# IMF Working Paper

# Collateral and Monetary Policy

*Manmohan Singh*

**IMF Working Paper**

**Research Department**

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**Prepared by Manmohan Singh**

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## Abstract

Financial lubrication in markets is indifferent to margin posting via money or collateral; the relative price(s) of money and collateral matter. Some central banks are now a major player in the collateral markets. Analogous to a coiled spring, the larger the quantitative easing (QE) efforts, the longer the central banks will impact the collateral market and associated repo rate. This may have monetary policy and financial stability implications since the repo rates map the financial landscape that straddles the bank/nonbank nexus.

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## I. INTRODUCTION

Undergraduate macroeconomic text books use the **IS/LM model** (**I**nvestment/**S**aving; **L**iquidity preference/**M**oney supply) as a construct to demonstrate the relationship between interest rates and real output in the goods and services market and the money market. The intersection of the IS and LM curves is where there is simultaneous equilibrium in both markets (Figure 1).[2] In a simple setting, inward shifts in IS curve (due to a contraction of C+I+G component that decreased output to $Y_B$) can be neutralized by shifting LM out by lowering (nominal or real ) interest rates to attain the initial level of output $Y_A$.

**Figure 1. The IS/LM model**
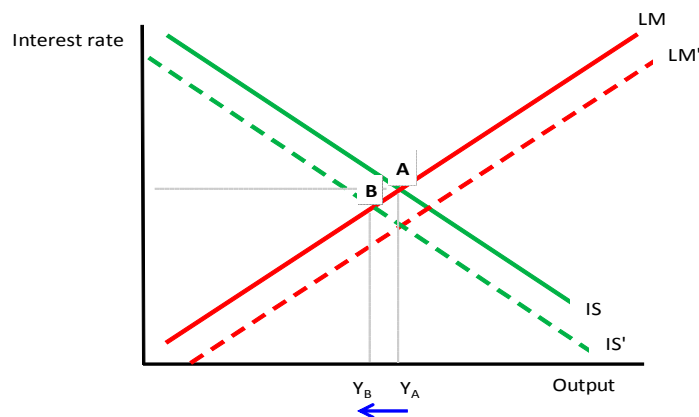


The pioneering works on the financial accelerator highlights that endogenous shocks to credit markets can initiate cyclical effects to the real economy (Bernanke, Gertler, Gilchrist, 1996 or BGG).  Specifically their paper highlights that shocks lead to flight to quality and thus higher cost for risky projects; this shifts  "in" the IS curve since household/firms invest less. Subsequently, the authors show, the financial accelerator can amplify shocks stemming from collateral constraints to the economy in a non-linear and quantitatively significant way (BGG, 1998).

From an overall financial lubrication perspective that requires intra-day debits and credits, and the cross-border financial markets traditionally use "cash or cash equivalent" in lieu of posting margin (i.e. money plus collateral). Collateral is essential to the financial plumbing and underpins a wide range of financial transactions: secured funding (mostly by nonbank

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[2] The horizontal axis represents output or real GDP and is labeled *Y*. The vertical axis represents the real interest rate, *i*. Since this is a non-dynamic model, there is a one-to-one relationship between the nominal interest rate and the real interest rate; therefore variables such as money demand, which actually depend on the nominal interest rate, can equivalently be expressed as depending on the real interest rate. The point where these schedules intersect represents a short-run equilibrium in the real and monetary sectors. This equilibrium yields a unique combination of the nominal/real interest rate and real GDP.

investors), repurchase agreements (or repo), and hedging (primarily with over-the-counter (OTC) derivatives). Last month, member of the Board of Governors of the Federal Reserve System, Daniel Tarullo reiterated that

 *"a major source of unaddressed risk emanates from the large volume of short-term securities financing transactions (SFTs) in our financial system, including repos, reverse repos, securities borrowing, and lending transactions."[3]*

This paper tries to highlight the important role of collateral in monetary policy issues, especially when many central banks have recently experimented with variants of quantitative easing (QE).

The rest of the paper is as follows. Section II links the price of money (i.e. interest rates) to the price of pledged collateral (i.e. repo rates) and provides a snapshot of recent activities that drive these prices via examples from the United States (U.S.) and the Eurozone. Section III straddles collateral and repo rates to monetary policy via the IS/LM framework. Section IV discusses that the larger their QE effort, the longer the central banks will impact the collateral markets and the associated repo rates. Section V concludes with some policy suggestions.

## II.  PRICE OF MONEY AND PRICE OF COLLATERAL

In some countries like the U.S. and the United Kingdom (U.K.), the price of money and money market rates are not market-determined due to IOER (interest on excess reserves) offered to only depository institutions; this creates a wedge between banks and nonbanks, and thus impacts other short end rates. For example, in the U.S., Freddie, Fannie and other non-depository institutions are not eligible to deposit excess reserves at the Fed and thus do not have access to IOER—this has resulted in market segmentation and forms a wedge in the money market rates.[4]  This wedge between IOER and Federal Fund rate is important; the Fed Funds rate on July 29, 2013 was 9 bps, quite far from the likely first step in tightening rates. Compare this deviation of 16 bps to the average daily absolute deviation of Fed Funds rate from their FOMC target of 3 bps. (Stella, 2013)

Now consider collateral or repo rates. Recall that collateral rate (or repo rate) is the rate at which cash is lent against collateral for an agreed tenor. It is agreed upon by the two parties at $t_0$ or start of repo. Typically, collateral shortage lowers repo rates; collateral abundance increases repo rates. This rate is a proxy for collateralized transactions that underpin the financial plumbing between the dealer banks/nonbanks.

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[3] http://www.federalreserve.gov/newsevents/testimony/tarullo20130711a.htm, July 11, 2013.

[4] Following the Lehman failure, the Fed introduced paying interest on excess reserves (IOER) for depository institutions. This was intended to place a "floor" (minimum bid) on short-term liquidity in the corridor system. However, Fannie and Freddie cannot access IOER (25 basis points) that banks can only receive, and, therefore, GSE cash positions (and cash positions of other home loan banks) have largely determined the Federal Funds rate—which trades *below* the IOER "floor."

Recently in the Eurozone, collateral/repo rates have dipped below zero; these include German /French /Dutch and also Danish/Swiss repo rates.[5] However, this is not the case with collateral/repo rates in the U.S. In theory, price of "good collateral" should not vary across assets except due to technical factor that include "home" bias, liquidity/depth/size of good European collateral relative to U.S. T-bill market, different type of QEs (Fed vs. ECB), cheapest to deliver collateral, etc. The interest on excess reserves (IOER) in the U.S. has also been instrumental in keeping a wedge between comparable repo rates in the U.S. and those in the Eurozone (Figure 2).[6] The Operation Twist also provided an extra dose of T-bills in 2012 to provide some lift to the GC rates.[7] Thus good collateral like U.S. GC rates are still in positive territory relative to good collateral in the Eurozone that has been in negative territory. The next section straddles collateral and repo rates to monetary policy via the IS/LM framework.

**Figure 2. Collateral Rates in Selected Eurozone Countries (left); United States (right)**
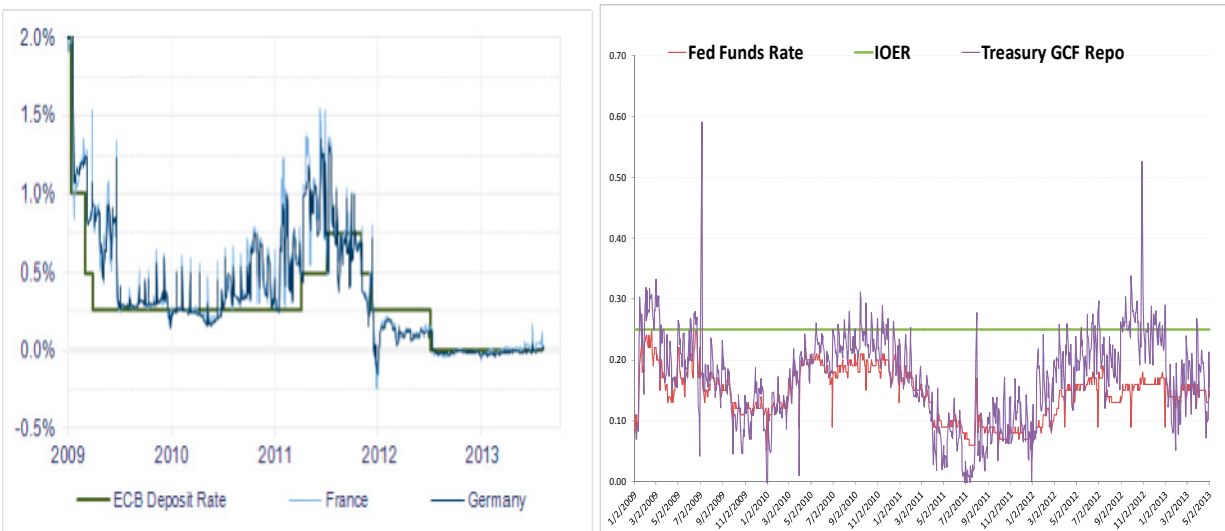


Sources: ICAP, Bloomberg, DTCC and staff estimates.

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[5] Despite the European Central Bank's (ECB) efforts to take in lower-grade collateral, actions of the Swiss National Bank (SNB) (and other central banks) are diluting this objective. After the Swiss franc/€ peg, the SNB balance sheet is now almost €500 billion with half of the assets comprising of "core" € bonds and equities. However SNB's bond purchases withdraw the best and most liquid collateral from the Eurozone; this reduces the collateral reuse rate since these bonds are silo-ed at SNB and not pledged in the financial markets. Silo-ed collateral has zero velocity by definition.

[6] See Fegatelli (2010) on Eurozone collateral market.

[7] In the US, it remains to be seen if cash shifts from repo to bank deposits when overnight GC goes negative in. There's a big psychological barrier between explicitly paying for protection and "accepting a lower return" to get protection.

**Box 1. Pledged Collateral and Money Aggregates**

Annual reports of large banks suggest that financial collateral (including collateral re-use) is sizable and comparable with monetary aggregate like M2 or broad money. When we consider collateral use/reuse in addition to M2 or the monetary base in U.S., U.K. and Eurozone, financial lubrication was over US$30 trillion before Lehman (and one-third came via pledged collateral). The subsequent decline in both available collateral *and* associated re-use of collateral was sizable (an estimated US$4–5 trillion). This is the difference between the green and the red line in the figure below. Note that the increase in M2 due to QE does not substitute for loss in financial collateral, especially if QE is in exchange for good collateral such as buying U.S. Treasury (Singh and Stella, 2012).

Financial Lubrication (Money and Collateral): 2007–12
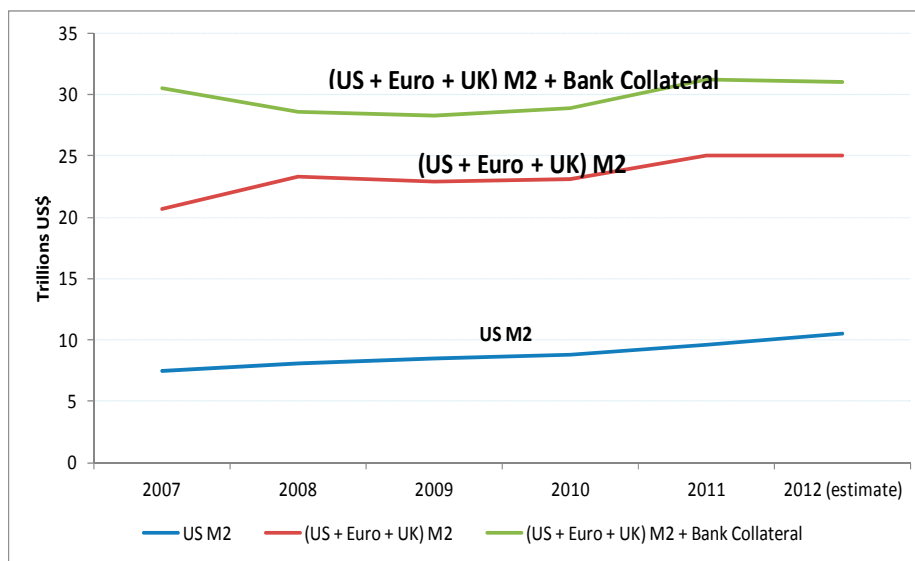


The 'kinks' in the red line in Figure 2 show M2 expansion, due to base money via QE. As of end-2012, the overall financial lubrication has rebounded to approximately US$30 trillion but the "mix" is more in favor of money (around 80 percent of financial lubrication) which not only has lower velocity than pledged collateral but much of it "sits" as excess reserves with central banks (Singh 2012). Thus a rebound in the pledged collateral market may be more effective in easing liquidity constraints in financial markets than further QE. For example, Fed's balance sheet has over US$ 2 trillion in excess reserves of large banks that does not contribute fully towards financial lubrication; inter-bank market can use this but not banks/nonbanks. More importantly, the cost/benefit analysis of QE may become more apparent when trade-offs will need to be made when central bank balance sheet unwind (or, do not unwind but continue to "carry" collateral until it matures).

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1/JGBs are generally not used in the cross-border pledged collateral market; hence Japan not included here.

### III. COLLATERAL AND MONETARY POLICY—VIA THE IS/LM FRAMEWORK

When collateral use drops, financial intermediation slows, with effects similar to the drying up of interbank markets (Singh, 2012a).[8] Financial collateral does not have to be rated AAA/AA but as long as the securities (i.e. debt or equity) are liquid, mark-to-market, and part of a legal cross-border master agreement, they will be used as "cash equivalent".[9] Such pledged financial collateral is difficult to map but a key component of financial plumbing. The collateral intermediation function is likely to become more important over time. In the short term, increased counterparty risks (as during 2007–08 and in Europe today) make secured funding more attractive. In the longer term, with more arm's-length transactions in an increasingly globally integrated financial system, market participants are seeking the security of collateral to underpin a wider range of claims. New regulations are also likely to increase the demand for collateral-based operations (CGFS, 2013).

The recent collapse in financial collateral (by an estimated US\$4–5 trillion) has significantly shifted the IS in (re: the IS/LM framework), lowering output to $Y_B$ and decreasing real interest rate.[10] In recent years, QE efforts are shifting the LM curve to the right to compensate this decline until LM curve will intersect with the IS curve at the initial output $Y_A$. The LM shift due to QE is sizable (and continuing) and along with IS inward shift, real interest rates may be well below zero (but "optically" due to distortions in the money rates that are above zero in nominal terms, we do not see sub-zero real rates)—Figure 3.

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[8] The stock of collateral can decline as investors become more concerned about counterparty risk, making them less willing to lend securities and making collateral safely sit idle in segregated accounts. It can also be affected by central bank measures, such as large-scale asset purchases which drain good quality collateral from the system, or a widening of the pool of collateral-eligible assets which increases the pledge-ability of these assets as collateral to the central banks (Singh and Stella, 2012). Collateral velocity—defined as the volume of secured transactions divided by the stock of source collateral—is affected by counterparty concerns and general risk aversion (due to higher haircuts), which then manifest as restrictions on the re-use of collateral

[9] The term re-pledged is a legal term and means that the dealer receiving the collateral has the right to re-use it in its own name (i.e. recipient has title transfer). Title transfer is essential to collateral velocity. In the bilateral pledged collateral market, contracts that straddle repo, securities lending, OTC derivatives and customer margin loans have title transfer.

[10] Since cross-border funding is important for large banks, the state of the pledged collateral market needs to be considered when setting monetary policy (Debelle, 2012).
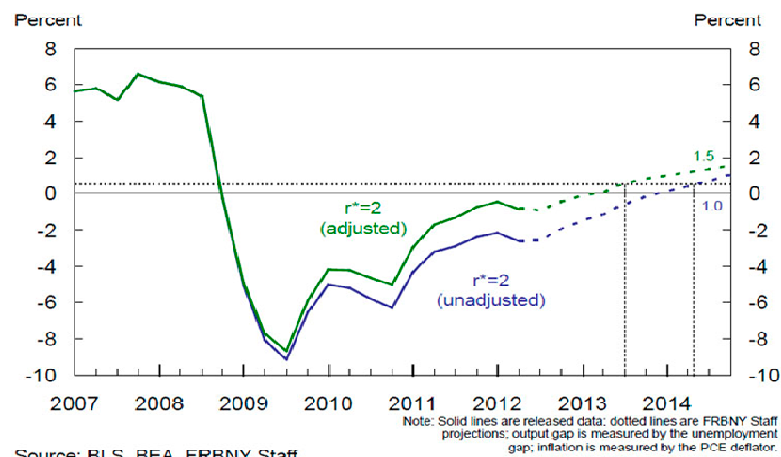
Figure 3. Contraction in Pledged Collateral Market and IS/LM Shifts
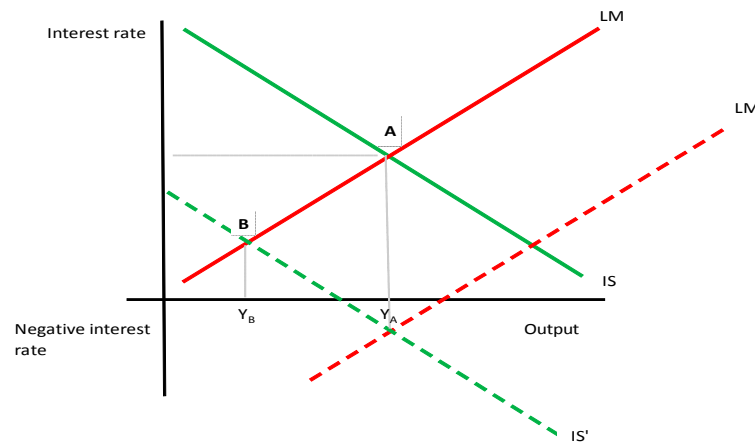


A recent speech by New York Fed President suggests that Fed's QE actions may have lowered the nominal rates by additional 150–200 basis points (Dudley, 2012).[11] So *unadjusted* real rates (i.e. if the Fed balance sheet had remained the same at US$800 billion as of    end-2007) may be much lower relative to the *adjusted* real rates (due to the expanded balance sheet via QE) that are officially announced and do not factor the rate cuts imbedded within QE—the blue and green lines respectively (Figure 5). Now consider the three most recent tightening cycles in the U.S. that have averaged close to 400 bps. With a 400 basis points tightening cycle, the new policy rate may anchor at 2 percent if it starts from minus 2 percent. Analytically in Figure 4, LM shifted out until $Y_A$ is reached at approx *minus* 2 percent and with a 400 bps tightening, the next policy rate cycle may stop at 2 percent (unless balance sheet also returns to the 2007 size in tandem).

Figure 4. Real Interest Rates via Taylor Rule With/Without Fed's Balance Sheet Adjustment



Source: BLS, BEA, FRBNY Staff

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[11] http://www.newyorkfed.org/newsevents/speeches/2012/dud120524.html.

**Box 2. Velocity of Pledged Collateral (2012)**

The box highlights that velocity of collateral has been adversely been impacted due to central bank actions in recent years. We updated this data following the methodology of Singh (2011, 2012) to show that the velocity as of end-2012 was 2.2, lower than around 2.5 as of end-2011 and sizably lower than 3.0 as of end-2007. While this decline may be seen differently by financial stability regulators, the overall financial lubrication (i.e. via money or financial collateral) interfaces with recent action of some central banks that mop up good collateral from the financial system.

As of end-2012, the pledged collateral received by the major banks that could be onward re-pledged in their own name was US$6 trillion. Collateral comes from two sources: non-hedge funds and hedge funds. Non-hedge fund data suggests pension, insurers, official sector and asset managers had US$1 trillion in securities on loan (without secondary market churning). The other source of raw collateral was hedge funds that due to higher AUM of US$2.4 trillion and technical factors such as long/short ratio (see figure) provided US$1.8 trillion collateral to the major banks from their prime brokerage (PB) *and* non PB activities. [PB related collateral coming to the banks was about US$700 billion; non-PB (largely repo) related collateral coming to banks was approx. $1.1 trillion].1/
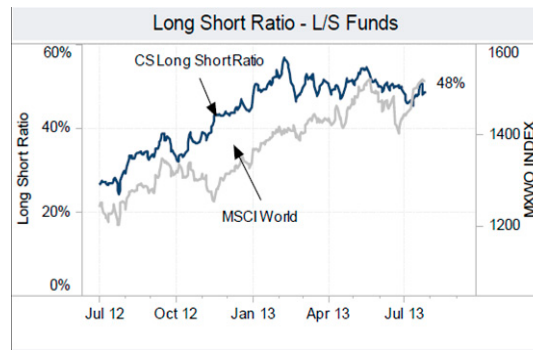


So velocity of collateral for end-2012 was about 6 trillion/2.8 trillion, or 2.15. This is lower than the 2.5 for end-2011 and largely neutralizes the bounce in "source" collateral (since the total sources of collateral was actually higher than as of end-2011 due to higher hedge fund AUM, leverage etc, relative turnaround in 2012).

**Sources of Pledged Collateral, Velocity, and Collateral, 2007 and 2010–12**
*(In trillions of U.S. dollars; velocity in units)*

| Year | Sources | | | Volume of Secured Operations | Velocity |
|------|---------------|--------|-------|----------|----------|
| | Hedge funds | Others | Total | | |
| 2007 | 1.7 | 1.7 | 3.4 | 10.0 | 3.0 |
| 2010 | 1.3 | 1.1 | 2.4 | 5.8 | 2.4 |
| 2011 | 1.3 | 1.05 | 2.35 | 6.1 | 2.5 |
| 2012 | 1.8 | 1.0 | 2.8 | 6.0 | 2.2 |

Sources: Risk Management Association; and IMF staff estimates. See also Singh (2011 and 2012).

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1/. PB related strategies (equity long/short) were 33 percent. So PB related collateral to the "street" was US$2.4 trillion x leverage of 1.5 x 33 percent share x delta bias of long/short of 0.6 or, about US$700 billion. Non-PB related collateral was US$2.4 trillion x 33 percent share x "adjusted leverage margin" or US$ 1.1 trillion. Rest one-third strategies do not require leverage-- managed futures, distressed or cash positions; collateral does not come to the street from such strategies.

The next section discusses that the larger the central bank's QE effort, the longer the central banks will impact the collateral markets and the associated repo rates

## IV. CENTRAL BANKS AND COLLATERAL MARKETS

Although there is a continuum between good and bad collateral, for simplicity we define C1 that is good collateral in all states of nature and can be converted to money or deposits including excess reserves (D) at no haircut. C2 is collateral that under normal market conditions is "good" but otherwise loses value. During a crisis, C1 (such as U.S. Treasuries or Bunds) and D may continue to be acceptable at par. There is a sudden split between D +C1, and everything else. Everything else ceases to be liquid.[12]  To the extent that central banks merely substitute central bank money (D) for assets that have retained their value as collateral (C1), not much liquidity relief is achieved. In order to provide effective liquidity relief for the system, central bank money and liquid collateral must be injected against illiquid or undesirable assets (C2); the supply of unencumbered collateral has to increase. Central banks became subject to a form of Gresham's Law (i.e. "bad collateral will drive out good collateral from markets") if they were slow or reluctant to loosen their collateral policies.  Just as water finds its own level, collateral in the market domain generally finds its economic rent when it is pledged for reuse.

**Table 1. Definition of Terms Used**

| Terms | Description |
|---|---|
| D | Bank deposits at the central bank. (D excludes banknotes, vault cash) |
| C1 | Good collateral in all states of nature; can be converted to D at no haircut |
| C2 | Collateral that  under normal market conditions is "good"; else loses value |
| C1 held by banks | Only banks can convert C1 to D overnight. Nonbanks cannot change C1 to D |
| Ultimate Liquidity | D plus C1 held by banks. |

Source: Singh and Stella (2012).

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[12] This is a mark-to-market view (and thus different from the "limit pro-cyclicality" school that endorses a floor on C2 type collateral during crisis). The "limit pro-cyclicality" school and their proposed use of ex-ante min/max haircuts may presently "stretch" collateral valuations in some places--triparty repo in the U.S., ECB or similar collateral facilities, and some local CCPs (see Copeland et al 2010; Fegatelli, 2010).  Draft proposals to reduce pro-cyclicality via ex-ante haircut schedule are not clear. Credit Support Annexes that support OTC derivative contracts, or master agreements that underpin cross border repo and securities lending are privately negotiated bilateral agreements that regulators cannot temper with. Such contracts include the "legal wheels of title transfer" and are designed to make financial collateral akin to money so that markets settle accounts/margins by "cash or cash equivalent

The past few years since Lehman has seen major central banks take out good collateral from markets and replace it with freshly printed money (except the ECB which has printed money but taken in bad collateral). Sooner or later, these balance sheets will *unwind*—either voluntarily when central banks will release collateral and take in money, or involuntarily as the securities held at central banks mature or roll-off. Analytically, the rate of absorbing money will move the LM curve left. Simultaneously the rate of release of collateral (in lieu of money) will move the IS curve up. So unwind will increase both, the (money) interest rate and the (collateral) repo rate. As both rates move up, policy makers will attempt to keep them close (and not create a wedge between them). Looking forward, it will be paramount that central banks gain back their "policy rate" typically set by macro underpinnings such as Taylor rule, output gap, inflationary forecast etc (and thus control the repo rate).

Since central bank balance sheets are presently bloated with collateral, some (e.g., the Fed) have envisaged an "unwind" that may be parallel in time and overlap with the path of the projected rate hikes.[13] However, the collateral/repo rate will need to be contained below the policy rate to avoid inflationary dynamics.[14] Thus repo rates will remain an important gauge if central banks chose to unwind. Analogous to a coiled spring, the larger the QE efforts the lesser the control central banks may have on the "wedge" between repo rates and their policy rate (e.g., IOER). This is likely to result in very little collateral release to the markets (see distinction between banks and nonbanks). Central banks that have withdrawn collateral via QE will be the biggest holder of good collateral (see Figure 5). This may have financial stability implications since the repo curve is a good proxy for how collateral flows between banks/nonbanks (Adrian and Shin, 2009).

When central banks buy securities, one of the immediate effects is to increase bank deposits, which adds to M2 (in the U.S., practically the Fed has bought from nonbanks, not banks).[15] Whether banks maintain those added deposits as deposits, or convert them into other liabilities (or, by calling in loans, reducing or moderating the growth of their balance sheets),

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[13] See exit strategy minutes as per June 2011 FOMC meeting.

[14] In the U.S., the repo rate could differ from IOER depending on the rate of release of collateral via reverse repos, an important unwinding avenue that has been suggested by the Fed. If Fed unwinds, the eligible parties for reverse repo (RRs) now include not only banks but also nonbanks such as GSEs (i.e. Fannie and Freddie) and selected MMMF etc. So the repo rate will be determined by the size of RRs, along with the broader supply/demand of the market. Various reforms under the rubric of shadow banking (e.g., in the U.S.) include trimming the MMMFs by removing the "par" NAV tag; Fannie Freddie reform, and the Tri-party repo system. But the nonbank world's balance sheet space is necessary if collateral needs to be unwound from central banks. Even if there is balance sheet space, the ability of the Fed to engage in RRs may be limited as sizable RRs could lead the repo rates to significantly exceed the IOER; this may lead to inflationary dynamics or expectations thereof. So collateral release rate to the market will be "measured" since the price of money (IOER) versus the price of collateral (repo rate) will need to strike a balance (Singh, 2013).

[15] Carpenter et al (2013, April), "Analyzing Federal Reserve Asset Purchases: From whom does the Fed buy?"

is an open question. QE-type efforts convert what had been good collateral into additional bank liabilities (Singh, 2013). At present, the Fed's has proposed a reverse repo program to unwind its balance sheet; however this will be contingent on balance sheet "space" at banks and nonbanks amidst a tighter regulatory environment (and the interaction of repo and policy rates). With Basel III regulations at the door, the banking system is likely to have limited appetite for these securities except for capital buffers. Nonbanks "balance sheet space" is key to any unwind of collateral.[16]

However, the excess reserves are on bank balance sheets now. So if all the excess reserves deposits were converted to reverse repos, and reverse repos were a perfect substitute for a excess reserve deposit (and they are not due to the distinction between D and C1 explained above), then the Fed could convert as much of the excess reserves as it wants into reverse repos, reducing total bank balance sheets by the amount of reverse repo done with eligible nonbanks such as MMMF/asset managers.[17] However, collateral with these nonbanks via reverse repos cannot be rehypothecated, or onward re-pledged, and thus will not contribute towards financial lubrication. So collateral released to nonbanks will not convert D to C1; only banks are allowed to rehypothecate collateral received via reverse repo (and increase collateral velocity). But as a by-product, collateral release to nonbanks will avoid any jumps in repo rates (as this is a necessary condition when policy rates lift off).

To convert D exactly to C1, the Fed needs a way to transfer possession to the market without ownership, rather like the Reserve Bank of Australia (RBA) has proposed (next section). The Fed's current SOMA lending facility doesn't fit the bill, as it is a Treasury-for-Treasury swap executed to cover specific issue shorts. A recent Treasury Borrowing Advisory Committee (TBAC) presentation suggested that U.S. Treasury is mulling a securities lending facility.[18]

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[16] The Fed set up 'reverse' repo with major MMMFs (and limited asset managers) in part so that any unwind would require less bank balance sheet space (than the excess reserves do now). The excess reserves are assets of banks now and they have corresponding liabilities; the reverse repo will move MMMFs out of a bank liability of some kind into a Federal Reserve liability. So the bank loses a liability to the MMMF and the reserve asset at the same time and the bank balance sheet shrinks.

[17] If we look at the collateral chains, at one end is the MMMF investor - the household and corporate wealth pool. At the other end, after a couple of loops for transformation, and some haircuts and subordination for extra capital, lies the promise to pay made by the borrower - household (mortgage) or corporate. The recent Fed's proposal short-circuits the chain, depositing that household wealth directly back at the Fed. The household and corporate wealth pool is better off; they get a deposit alternative that is superior to anything available now. The borrower pool is worse off; that pool of wealth won't be transformed into any lending to them. D does not become C1. http://www.federalreserve.gov/monetarypolicy/fomcminutes20130731.htm

[18] TBAC's slides (July 30, 2013): http://www.treasury.gov/resource-center/data-chart-center/quarterly-refunding/Documents/Charge_3.pdf.

## Figure 5: Collateral and Financial Plumbing
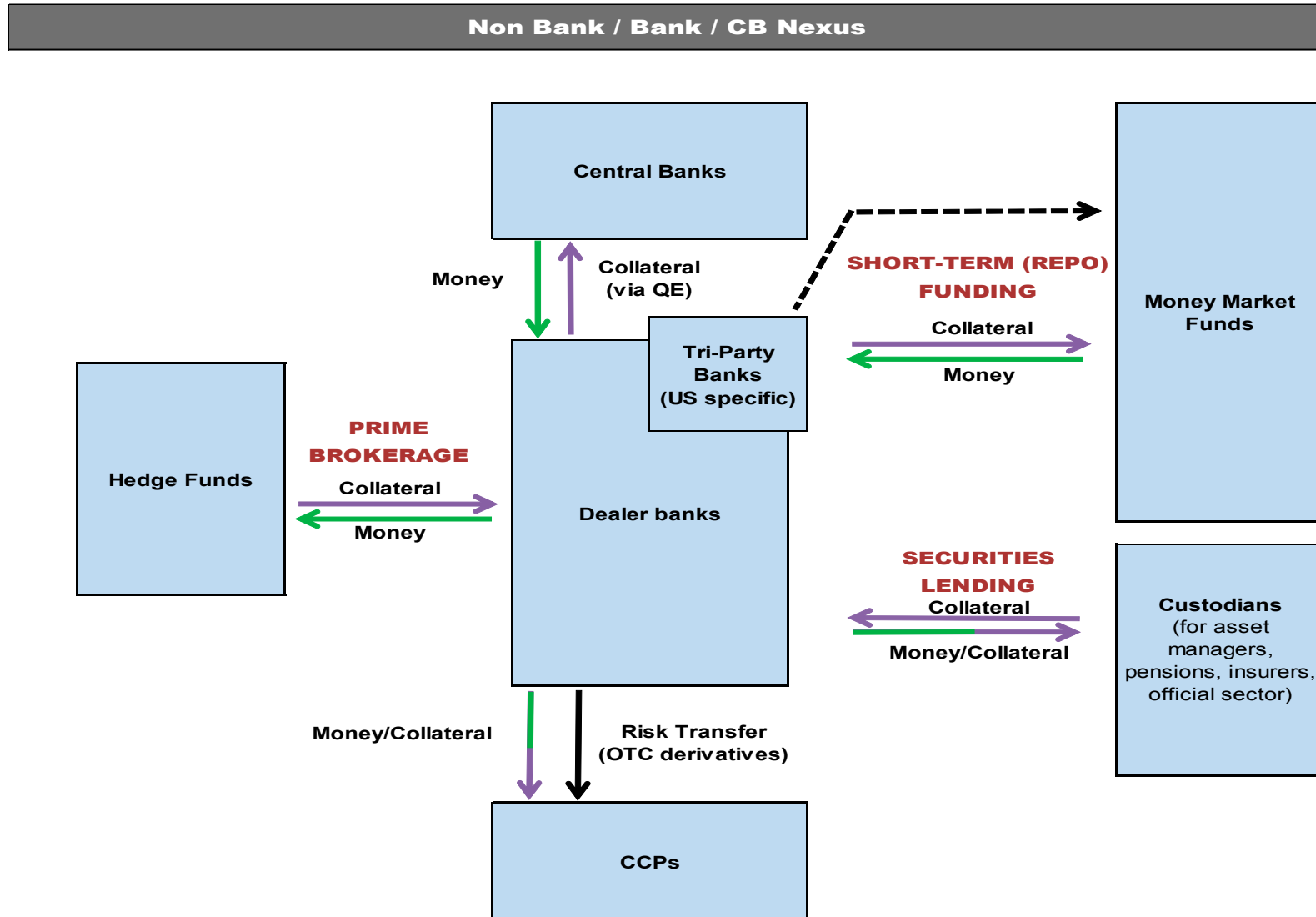
## V. CONCLUSION:

The RBA's proposals manage to cope with the upcoming regulatory changes that will warrant significant additional high quality liquid assets (or good collateral), without issuing more debt securities (unlike discussions in some policy circles).[19] Their suggested route is akin to collateral transformation but at a penalty rate, but this would keep the collateral re-use rate from declining. [20]  In other words,

$$\text{Demand}_{\text{collateral}} = \text{Supply}_{\text{collateral}} * \text{re-use factor}$$

RBA however does not face QE type dilemmas (like the Fed or BoE) where release of good collateral will be limited due to the interaction between the repo rate and the policy rate. In short, when sizable good collateral is paid 25 bps interest (e.g., the Fed) or 50 bps (e.g., the U.K.) on excess reserves, then the policy rate is "loaded" with inflationary ammunition. Thus, collateral release rate will need to be controlled so that repo rate stays below policy rate. Given this constraint, only some jurisdictions may be able to emulate RBA or variant of their approach (e.g., Singapore, Hong Kong, New Zealand, South Africa, etc.)

For those central banks with large balance sheets due to QE, there will be asymmetry between the pace at which these central banks took in collateral and the pace at which they will release it. Here it is useful to make the distinction between ownership and possession. Good collateral has a number of different characteristics (fixed duration, credit-free, liquid, etc). So these securities can provide many different services (markets can buy 'pure' duration; sell duration short; or transfer possession to provide collateral services, etc).  Some central banks like the Fed have been  taking these securities (or good collateral, C1) out of the market for the sound macro reason that they need to take duration out of the economy (the portfolio balance channel), but duration is a function of ownership, not possession. Fed cannot let the ownership of these securities go back to the private market until the economy is strong enough to handle the duration (which is why they leak out slowly).

Duration, however, isn't the service that the market needs. The economy needs the collateral services that these securities can offer, which transfers with possession, not ownership. Securities in the market domain have a velocity; those at the central bank do not. So, D (excess reserves) does not substitute for C1 (good collateral) and thus there is a net reduction in overall financial lubrication.[21]

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[19] BIS working paper 399, "Global Safe Assets," Gourinchas and Jeanne, 2013. Also Gorton et al (2013); Greenwood et al (2010); Duffee (1996); IMF (2012).

[20] http://www.rba.gov.au/publications/bulletin/2012/sep/pdf/bu-0912-6.pdf  This committed liquidity facility (CLF) is akin to paying a fee to get the guarantee of contingent collateral transformation from the RBA at a penalty rate.

[21] As discussed, nonbanks will not be able to rehypothecate, or onward re-pledge collateral they receive via reverse repos (Fed's proposed unwind facility). So collateral released to nonbanks will not convert D to C1.

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