Understanding the role of collateral in financial markets

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Views expressed are of the author only and not attributable to the IMF.
Summary of key messages:

- Financial collateral metrics are at par with money metrics and an integral part of financial lubrication; collateral metrics complement what is discussed in textbooks on money metrics.

- Monetary Policy at ZLB (with QE) has interfered with financial plumbing by silo-ing good collateral; unwind of CB balance sheets opens a new chapter “collateral and monetary policy”

- Regulations (Basel/Dodd Frank Act etc) and QE are likely to lead to un-intended consequences.
  - OTC derivatives market and CCPs; break-down in this plumbing?
  - Shadow banking should not be a pejorative term; also uses capital
  - QE/regulations overlap in a “changing collateral space”
  - Safe assets: is there really a shortage? collateral re-use rate (velocity)
Pledged Collateral for re-use does not appear on Balance Sheet but only in footnotes—thus, this is not picked up in Flow of Funds, or Call reports.

The typical language, in all large banks active in collateral funding appears as follows (from Lehman’s last annual report below):

As of November 30, 2007, the fair value of securities received as collateral that were permitted to sell or re-pledged was approximately $798 billion…. (of which) the firm sold or re-pledged approximately $725 billion as of November 30, 2007.
Pledged Collateral—US banks

The diagram illustrates the pledged collateral in billions of US dollars for various US banks from 2007 to 2013. The banks included are Bear Stearns, Lehman, Morgan Stanley, Goldman Sachs, Merrill/BoA, JP Morgan, and Citigroup. Each bank is represented by a color-coded bar for each year, allowing for a visual comparison of pledged collateral amounts over the years.

- Bear Stearns
- Lehman
- Morgan Stanley
- Goldman Sachs
- Merrill/BoA
- JP Morgan
- Citigroup

The y-axis represents billions of US dollars, with values ranging from 0 to 1200 billion US$. The x-axis lists the years from 2007 to 2013, with each bank's pledged collateral amount shown for each year.
Pledged Collateral—European banks (plus Nomura)
Hedge Funds largely finance their positions in two ways:

- **First**, they can either pledge collateral for reuse to their prime broker in lieu of *cash borrowing* from the prime broker (via rehypothecation).
  - Note: in the U.S., SEC’s Rule 15c3a and Regulation T generally limits PB’s use of rehypothecated collateral from a client. Non US jurisdictions such as UK via English Law do not have any limits.

- **Second**, HFs also fund their positions via *repo(s)* with dealers who may or may not be their PBs.

HF collateral “to the street” from PB and repo was about $1.7 trillion (2007) and down to about $1.35 trillion in recent years. Most recently with AUM growing sizably, leverage rebouding.... collateral from HF to street about $1.85 trillion end-2013.
The “non-hedge fund” source of collateral—declining due to counterparty risk etc

**Table 1: Securities Lending, 2007-2013**

<table>
<thead>
<tr>
<th>Collateral Received from Pension Funds, Insurers, Official Accounts etc (US dollar, billions)</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Securities Lending vs. Cash Collateral</td>
<td>1209</td>
<td>935</td>
<td>875</td>
<td>818</td>
<td>687</td>
<td>620</td>
<td>669</td>
</tr>
<tr>
<td>Securities Lending vs. Non-Cash Collateral</td>
<td>486</td>
<td>251</td>
<td>270</td>
<td>301</td>
<td>370</td>
<td>378</td>
<td>338</td>
</tr>
<tr>
<td>Total Securities Lending</td>
<td>1,695</td>
<td>1,187</td>
<td>1,146</td>
<td>1,119</td>
<td>1,058</td>
<td>998</td>
<td>1,008</td>
</tr>
</tbody>
</table>
Figure 2.4 The sources and uses of collateral – summary (2007, 2010, 2011 and 2012)

(iii) Commercial banks

De minimis

Money market funds

Central collateral desk

$10 trillion (2007)
$5.8 trillion (2010)
$6.2 trillion (2011)
$6.0 trillion (2012)
$5.8 trillion (2013)

(i) Hedge funds

$1.6tn (2007)
$1.3tn (2010)
$1.35tn (2011)
$1.8tn (2012)
$1.85tn (2013)

(ii) Securities lending (via custodians) for sovereigns/official accounts, pension, insurers, asset managers etc

Red curve lines = users of collateral
Black straight lines = suppliers of collateral
An example of repeated use of collateral (that leads to “collateral chains”)
Table 2.3. Sources of Pledged Collateral, Volume of Market, and Velocity (2007, 2010-2013)
(In trillions of U.S. dollars; velocity in units)

<table>
<thead>
<tr>
<th>Year</th>
<th>Hedge funds</th>
<th>Others</th>
<th>Total</th>
<th>Volume of secured operations</th>
<th>Velocity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>1.7</td>
<td>1.7</td>
<td>3.4</td>
<td>10.0</td>
<td>3.0</td>
</tr>
<tr>
<td>2010</td>
<td>1.3</td>
<td>1.1</td>
<td>2.4</td>
<td>5.8</td>
<td>2.4</td>
</tr>
<tr>
<td>2011</td>
<td>1.3</td>
<td>1.05</td>
<td>2.35</td>
<td>6.1</td>
<td>2.5</td>
</tr>
<tr>
<td>2012</td>
<td>1.8</td>
<td>1.0</td>
<td>2.8</td>
<td>6.0</td>
<td>2.2</td>
</tr>
<tr>
<td>2013</td>
<td>1.85</td>
<td>1.0</td>
<td>2.85</td>
<td>5.8</td>
<td>2.0</td>
</tr>
</tbody>
</table>

Sources: Risk Management Association; also IMF Working Paper, Velocity of Pledged Collateral (Singh, 2011)
Overall Financial Lubrication—
Money and Collateral.......some intuition

Graph showing trends in:
- (US + Euro + UK) M2 + Bank Collateral
- (US + Euro + UK) M2
- US M2

Over the years from 2007 to 2013, the graph illustrates the growth in these financial metrics, with the (US + Euro + UK) M2 + Bank Collateral showing the most significant increase.
Collateral in IS/LM framework

Interest rate

Output

Y

Y

Y_A

Y_B

LM

LM'

IS

IS'

A

B
IS/LM and pledged collateral market crash; IS shifts “in” sizably; LM shifts “out” via QE etc.

Interest rate

Negative interest rate

Output

LM

LM'

IS

IS'

A

B

Y_A

Y_B

Y

Y

Pre-Lehman GC (general collateral) repo rate vs. Fed Funds rate

(GC repo rate is secured funding via collateral that is mostly liquid US Treasuries and/or MBS; the Triparty framework is used for GC repo)
Eurozone ‘good collateral’ rates and Eonia (their Fed Funds rate); since Sept ’14, deposit rate at minus 20 bps
QE resulted in Fed printing and nonbanks selling UST and MBS to Fed.

- The bank deposit market is sizable—in fact the top 4 bank holding companies (Bank of America, Wells Fargo, Citibank and JPMorgan) hold about $3.8 trillion in deposits as per FDIC’s June 2014 data, relative to $1.9 trillion as of June 2008.

- The top 50 bank holding companies (including foreign) hold $7 trillion as of June 2014, relative to $4 trillion as of June 2008.

- QE largely explains the growth in deposits (Carpenter et al 2013)

- Banks do not want these deposits, as Basel rules are implemented; banks want “balance sheet space”
The “old plumbing” ..... in blue area
The critical pieces of the plumbing are the repo markets and the bank deposit market.

- The U.S. bilateral repo market is a *market for collateral*: securities for possession and use, (incidentally against cash).

- The Tri-party repo (TPR) market in the U.S. is a *market for funding*: money for broker dealers/banks (incidentally collateralized by securities).
The new-plumbing:
RRP short-circuits the “nonbank/bank” plumbing
Accounting Drainage, especially RRP with nonbanks

1a. Non-Banks Use of Reverse Repo Program (RRP) with Fed

Federal Reserve

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excess Reserves</td>
<td></td>
</tr>
<tr>
<td>100 Million</td>
<td></td>
</tr>
<tr>
<td>RRP (no rehypothecation)</td>
<td></td>
</tr>
<tr>
<td>100 Million</td>
<td></td>
</tr>
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</table>

1b. Banks Use of Reverse Repo Program (RRP) with Fed

Federal Reserve

<table>
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<tr>
<th>Assets</th>
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<tbody>
<tr>
<td>Excess Reserves</td>
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<tr>
<td>100 Million</td>
<td></td>
</tr>
<tr>
<td>RRP (Rehypothecation capped--only within Tri-Party)</td>
<td></td>
</tr>
<tr>
<td>100 Million</td>
<td></td>
</tr>
</tbody>
</table>
Excess reserves do not equal good collateral

- However, collateral with these nonbanks via reverse repos cannot be rehypothecated, and thus will not contribute towards financial lubrication.

- Only banks are allowed to rehypothecate collateral received via reverse repos (e.g., term RRP, may increase collateral velocity)
  - if banks have balance sheet space
  - At present banks receive 25 bps via IOER; why bid at 5 or 10 bps, unless returns from “reuse” exceed 25bps, net of balance sheet costs, FDIC levy, etc.

- So roughly 3 trillion (change in) good collateral (that could be used by the financial system—banks and nonbanks) that is silo-ed on the Asset side, while roughly an equal amount is in “reserves” that is in banking domain only
“Also, with an exceptionally large balance sheet there will be considerable attention on the methods that the FOMC will likely use in order to exert control over the level of short-term rates”

[intuitively, from an overall financial lubrication angle (i.e., money+collateral), if collateral velocity has already been reduced from approx 3 to 2, there may be less tightening needed from monetary policy cycle.]
Figure 4. Real Interest Rates via Taylor Rule With/Without Fed’s Balance Sheet Adjustment

Note: Solid lines are released data; dotted lines are FRBNY Staff projections. Output gap is measured by the unemployment gap, inflation is measured by the PCE deflator.

Source: BLS, BEA, FRBNY Staff
Dealers are interested in collateral transformation. In fact they may be the only actor in the financial space to bridge the likely demand/supply gap. However transforming a BB to AA/AAA may be constrained due to Basel III.

The final definition of leverage/LCR ratios will matter, especially if ratios “pick up” all off-balance sheet pledged collateral transactions.

The re-use of collateral is fundamental to bridging the gap between demand and supply. Academia has so far ignored this aspect in their models. Fed’s RRP is another example of supplying safe assets. Similar angle for Reserve Bank of Australia’s facility.

\[ \text{Demand}_{\text{collateral}} = \text{Supply}_{\text{collateral}} \times \text{re-use factor} \]
Large part of AAA issuance was private sector securitization (i.e., “burgundy” area)
Regulatory focus—so far...

- To date, regulatory efforts have focused on fortifying the equity base ($e_i$) of the banking system and limiting the banking system’s leverage ($\lambda_i$) through leverage caps.

- Non-bank funding to banks was assumed to be “sticky” and mainly in the form of household deposits.

- Regulatory efforts have not focused on sizable volumes of bank funding from non-banks. Since the money holdings of asset managers (pension, insurers, MMFs etc) are ultimately the claims of households, it follows that households ultimately fund banks through both M2 and non-M2 instruments.

- While households’ direct holdings of M2 instruments reflect their own investment decisions, their indirect holdings of non-M2 instruments are not a reflection of their direct investment choices, but the portfolio choice of their fiduciary asset managers.
Figure 1 is a snapshot of “z” or the nonbank/bank nexus explained in the analytical framework. The dealer bank depicted above are active in the cross-border collateral intermediation. So “zi” is important for dealer bank “i”. The ultimate borrowers also borrow directly from commercial banks; however they are not shown in this figure as their interaction with nonbanks is minimal; hence “zi” is negligible.
Moving OTC derivatives to CCPs

SIFIs

GS

MS

UBS

CS

BARC

RBS

Deutsche

Citi

CCPs

ICE Trust, U.S.

LCH Swapclear, U.K.

ICE Clear, U.K.

CME, U.S.
Risk from this market is indeed sizable due to inadequate collateral supporting the OTC Derivative transactions.

Table 1: Under-collateralization in the OTC Derivatives Market

<table>
<thead>
<tr>
<th></th>
<th>Gross market value</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRAND TOTAL</td>
<td></td>
</tr>
<tr>
<td>A. Foreign exchange contracts</td>
<td>4,084</td>
</tr>
<tr>
<td>B. Interest rate contracts</td>
<td>20,087</td>
</tr>
<tr>
<td>C. Equity-linked contracts</td>
<td>1,112</td>
</tr>
<tr>
<td>D. Commodity contracts</td>
<td>955</td>
</tr>
<tr>
<td>E. Credit default swaps</td>
<td>5,116</td>
</tr>
<tr>
<td>F. Unallocated</td>
<td>3,927</td>
</tr>
<tr>
<td><strong>GROSS CREDIT EXPOSURE</strong></td>
<td><strong>5,055</strong></td>
</tr>
</tbody>
</table>

*Gross market values have been calculated as the sum of the total gross positive market value of contracts and the absolute value of the gross negative market value of contracts with non-reporting counterparties. Gross credit exposure is after taking into account legally enforceable bilateral netting agreements. Source BIS
CCP and shifting taxpayer “put”

- Generally speaking, large losses stemming to a bank from their OTC derivative positions—if it results in bank bailout—will typically be picked up by taxpayer from the jurisdiction in which the bank is located.
  - For example, derivative losses at branches of a Canadian bank in a foreign jurisdiction (e.g., London) is a Canadian taxpayer liability. Ditto for say Deutsche Bank branch in London (liability is of German taxpayer)

- However, moving OTC derivatives positions form say a Canadian bank to a foreign CCP that is owned/incorporated in a foreign jurisdiction (UK), shifts some of the Canadian taxpayer liability related to cleared OTC contracts to a UK taxpayer liability if UK had to bail-out the CCP.

- Benefits vs. Costs of building this infrastructure?
When plumbing breaks...

- Should nonbanks be bailed out?

- Recent SIFI designation to insurers, CCPs…. (and perhaps) asset managers?
  - Nonbank/bank nexus: regulators trying to understand this (data gaps? working groups on repo vs rehypothecation/sec lending/OTC derivatives/shadow banking etc.)

- Recent regulations will likely shrink banks; however bailing out nonbanks (MMMF, CCPs etc.) would be going back to square one!

- VMGH proposal for CCPs (largely a UK initiative)—a “bail-in” for nonbanks but only embraced marginally, even in UK!.

  (forthcoming, RBA analytical study shows VMGH-related contagion to be minimal)