillion at present.[16] By contrast, non-bank institutions—such as securities companies, brokers and dealers (those not affiliated with bank holding companies), money-market mutual funds, hedge funds, etc.—rely heavily on the repo market to help fund their growing portfolios of securities, especially corporate bonds. Until now, their funding needs have been met by the supply of funds from other non-bank institutions, but the supply-demand balance has been shown to be quite delicate, vulnerable to cash-draining events such as corporate tax payments.

Under those circumstances, asking the Fed to renew QE to add liquidity to the financial system will not fully address the potential funding problems in the repo market. Renewed QE will only increase banks' excess reserves without supplying much additional liquidity to the repo market, which is now mainly used by non-bank market participants. Reestablishment of

15 Izabella Keminska, "There's a Blackhole in the Dollar Funding Market," *Financial Times*, August 23, 2019, https://ftalphaville.ft.com/2019/08/22/1566491938000/There-s-a-black-hole-in-the-dollar-funding-market/.

16 Stephen G. Cecchetti and Kermit L. Schoenholtz, "Bank Financing: The Disappearance of Interbank Lending," Money$Banking, March 5, 2018, https://www.moneyandbanking.com/commentary/2018/3/4/bank-financing-the-disappearance-of-interbank-lending.



Since the 2008 financial crisis, concerns about risks to global financial stability have elevated macroprudential supervision to part of the main responsibilities of financial regulators *Photo credit: Unsplash/Maarten van den Heuvel.*

the Fed permanent repo facility, as proposed by the St. Louis Fed, can address the problem.[17] However, if implemented, this will probably complicate the Fed's task as it attempts to implement its monetary policy decisions in setting the Fed funds rate targets by using a variety of tools: fixing the IOER for banks, and adjusting the quantity of liquidity in the repo market via the reverse-repo and now-repo facilities, dealing with a larger set of counterparties, but mostly with non-banks. This could make monetary policy more complicated, and possibly less effective.

Moreover, being expected to stabilize the repo market on an ongoing basis poses a risk of moral hazard—the Fed could end up facilitating the growing holding of securities, especially corporate debt of lower credit quality, attracting demand in the current search for yield environment. This heightens concerns about debt sustainability going forward: US corporate debt has risen to 74 percent of GDP, while government debt has reached 101.2 percent—with prospects of noticeable increases given the trillion-dollar-plus federal deficits starting from this fiscal year.

II. DOMESTIC POLICY MEASURES

These measures are recommended to strengthen macroprudential policies and to maintain FX reserves sufficient to be able to provide emergency funding to corporate borrowers in foreign currencies if they cannot obtain funding from private markets.

A. THE NEED TO FURTHER DEVELOP MACROPRUDENTIAL POLICY TOOLS

Since the 2008 financial crisis, concerns about risks to global financial stability have elevated macroprudential supervision to part of the main responsibilities of financial regulators, especially central banks. Macroprudential supervision is meant to complement microprudential regulation (focusing on the safety and soundness of individual banks or financial institutions) by examining the linkages and interactions between financial institutions and markets that could amplify systemic risks, triggering a global financial crisis.

The Basel III framework has gone some way in furnishing macroprudential policy tools. These include macroprudential overlays targeting potentially risky

17 David Andofatto and Jane Ihrig, "Why the Fed Should Create a Standing Repo Facility," Federal Reserve Bank of St. Louis, March 6, 2019, https://www.stlouisfed.org/on-the-economy/2019/march/why-fed-create-standing-repo-facility.

activities, such as trading or derivative exposures, or systemically important institutions, as well as counter-cyclical capital buffers. Accounting reforms implementing expected loss provisions by banks are also meant to reduce the pro-cyclicality of balance sheet growth. These are useful measures, but they deal mainly with banks, not non-bank financial institutions.

The requirements for derivative contracts to be centrally cleared (which has been successfully implemented) and for non-cleared over-the-counter (OTC) contracts to have higher margins apply to all financial institutions, and have helped to contain the degree of interconnectedness in the financial system.

The above measures, in any event, have not been tested over a full cycle. The only truly tested and reliable measure remains the loan-to-value (LTV) ratio in the mortgage market. It is useful, but limited in scope, and again applicable only to banks, not to the growing ranks of non-bank mortgage originators.

Basically, it is not easy to monitor and determine when a financial crisis is about to materialize, and to take action to forestall it. In fact, together with the IMF, major central banks have published regular financial-stability reports. These reports examine a variety of indicators of financial stress—including credit/debt growth, credit/GDP gaps, credit quality of loans or bonds, potentially extreme valuations of assets, excessive positioning, and crowded trades—to assess evolving risks to financial stability. However, it is not clear that any indicators have proven robust and reliable enough to give a clear warning of impending crisis, and compelling enough to demand forceful actions from regulators. Even if such a warning can be given, it is not clear what policy tools regulators can use to diffuse or mitigate the perceived risk.

The case of leveraged loans demonstrates the difficulty of assessing financial stability risk and doing something about it. In March 2013, the Board of Governors of the Federal Reserve, the Office of Comptroller of the Currency (OCC), and the Federal Deposit Insurance Corporation (FDIC) jointly issued the leveraged-lending guidelines, encouraging banks to strengthen underwriting standards. Regulators had expressed concerns about the strong growth of leveraged loans, dominated by covenant-lite issues and more loans at high leverage (in the first quarter of 2013, the debt-to-EBITDA ratio of newly issued leveraged loans averaged 5.8x, according to the Loan Pricing Corporation).[18] The regulatory agencies followed up in 2014 with a list of frequently asked questions (FAQs) to clarify their intentions.

However, in May 2017, a New York Fed staff study found that the leveraged-lending guidelines were not effective in mitigating the perceived systemic risk: while large banks showed signs of refraining from participating in highly leveraged transactions, the leveraged-loan market migrated to non-bank players, and the banks were still exposed to the market via lending to those non-banks.[19] In 2017, the US Government Accountability Office (GAO) found that the joint agency guidelines were, in fact, rules—but the agencies had failed to follow proper rule-making procedures by inviting public comments and submitting drafts to the GAO and Congress for review, in accordance with the Congressional Review Act.[20] This put the guidelines on dubious legal footing. In a statement on September 11, 2018, the agencies acknowledged that they would not take enforcement actions based on the guidelines, but still expressed their concerns about the leveraged-loan market in their February 25, 2019, response to queries from US Senator Elizabeth Warren.[21] Indeed, the leverage ratio for buyouts has increased further, to 6.96x debt-to-EBITDA in the first quarter of 2019, according to the Loan Pricing Corporation.[22] Furthermore, the

18 "Interagency Guidance on Leveraged Lending," Board of Governors of the Federal Reserve System, Federal Deposit Insurance Company, Office of the Controller of the Currency, March 21, 2013, https://www.federalreserve.gov/supervisionreg/srletters/sr1303a1.pdf.

19 Sooji Kim, Matthew C. Plosser, and João A.C. Santos, "Macroprudential Policy and the Revolving Door of Risk: Lessons from Leveraged Lending Guidance," Federal Reserve Bank of New York, May 2017, https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr815.pdf?la=en.

20 US Government Accountability Office, "Letter to Senator Pat Toomey," Congressional Record—Senate, October 19, 2017, https://www.congress.gov/crec/2017/10/19/CREC-2017-10-19-pt1-PgS6636-2.pdf.

21 "Interagency Statement Clarifying the Role of Supervisory Guidance," Board of Governors of the Federal Reserve System, Federal Deposit Insurance Corporation, National Credit Union Administration, and Office of the Comptroller of the Currency, September 11, 2018, https://www.fdic.gov/news/news/press/2018/pr18059a.pdf.

22 Kristen Haunss, "Regulators Voice Concerns over US Leveraged Loan Risk," Reuters, May 8, 2019, https://www.reuters.com/article/regulators-levloans/regulators-voice-concerns-over-us-leveraged-loan-risk-idUSL2N22K0OC.

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growing use of "add-backs" (inclusion of projected cuts in operating costs to boost estimated earnings) means that effective leverage can be higher than reported.

The private sector has also pushed back. In March 2019, the Banking Policy Institute (BPI) released a study pointing out that, in the five years following the 2013 issuance of the leveraged-lending guidelines, the default rate in the leveraged-loan market fell to 1.6 percent at end 2018, and was estimated by Fitch Ratings to be 1.5 percent in 2019—quite low by historical standards.[23] As such, the BPI study concluded that the regulatory agencies had made a wrong diagnosis and adopted an ineffective measure concerning the leveraged-loan market.

This episode raises two important issues. First, there is a pressing need to further develop macroprudential policy measures with solid legal and regulatory foundations that cover both banks and non-banks, and can be effective in changing market behavior (beyond expressing regulators' concerns). At the very least, international financial institutions should cooperate to compile and publish timely and comprehensive data on global liquidity conditions. In particular, the IMF should resume its monitoring of global liquidity stresses—a useful exercise it discontinued in 2011.

Second, as mentioned earlier, it is also important to investigate the impact of extraordinary monetary policy measures—which were meant to be temporary to fight the financial crisis and the ensuing recession, but have been in place for more than a decade—on the building up of financial imbalances and distortions. The leveraged-loan market can also serve to illustrate this problem. Low interest rates for a long period, amid plentiful central-bank liquidity and a strong search for yield, have allowed even unprofitable and highly lever-

23 Greg Baer and Brett Waxman, "The Banking Agencies and Leveraged Lending: A Case Study in the Hazards of 'Macroprudential' Regulations," Bank Policy Institute, March 7, 2019, https://bpi.com/the-banking-agencies-and-leveraged-lending-a-case-study-in-the-hazards-of-macroprudential-regulation/.

aged companies to refinance, keeping the default rate low. Being backward looking, such low default rates have nothing to say about the risk of a sharp increase in defaults if the permissive monetary environment changes.

B. ENCOURAGING FINANCIAL DIVERSITY

The diversity of financial institutions, with natural differences in their balance-sheet structures and investment motivations and objectives, can help provide market liquidity and enhance the resiliency of the financial system.[24] This can be developed into an important component of the macroprudential regulatory framework.

Banks—and, to some extent, investment funds—have a positive duration gap in their balance sheets, meaning the average duration of their assets is longer than that of their liabilities. As a result, when interest rates rise, asset prices fall, or credit quality deteriorates, the value of bank assets tends to decline more than their liabilities, putting pressure on their capital and liquidity ratios and forcing them to liquidate falling assets. Investment funds can also sell into falling markets if they need to raise cash to meet redemption demand.

On the other hand, pension funds and insurance companies have a negative duration gap, with the average duration of their assets shorter than that of their liabilities. In adverse circumstances, their assets tend to fall less than their liabilities, strengthening their solvency and allowing them to acquire assets that have declined in price to attractive levels. Thus, they can play a stabilizing role by taking the other side of a falling market.

Indeed, empirical research by staff of the European Systemic Risk Board, using recently available granular data on security holdings by EU institutional investors, shows that insurers and pension funds behaved in a counter-cyclical manner, but the strength of such an effect has weakened since the pre-crisis period.[25]

As a consequence, policymakers should find ways to promote financial diversity, which can help strengthen the resiliency of the financial system. In particular, pension funds and insurance companies should be encouraged to fully implement the anti-cyclical measures prescribed in Solvency II—as highlighted by the European Insurance and Occupational Pension Authority.[26]

C. ACCUMULATING FX RESERVES

Since the 1997 Asian financial crisis, many EM countries have accumulated FX reserves as self-insurance. This seems to have worked. Recent analysis by the BIS shows that countries with FX reserves in the range of 60–80 percent of their GDP have experienced much smaller changes in their currencies (about 10 percent or less) through the crisis period 2006–09.[27] By contrast, countries with much lower reserves—less than 20 percent of GDP—had much sharper exchange-rate changes of 20–40 percent over the same period.

At present, EM countries have about $7.2 trillion of FX reserves, of which China accounts for about $3 trillion, while EMs besides China have about $4.2 trillion. As such, China seems to be well provisioned to provide emergency support to its estimated $1.7 trillion of FX debt. Other EMs, however, are in a less comfortable position to render lender-of-last-resort emergency backstops to their $6.8 trillion FX debt, in addition to the need to provide for three to six months of imports and 20 percent of broad domestic money—these being the criteria for assessing reserve adequacy. Basically, accumulating more reserves would build a more comfortable cushion in times of crisis, but that comes with externalities and opportunity costs. Moreover, when it's necessary to draw down the reserves, that may be perceived negatively by financial markets—leading to a fear of losing reserves.

In any event, and at the very least, authorities in EM countries should require more disclosure about FX borrowing by their public- and private-sector entities,

24 Hung Tran and Jaime Caruana, *Diversity Builds Financial Resilience, Atlantic Council*, April 9, 2019, https://www.atlanticcouncil.org/blogs/new-atlanticist/diversity-builds-financial-resilience/.

25 Yannick Timmer, "Cyclical Investment Behavior across Financial Institutions," European Systemic Risk Board, July 2016, https://www.esrb.europa.eu/pub/pdf/wp/esrbwp18.en.pdf?e853a4ba16e926921a9c72b46a427b4a.

26 "Solvency II Tools with Macroprudential Impact," European Insurance and Occupational Pension Authority, 2018, https://eiopa.europa.eu/Publications/Reports/Solvency%20II%20tools%20with%20macroprudential%20impact.pdf.

27 Agustín Carsten, "Exchange Rates and Monetary Policy Framework in Emerging Market Economies," Bank for International Settlements, May 2, 2019, https://www.bis.org/speeches/sp190502.htm.

so that they have sufficient information to make contingency plans in case of need.

III. COOPERATIVE PROVISION OF CENTRAL-BANK LIQUIDITY

Since the 2008 financial crisis, the global financial safety net has been strengthened. The IMF lending capacity has been increased to $750 billion, and its Flexible Credit Line has become more acceptable for countries to use as a way of warding off speculative financial attacks. The European Stability Mechanism (ESM) has been institutionalized, with a lending capacity of €500 billion, and the Chiang Mai Initiative has been multilateralized and institutionalized, with its reserve fund raised to $240 billion. Important and useful as these institutions are, they have been designed to deal with balance-of-payment crises in one or a small group of countries. For a global liquidity crisis, comparable in scope to that of 2008, those institutions are neither appropriate (the requirement of conditionality prevents them from being able to act on short notice) nor sufficient (their lending resources are finite and constrained by countries' quotas).

In a global liquidity crisis, the key measure able to calm the panic among market participants is the currency-swap agreement among major central banks—a central bank enjoying monetary sovereignty can issue as much of its currency as needed, and at short notice. Of particular importance is the arrangement involving the Fed in providing USD liquidity to other major CBs, which, in turn, can support their own financial institutions unable to get USD funding from private-sector markets. At the height of the 2008 financial crisis, the Fed swap lines with fourteen foreign CBs amounted to $600 billion. Going forward, despite the constraints imposed by the Dodd-Frank law on its ability to employ several lender-of-last-resort tools that were crucial in stabilizing the 2008 crisis, the Fed's ability to arrange currency-swap lines is thought to remain intact.[28] However, in the currently dysfunctional international political environment, full of discord and distrust among political leaders, it is unclear if such timely currency-swap arrangements among major central banks on sufficient scales can, or should, be counted on.

As a consequence, it may be more difficult to stabilize the next global liquidity crisis. In particular, a serious risk facing the international financial system is the fact that non-US banks have a liability of up to $15 trillion USD, yet need to rely largely on short-term interbank and currency-swap markets for refunding, and have no effective lender of last resort as a backstop. If a global financial crisis breaks out, such huge USD funding distress by non-US banks will put the situation in uncharted waters.

IV. CONCLUSIONS

Overall, the banking sector has strengthened since the financial crisis, and has not generated any excessive credit expansion—traditionally a precursor to crisis. Instead, new forms of credit expansion and financial intermediation, via non-bank financial institutions and capital markets, have posed new risks, requiring financial regulators to develop appropriate policy measures to address them. Three new areas of vulnerability have become pressing.

First is the global economy's dependence on extraordinary monetary accommodation to maintain growth, even though such permissive monetary conditions have already created imbalances and distortions in the financial system. As former Fed Governor Jeremy Stein said, "…monetary policy…can get in all of the cracks."[29] The longer this situation persists, the bigger the imbalances and distortions become—which is unsustainable in the long run.

Second is the estimated $15 trillion USD liability incurred by banks and other financial institutions outside the United States. Those banks depend on short-term (and shrinking) interbank and currency-swap markets for refunding, without the comfort of a lender of last resort. It is not clear how those banks can cope with a USD bank run.

Last, but not least, is a range of weaknesses in the corporate debt market, including the preponderance of BBB-rated bonds, highly leveraged covenant-lite loans, leveraging by very weak companies, and growing FX debt in emerging markets vulnerable to sudden stops

28 Timothy Geithner, "Are We Safer? The Case for Strengthening the Bagehot Arsenal," Per Jacobsson Lecture, Washington DC, October 8, 2016, http://www.perjacobsson.org/lectures/100816.pdf.

29 Jeremy Stein, "Overheating in Credit Markets: Origins, Measurements and Policy Responses," Board of Governors of the Federal Reserve System, February 7, 2013, https://www.federalreserve.gov/newsevents/speech/stein20130207a.htm.

in capital flows. In addition, many non-bank institutions rely on the repo market to help fund their securities portfolios, and the US repo market can be vulnerable to funding squeezes following any cash-draining events.

Basically, authorities are being pushed out of their comfort zone (of regulating banks) to reconcile the economy's reliance on monetary accommodation with the ensuing imbalances and distortions posing risks to financial stability, and to develop lender-of-last-resort facilities for banks outside the United States with huge USD liability, as well as buyer-of-last-resort facilities for various weak segments of the corporate debt markets, including for non-US borrowers.

With those challenges, the currently mediocre performance of the global economy, with low inflation and low interest rates, makes the tasks of financial regulators ever more difficult.

Hung Q. Tran is an accomplished economist, with broad experience across the private sector, international organizations and research institutions. From 2007 until retirement in 2018, Mr. Tran was at the Institute of International Finance (IIF). Since 2012 he served as IIF's Executive Managing Director while simultaneously leading its Global Capital Markets Department. Prior to his work at the IIF, Mr. Tran served for six years at the International Monetary Fund as Deputy Director of the Monetary and Capital Markets Department, IMF where he was responsible for the IMF's flagship publication "Global Financial Stability Report." From 1998 to 2001 Mr. Tran served as Managing Director, Chief Economist and Global Head of Research for Rabobank International, a Dutch multinational bank. He spent the previous twelve years with Deutsche Bank, including having been the founding Managing Director of Deutsche Bank Research. Earlier in his career he had served in senior positions in international fixed income research for Merrill Lynch (1984-1987) and Salomon Brothers (1979-1984) in New York.

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