

# High Grade Strategy Notes

## The Legacy of the Bank Leverage Ratio (for Credit)

- The leverage ratio has emerged as a defining feature of the efforts by regulators worldwide to overhaul capital standards for banks in the wake of the Great Financial Recession.
- Keeping track of the current state of affairs with respect to global bank regulations in general, and the leverage ratio in particular, is no easy task. Despite the best intentions of the Basel Committee on Banking Supervision (BCBS) it appears as if at least three distinct capital regimes are likely to result, with material differences between the US, the UK, and the rest of Europe.
- Under the leverage ratios currently being implemented by national regulators, US banks are the most deficient, albeit the 5% bank holding company target for advanced approach banks is 200bp higher than Europe's 3% threshold.
- Fully implementing the BCBS's proposed revisions to the leverage ratio—which somewhat confusingly were released at the same time that national regulators released their own leverage ratio guidance—would result in a 45bp and 35bp reduction to bank leverage ratios, in the US and Europe, respectively. However, there is significant variation between banks depending on the business mix, with Goldman Sachs and Morgan Stanley most exposed among US banks. And many banks have not provided sufficient disclosure on their written credit derivative exposure, so deficiencies could grow.
- The broader market implications of instituting a leverage ratio are likely to be significant. We expect further pressure on bank balance sheets, but the focus will likely shift to reducing balance sheet-intensive businesses that generate a low return on assets. Repo and reverse repo, derivatives, lending commitments, and even cash are likely to be targeted.
- Less repo and reverse repo activity is likely to have a deleterious effect on fixed income market liquidity and create challenges for the money market industry. While the Treasury and mortgage market will be the most directly impacted, spillover to credit is inevitable.
- A renewed focus on standardizing derivatives and collapsing offsetting trades is also likely to be a legacy of the leverage ratio. What's more, if the BCBS's proposed revisions are adopted, CDS curves could steepen as banks seek to buy longer-dated protection to reduce their written credit derivatives exposure.

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## The Legacy of the Bank Leverage Ratio

The leverage ratio has emerged as a defining feature of the efforts by regulators worldwide to overhaul capital standards for banks in the wake of the Great Financial Recession. Yet, despite the best intentions of the Basel Committee on Banking Supervision (BCBS) it appears as if at least three distinct capital regimes are likely to result, with material differences between the US, the UK, and the rest of Europe—which could indeed fracture further.

In this note, we will discuss some of the general market-wide and credit-specific consequences of the US supplemental leverage ratio, the UK CET1 leverage ratio, and the CRD4 leverage ratio, as well as the revisions that the BCBS is simultaneously contemplating.

There are four main sections to the note. We start with a discussion of the quagmire that leverage ratio regulation has become. That's followed by a deep dive into how derivatives are handled with respect to the leverage ratio. The third section runs through the implications to the banking sector, focusing on capital shortfalls. And we conclude with an analysis of the broader market implications.

Indeed, the introduction of a leverage ratio—essentially tier 1 capital divided by a bank's non-risk-weighted assets—is likely to have widespread implications for markets, banks, and financial stability. Those that think that the leverage ratio will simply require banks to raise more capital—as Barclays did mid-year—or cut assets underestimate the broader significance of this new regulatory benchmark, in our opinion.

Investors that are concerned about these issues should note that the comment period for the Basel Committee's consultative document ends on September 20, 2013. Likewise, the comment period for US Basel III final rules concludes on October 21, 2013.

## One Set of Guidelines, Multiple Regimes

Keeping track of the current state of affairs with respect to global bank regulations, in general, and the leverage ratio, in particular, is no easy task. It's been nearly two-and-a-half years since the leverage ratio framework was first put forward in December of 2010 by the BCBS, yet it is only in the last few months that guidelines from the various national regulators have been released detailing how Basel III will be implemented into national law. To complicate matters further, it appears that the BCBS is not content with the leverage ratio as initially proposed.

**BCBS proposes revisions to leverage ratio** — At the end of June, the BCBS released a consultative document proposing significant revisions to the original leverage ratio from 2010. These revisions primarily impact the denominator of the leverage ratio—what's called the Exposure Measure—such that many banking activities that would have not featured in the calculation or would have benefited from offsets are now included, like derivatives and securities financing. While the 3% leverage ratio target remains unchanged for banks under the Basel Committee's proposal, the revisions make meeting that target significantly more difficult. Given the timing of their release, not surprisingly, the BCBS revisions to the leverage ratio do not feature in the plans of national regulators, at least not yet.

**Meanwhile, Europe adopts CRD IV** — Indeed, the EU adopted CRD IV, the EU's implementation of Basel III, on June 20th, six days prior to the BCBS publishing their proposed revisions to the leverage ratio. As such, the leverage ratio in CRD IV does not reflect the changes proposed by the Basel Committee, changes which after being finalized we expect to be eventually implemented into EU law.

**UK changes the numerator of leverage ratio to CET1** — Likewise, on the same day as CRD IV was adopted, the UK bank regulator, the Prudential Regulation Authority (PRA), published its assessment of bank capital, which included a leverage ratio component that according to the FT was inserted within the “past fortnight.” While the denominator of the UK leverage ratio does not incorporate the BCBS’s proposed revisions either, the UK ratio uses a stricter numerator—CET1 capital as opposed to tier 1 capital—and, mandated compliance by mid-2014, far earlier than the Basel Committee’s January 2018 implementation deadline.

**US leverage ratio targets advanced approach banks** — Completing the regulatory trifecta, American banking regulators proposed a supplementary leverage ratio of 3% for US banks as part of their implementation of Basel III roughly two weeks later. In addition, the regulators proposed an add-on for the 8 US banks operating under the advanced approach that sets the supplementary leverage ratio at 5% for bank holding companies and at 6% for their deposit-taking guaranteed subsidiaries in order to be deemed well-capitalized. Once again, the revisions to the denominator that the Basel Committee made two weeks prior were not included.

**BCBS proposed revisions face uncertain future** — Frankly, it is unknown to what extent the BCBS revisions played a part in UK and US regulators adopting a “super-equivalent” set of rules. As a recent analysis conducted by Davis Polk notes with respect to the US ratio, “it is not clear whether, in determining the size of the proposed American Add-on, the agencies took into account any additional increase in stringency of the Basel III leverage ratio that would result from the Basel Committee’s recent proposed revisions to the denominator of the ratio.”

At this point it is difficult to predict how national regulators might respond to the BCBS’s proposed revisions. It is entirely possible that national regulators adopt the revisions to the leverage ratio at a later date. But, alternatively, national regulators could stick with their own implementation of the rules, especially if they find it difficult to backtrack both politically and operationally. Indeed, in the US, there is some anecdotal evidence that regulatory sensitivity to the impact that the leverage ratio could have on the repo market has increased, perhaps to the point where strengthening the rules further would be resisted.

As it stands, under the less stringent calculation of the denominator currently being implemented by national regulators, banks must sum their on-balance sheet assets, the potential future credit exposure of their derivatives, 10% of the notional of unconditionally cancellable commitments, a portion of their other commitments, and other off-balance sheet exposures, like securities financing transactions. Importantly, when it comes to incorporating off-balance sheet exposures, the denominator allows only the net exposure to be counted in regards to repo, under the applicable accounting rules (i.e., either IFRS or US GAAP).

In contrast, the BCBS’s proposed revisions to leverage ratio are far more conservative. Not only does the BCBS’s proposed revisions include the same on- and off-balance sheet assets that the less stringent calculation includes, but among other features they make no exclusion for securities financing transactions (i.e., repo and reverse repo are calculated on a gross, not net, basis) and, in the case of derivative exposures, banks would be required to include a cost to replace a position should a counterparty fail irrespective of how much collateral has been collected.

Figure 1. BCBS leverage ratio and its regional variations in the US / EK / Europe

Leverage Ratio - Definition	Main Regional Variations
$\frac{\text{Tier 1 Capital}}{\text{Non-risk-weighted Assets}}$ <p>*Has to be &gt;= 3% per BCBS original 2010 framework **Implementation deadline : Jan 2018</p>	<p>US : SLR - For US banks operating under the advanced approach : 5% for bank holding companies and 6% for their deposit-taking subsidiaries</p> <p>UK : CET1 - Numerator more stringent than BCBS proposal; uses CET1 Capital instead of Tier-1 Capital; Accelerated compliance schedule by mid 2014</p> <p>Europe : CRD IV - largely in line with 2010 BCBS proposal</p>

Source: Citi Research

## The Treatment of Derivatives

For credit market participants, the treatment of derivatives deserves further consideration, particularly since the leverage ratio will for the first time capture the *gross size* and *interconnectedness* of a bank's derivative business directly in a regulatory capital ratio. Indeed, the leverage ratio will implicitly lead to a far greater emphasis on the systemic risks associated with a counterparty failure, as the exposure associated with a derivative takes into account a portion of the notional of the contract while limiting the benefits of netting.

On a derivative for which a bank collects variation margin to offset mark-to-market, banks must calculate the Potential Future Exposure (PFE) of the derivative contract—i.e., its individual PFE. To calculate the individual PFE of a derivative, banks first determine the **conversion factor** (Figure 2) that applies to a given contract's notional. For instance, CDS contracts that reference investment grade corporations have a 5% conversion factor while contracts on high-yield companies get a 10% factor. So if a bank buys \$100 million of protection on an IG-rated corporation, the PFE associated with that contract is \$5 million.

Figure 2. Credit conversion factors

Tenor	Interest Rate	FX and Gold	IG Credit	HY Credit	Equity	Prec. Metals (non gold)	Commodity/ Other
<=1yr	0.0%	1.0%	5.0%	10.0%	6.0%	7.0%	10.0%
<=5yr	0.5%	5.0%	5.0%	10.0%	8.0%	7.0%	12.0%
>5yr	1.5%	7.5%	5.0%	10.0%	10.0%	8.0%	15.0%

Source: BCBS, Citi Research

Determining the PFE for a *portfolio* of derivative contracts that are allowed to be netted requires using the Current Exposure Method (CEM)—a formulaic approach used in past Basel accords. Specifically, banks are instructed to calculate the net-to-gross ratio (NTGR) which is the net replacement cost of the portfolio (i.e., the net MTM of the portfolio) divided by the gross replacement cost (which only includes contracts with a positive MTM). Banks then sum up all the individual PFEs; 40% of the sum gets no netting benefit whereas the other 60% of the sum is multiplied by the net-to-gross ratio (which is usually less than one) to grant some partial netting benefit.

### PFE of Netting Agreement:

$$\left( \frac{\text{PFE of Netting Agreement}}{\text{Netting Agreement}} \right) = 40\% \times \left( \frac{\text{sum of PFE of Individual Contracts}}{\text{Individual Contracts}} \right) + 60\% \times \left( \frac{\text{Net/Gross Ratio}}{\text{Ratio}} \right) \left( \frac{\text{sum of PFE of individual contracts}}{\text{contracts}} \right)$$

**PFE of Individual Contract:**

$$\left( \frac{\text{PFE of Individual Contract}}{\text{Contract}} \right) = \left( \frac{\text{Notional Amt. of contract}}{\text{Contract}} \right) \times \left( \frac{\text{Applicable Credit Conversion Factor}}{\text{Contract}} \right)$$

As an example, assume a bank has in the past bought \$100 million of protection on two different IG-rated credits. Furthermore, suppose the current mark-to-market value of the first contract is positive \$5 million and the second is negative \$2 million. In this case, the net-to-gross ratio would be 0.6 (ie \$3 million/\$5 million) and the sum of the individual PFEs would be \$10 million (ie \$5 million for each \$100 million IG contract). According to the formula then, the PFE for this portfolio of two credits would be \$7.6 million, \$2.4 million less than if no netting was allowed.

Perhaps counter-intuitively, the netting formula penalizes banks that have no derivative contracts with negative mark-to-market. Indeed, if the mark-to-market on every contract a bank entered into was positive (obviously, unlikely), then the net-to-gross ratio would be one. In contrast, a portfolio where all contracts with positive mark-to-market are perfectly offset by contracts with equally negative mark-to-market could receive the maximum netting benefit as a bank may only need to add 40% of the sum of all the individual PFEs to their Exposure Measure.

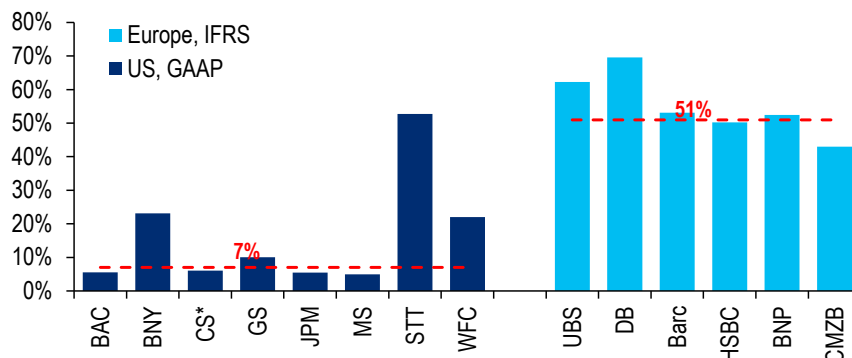
Unlike when a bank calculates their risk-weighted capital exposure, the regulators do not allow the use of an alternative model to the Current Exposure Method (CEM)<sup>1</sup>, a consequence of which is that there is no way to incorporate cross-product netting for the sake of the leverage ratio calculation. So in the case where a bank has sold a cash-CDS basis package to an investor and provided the financing on the bond leg, the bank would be prohibited from netting the CDS exposure with the bond financing exposure for the sake of the Exposure Measure.

**Sharp differences in netting in the US vs. Europe** — Moreover, what derivative contracts are allowed to net with each other varies significantly between jurisdictions as the rules are essentially governed by national accounting standards. Indeed, in the US, GAAP rules allow for the netting of derivative exposures that are subject to a master netting agreement, whereas IFRS accounting rules are far stricter. The result is that US banks are able to report a derivative position on their balance sheet that represents just 7% of their gross derivative assets, while European banks report derivative positions that are closer to 50% of their gross derivative assets—a sharp difference.

As such, when it comes to the leverage ratio and the PFE calculation, a US bank with an identical derivatives portfolio to a European bank will have a far lower Exposure Measure. The reason is that the net-to-gross-ratio (NTGR) for a US bank is likely to be lower than a European bank as more derivative contracts are allowed to net with each under US GAAP relative to IFRS, resulting in a smaller NTGR numerator.

<sup>1</sup> Although the BCBS has asked for comments on an alternative model called the non-internal model method (NIMM). Among other features, the NIMM would allow netting of collateral for unmargined trades and netting of derivative transactions within an asset class (instead of just within an individual netting set, which might include all CDS with XYZ counterparty, for instance).

**Figure 3. Widely different derivatives netting impact under US GAAP vs. European IFRS, net-to-gross ratios in %**



Source: Various company disclosures, Citi Research  
\*Although CS is a Swiss Bank, it reports under US GAAP standards.

**BCBS's proposed revisions to impact the treatment of collateral** — What's more, the revisions proposed by the BCBS go quite a few steps further than the current rules being implemented by national regulators. Whereas the national regulators essentially stop after calculating the PFE for derivatives, presuming that all contracts are subject to variation margin (i.e., clients must post collateral to minimize the risk that the bank is forced to replace the contract at current rates should the client default), the Basel revisions give no credit for such collateral and therefore require banks to recognize the full replacement cost on their positions (which is either equal to zero or the positive mark-to-market on the trade). In the minds of the Basel Committee, collateral received by a bank is often in turn re-used in repo-style transactions that further lever the bank. As such, the Committee thought it warranted to remove any benefit banks were receiving from that collateral.

**Credit derivatives further penalized** — Finally, the revisions the BCBS proposes add one more component to the calculation specifically for CDS. In the case where a bank has sold protection on a reference entity and has not purchased protection on the same reference entity that is of equal-or-greater maturity, the full notional of the contract in which the bank has sold protection is added to the exposure measure (although it's removed from the PFE calculation so as to avoid double counting).

For example, in the case where a bank has sold \$100 million of protection on an IG-rated credit, bought \$100 million of protection on another IG-rated credit, and where the current mark-to-market on the two contracts is positive \$5 million and negative \$2 million, respectively, the full Exposure Measure calculation under the Basel proposal would work as follows. First, the net replacement cost for the portfolio would be \$3 million. Second, the sold protection would generate another \$100 million of exposure because the bank does not own any protection on the IG-rated credit that is of equal-or-greater maturity. Third, the potential future exposure (PFE) would be \$5 million (i.e., just the 5% conversion factor applied to the contract in which the bank bought protection because the contract in which the bank sold protection is removed in order to prevent double counting). As such, the bank's Exposure Measure on this portfolio would be \$108 million, compared to just \$7.6 million under the US proposal.

## Capital Implications

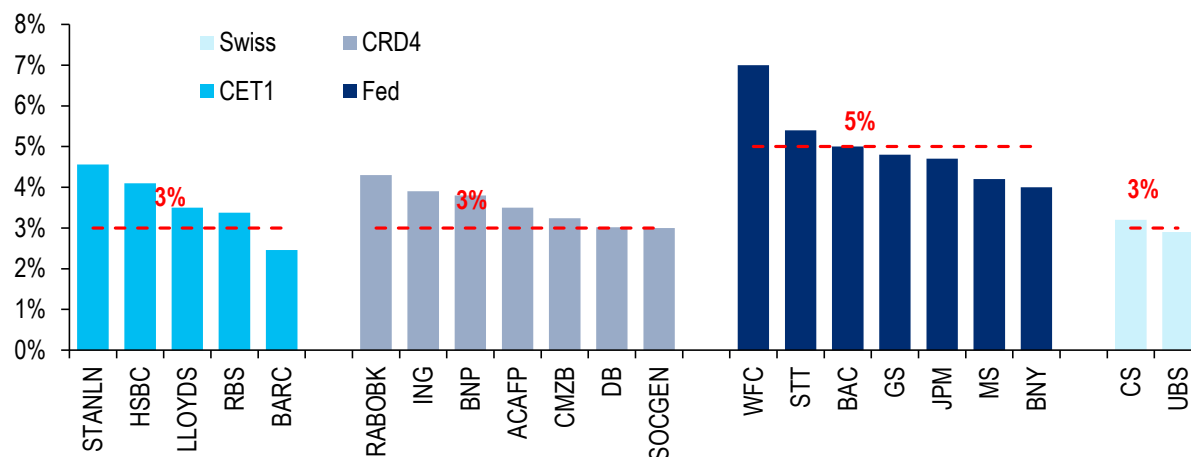
On both sides of the Atlantic, banks have begun to report where they stand relative to the leverage ratios adopted by their national regulator(s).

**US banks most deficient** — In the US, all of the global systemically important banks (G-SIBs) provided some form of guidance during their second quarter earnings calls. Under the existing US guidelines, five of the eight banks are currently under the 5% target for bank holding companies, while three banks (JPM, BK, and STT) noted they are deficient with respect to the 6% target for deposit taking subsidiaries—some, like JP Morgan at 4.3%, significantly so—three noted they are already in-or-near compliance (BAC, MS, WFC), and one didn't comment (GS).

**UK announces most accelerated implementation timeline** — Likewise, in the UK, the PRA's June 20 report addressed the capital positions of the eight major UK banks and building societies. The report identified Barclays and Nationwide as deficient with respect to the CET1 leverage ratio and mandated the firms remedy their deficits by mid-2014, well ahead of the BCBS's implementation timeline of January 2018.

**European leverage ratio most lenient for now** — In Continental Europe, most large banks have disclosed where they stand relative to a fully phased-in leverage ratio with just two out of fifteen banks currently below the 3% target. That being said, there's considerable risk that national regulators continue to move the goal posts, so to speak. Indeed, the Dutch Finance Minister, Jeroen Dijsselbloem, who currently leads the group of 17 euro finance ministers, recently suggested a 4% leverage ratio for banks considered too big to fail—a target that the majority of European banks would currently fail to meet.

Figure 4. Leverage ratios for largest banks under the rules set by their various national regulators



Source: Various company disclosures, Citi Research

**BCBS's proposed revisions yet to be quantified** — What's more, it's important to stress that the leverage ratios that banks are currently reporting do not incorporate the BCBS's revisions to the denominator of the leverage ratio, which few banks have attempted to quantify. In addition, it's highly likely that banks will shoot for a leverage ratio higher than prescribed minimums in order to build in a buffer, given that executive compensation can be curtailed if banks fall below their targets.



To get a sense of how much leverage ratios could be impacted by the BCBS's proposed revisions we look at the three components likely to drive bank leverage ratios lower under the new framework: (1) treating repo and reverse repo on a gross basis rather than net, (2) removing the benefits of collateral as a mitigant to derivative exposure, and (3) penalizing written credit derivatives for which a bank has not purchased longer dated protection on the same entity.

## 1. Repo & Reverse Repo

The US and European repo markets together are roughly \$6 trillion in size according to data from the Federal Reserve and the International Capital Market Association (ICMA). But how much of that number currently resides off-balance sheet and could now be caught up in a leverage ratio calculation? Contrary to the understanding of some market participants, a significant portion of the \$6 trillion number is already reported on bank balance sheets. It is *not* the case that banks report the residual position of their repo and reverse repo on their balance sheet as if one nets with the other in such a broad based way, as some pundits have suggested.

Indeed, recent quarterly disclosures from the second quarter of 2013 indicate that roughly 77% of the *gross* amount of repo outstanding at a bank is already reported in the *net* repo and reverse repo numbers that are reflected on US bank balance sheets. The eight G-SIBs reported slightly less than \$2 trillion of reverse repos and securities borrowed in the second quarter of 2013—transactions that would show up on the asset side of the balance sheet and hence contribute to a leverage ratio calculation. And under US GAAP accounting rules, just over \$1.5 trillion of that \$2 trillion is already reflected on bank balance sheets as net figures.<sup>2</sup> As such, applying a 5/6% target to the \$460bn of off-balance sheet reverse repo and securities borrowed transactions results in a 17/20bp reduction in the leverage ratio of the eight G-SIBs.

Figure 5. Impact of repo on US banks

Bank	Gross Amt on Balance Sheet (a)	US GAAP Netting Offset	Net Amt on Balance Sheet (b)	% Repo on B/S (b)/(a)	Leverage ratio impact
Bank of America	327	103	224	69%	0.18%
BNY Mellon	10	0	10	100%	0.00%
Goldman Sachs	393	54	339	86%	0.20%
JP Morgan	486	117	369	76%	0.17%
Morgan Stanley	360	88	272	75%	0.37%
State Street	41	26	15	36%	0.49%
Wells Fargo	46	5	41	88%	0.01%
Total for 8 G-SIBs \$	1992	460	1532	77%	0.17%

Source: Various company disclosures, Citi Research

<sup>2</sup> It should be noted that many banks note in the footnotes to their financials collateral received that is far in excess of the gross amount of their reverse repo. Even adding the collateral received on derivatives leaves a significant residual. For instance, JPM notes the firm has accepted \$723.7bn of collateral that it could sell, "generally obtained under resale agreements, securities borrowing agreements, customer margin loans and derivative agreements". However, the gross notional of JPM's reverse repo is \$486bn and collateral received to back derivative trades is \$64bn, which together only total \$550bn—leaving \$174bn of the collateral received unexplained. It is possible that this collateral backs truly off-balance sheet reverse repo (security-for-security lending) as discussed in *Are the brokers broken?* (Matt King, 2008). A back of the envelop analysis suggests that if this received collateral was associated with additional reverse repo and regulators decided to target it, the additional reduction to leverage ratios could exceed 20bp.



Likewise, many European banks have also begun to report their gross and netted repo activity, with broadly similar results to the US. Indeed, just over half of the European banks with significant repo operations have disclosed gross numbers in their most recent semi-annual reports. In dollar terms, these banks together also have roughly \$2 trillion of gross reverse repo and securities borrowed, but only report \$1.45 trillion on their balance sheets after netting at the counterparty level. Therefore, if one applies a 3% leverage ratio to the \$558bn repo assets not reflected in the net numbers, leverage ratios decline by approximately 12bp—a number we assume is representative of the broader 15 bank sample set.

Figure 6. Impact of repo on European banks

Bank	Currency	Gross Amt on Balance Sheet (a)	IFRS Netting Offset	Net Amt on Balance Sheet (b)	% Repo on B/S (b)/(a)	Leverage ratio impact
UBS	CHF	160	23	137	86%	0.06%
Deutsche Bank	EUR	287	63	224	78%	0.10%
Barclays	GBP	288	123	165	57%	0.22%
Credit Suisse	CHF	214	41	173	81%	0.10%
HSBC	USD	299	89	210	70%	0.08%
BNP Paribas	EUR	243	74	168	69%	0.11%
Commerzbank	EUR	112	19	93	83%	0.09%
Total \$*		2011	558	1453	72%	0.12%

Source: Various company disclosures, Citi Research

\*Total amounts are converted into USD in Mid-August.

## 2. Derivative Collateral

Removing the benefits of the collateral banks hold against derivatives will also have a noticeable impact on capital. The eight US G-SIBs together hold nearly \$300bn in cash and financial collateral against their derivative assets and have pledged another \$211bn against their derivative liabilities. Under the BCBS's proposed revisions both collateral received and pledged are added to the exposure measure. As such, the impact to the leverage ratio for the 8 US G-SIBs ends up being 18/22bp to meet the 5/6% US leverage ratio. Similarly, the seven European banks that have disclosed numbers, in dollar terms, report having received \$317bn of collateral against their derivative assets and pledged \$320bn, which would result in a 13bp hit relative to a 3% leverage ratio.

Figure 7. Impact of derivative collateral on US banks

Bank	Asset Collateral	Liability Collateral	Leverage ratio impact
BAC	50.5	41.3	0.16%
BNY	1.2	0.2	0.02%
GS	79.4	22.7	0.36%
JPM	64.6	56.8	0.17%
MS	60.8	36.1	0.40%
STT	0.9	0.9	0.04%
WFC	5.4	11	0.04%
Total for 8 G-SIBs	296	211	0.18%

Source: Various company disclosures, Citi Research

Figure 8. Impact of derivative collateral on European banks

Bank	Currency	Asset Collateral	Liability Collateral	Leverage ratio impact
UBS	CHF	46.3	28.2	0.18%
DB	EUR	65.6	66.1	0.19%
Barc	GBP	48.1	42.8	0.17%
CS	CHF	28.1	31.5	0.14%
HSBC	USD	35.6	34.3	0.07%
BNP	EUR	19.1	30.9	0.08%
CMZB	EUR	9.6	18.4	0.13%
Total	USD	317	320	0.13%

Source: Various company disclosures, Citi Research

## 3. Written Credit Derivatives

Finally, the written credit derivatives penalty is likely to have a meaningful impact on leverage ratios, although it's difficult to say to what extent for a number of reasons. First, bank disclosures are lacking; only three of the 8 US G-SIBs (GS, JPM, WFC) and one of the European banks (CS) have disclosed the notional amount of protection bought that's on the exact same reference entity as the protection the

banks have sold. Yet even this level of detail will likely lead to an underestimation of the impact to leverage ratios because it is unknown whether the protection purchased is of longer maturity than the protection sold. What's more, we note that in many respects, the exposure measure associated with written credit derivatives can be ameliorated with relative ease if history is a guide<sup>3</sup>.

Based on the imperfect disclosures of the four banks that have provided some information on their written credit derivative exposure, we reckon that leverage ratios are likely to decline on average by 18bp against a 5% target, or 8bp excluding Goldman Sachs, whose net protection sold is especially large relative to their peers. But as estimates go, it's difficult to have a lot of confidence that the 4-bank average will prove representative of the other 19 major banks in our sample set. Indeed, the variation between Goldman Sachs (48bp) and Wells Fargo (3bp) is large enough that the average should be taken with a grain of salt, especially since the numbers are likely to grow as disclosure improves.

Figure 9. Impact of written credit derivatives on US banks

Bank	Purchased Credit Derivatives (a)	Written Credit Derivatives (b)	Maximum of (b) - (a) and 0
BAC	1569	1561	-
BNY	-	-	-
GS*	1575	1714	139
JPM*	3097	3156	58
MS	1716	1737	21
STT	-	-	-
WFC*	12	23	11

Source: Various company disclosures, Citi Research

\*Note: Goldman Sachs, JP Morgan, Wells Fargo, and Credit Suisse provide a purchased credit derivatives number which consists solely of contracts that offset written credit derivatives. Other banks that provide data do not make such a detailed disclosure around their purchased credit derivatives, suggesting that the net exposure could be higher than implied. All disclosure are lacking with respect to which purchased credit derivatives offset written credit derivatives AND are of equal-or-longer maturity.

Figure 10. Impact of written credit derivatives on European banks

Bank	Purchased Credit Derivatives (a)	Written Credit Derivatives (b)	Maximum of (b) - (a) and 0
UBS	1082	1060	-
DB	1340	1269	-
Barc	-	-	-
CS*	775	806	32
HSBC	402	404	2
BNP	-	-	-
CMZB	-	-	-

## Total Impact

**US** — In total then, we see leverage ratios at six of the eight US G-SIBs as deficient by 25bp at the bank holding company level before taking into account the BCBS's proposed revisions, and 70bp after—with the 45bp of additional deficiency driven by 17bp from repo, 18bp from derivative collateral, and at least 10bp from written credit derivatives. In capital terms, 70bp translates into a \$82bn capital hole at those six firms. Alternatively, the six deficient G-SIBs could reduce their combined exposure measure (the denominator) by \$1.47 trillion. Expressed as a percentage, the US banks with deficiencies need to increase their capital by roughly 12% or reduce their exposure by 11% at their holding companies.

Should the US adopt the BCBS's proposed revisions, the top four deficient US G-SIBs relative to the 5% holding company target in descending order are Morgan Stanley (166bp), Goldman Sachs (124bp), BNY Mellon (102bp), and JP Morgan (72bp).

<sup>3</sup> Indeed, over the course of 2012, Deutsche Bank reduced the gross notional of the credit derivatives on their balance sheet by one-third. Similarly, Credit Suisse's *net* exposure fell by one-third over the first half of 2013.

Figure 11. Total impact to leverage ratio from BCBS proposed revisions on US banks

Bank	BCBS Proposed Revisions			Existing Deficiency (Surplus)	Total Deficiency (Surplus)
	Repo	Deriv. Collat.	Cred. Deriv.		
BAC	0.18%	0.16%	Unknown	0.00%	0.34%
BNY	0.00%	0.02%	Unknown	1.00%	1.02%
GS	0.20%	0.36%	0.48%	0.20%	1.24%
JPM	0.17%	0.17%	0.08%	0.30%	0.72%
MS	0.37%	0.40%	0.09%	0.80%	1.66%
STT	0.49%	0.04%	Unknown	(0.40%)	0.12%
WFC	0.01%	0.04%	0.03%	(2.00%)	(1.92%)

Source: Citi Research

**Europe** — We reckon that leverage ratios would decline by at least 35bp if the BCBS's proposed revisions are implemented in Europe. However, all but two banks are already above the 3% target and most comfortably so. As such, we reckon a 35bp hit to leverage ratios would only leave five of fifteen banks deficient. In capital terms, we reckon these five banks would need to raise \$41.3bn, but that's disproportionately driven by a \$22.6bn capital hole at Barclays that doesn't take into account the banks recent rights issue. Alternatively, banks could reduce their exposure measure by just over \$1.1 trillion to accomplish the goal.

Whether the capital shortfalls associated with the leverage ratio will ultimately prove problematic for bank creditors is another question, and one which clearly depends on how the regulations evolve. If national regulators were to ignore the BCBS's proposed revisions, our sense is that banks should be able to manage quite well, especially against a January 2018 implementation deadline—even if it's likely that the market enforces compliance on a quicker timetable. Yet, if the BCBS's revisions are incorporated into the leverage ratio rules, or national regulators continue to opt for rules that go above and beyond the Basel III guidelines, banks *could* have a tougher time achieving compliance.

Figure 12. Total impact to leverage ratio from BCBS proposed revisions on Euro banks

Bank	BCBS Proposed Revisions			Existing Deficiency (Surplus)	Total Deficiency (Surplus)
	Repo	Deriv. Collat.	Cred. Deriv.		
UBS	0.06%	0.18%	Unknown	0.10%	0.34%
DB	0.10%	0.19%	Unknown	(0.02%)	0.27%
Barc	0.22%	0.17%	Unknown	0.54%	0.92%
CS	0.10%	0.14%	0.08%	(0.20%)	0.11%
HSBC	0.08%	0.07%	0.00%	(1.10%)	(0.95%)
BNP	0.11%	0.08%	Unknown	(0.80%)	(0.61%)
CMZB	0.09%	0.13%	Unknown	(0.24%)	(0.01%)

Source: Citi Research

**Capital shortfalls look relatively manageable** — There are a number of ways to put potential capital shortfalls in context. In the US, the consensus 2013 net income expectations for the eight G-SIBs sum to \$87bn—slightly more than the \$82bn minimum capital hole that adoption of the BCBS's proposed revisions would create. Alternatively, one could compare the capital shortfall relative to the various mortgage settlements and put-back litigation of the last few years. Citi Research estimates that the liability associated with such activity for the large US bank servicers is likely to be in excess of \$70bn.

Viewed against net income or mortgage liabilities, we'd argue that a \$82bn capital hole is still a manageable number for the US banks sector as a whole. That being said, the potential deficiency varies substantially between banks. **We could see credit spreads of Morgan Stanley and Goldman Sachs debt, in particular, reacting negatively if the BCBS's revisions were to be adopted.**

In Europe, the story is much the same, in our opinion. The \$41bn capital hole compares to consensus estimates of more than \$76bn of 2013 net income for the 15 banks in our sample set. **As such, as long as the leverage ratio target was not raised in Europe, to say 4%, the capital or asset reductions required to bring the banking sector into compliance should not prove overly onerous and would likely have little impact on spreads, at least away from Barclays.**

That being said, there are likely to be plenty of ramifications for markets as a whole from the introduction of the leverage ratio, some of which we will try and expound upon in the next section. And to the extent that national regulators continue to opt for a ratio that has more teeth, so to speak, the broader consequences to markets are likely to be felt more acutely by investors.

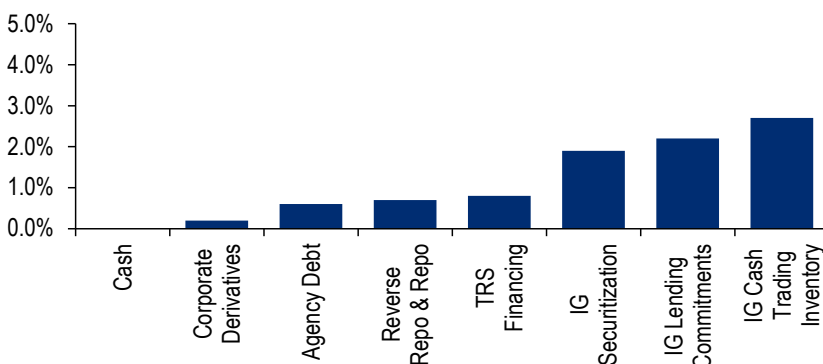
What's more, it should be noted that there are aspects to the capital analysis that we leave unaddressed. For instance, in the US, the new regulations will require the US operations of foreign banks to be separately capitalized with a 3% leverage ratio. Yet it's entirely possible that regulators decide to subject foreign bank operations to the same sort of 5/6% regime in order to level the playing field from a competitiveness perspective and protect the financial system from systemic risk.

## Broader market implications

**More pressure on bank balance sheets:** An obvious consequence to the introduction of a non-risk-weighted leverage ratio is that banks will be incentivized to reduce their holdings of low-risk assets that generate relatively little return rather than raise fresh capital. Indeed, under such a framework, cash and cash-like instruments are one of the least efficient assets a bank can hold on its balance sheet, which, in a very real sense, puts the leverage ratio in direct opposition to Basel III's other monitoring tools, the liquidity coverage ratio and the much more well-established battery of risk-weighted capital ratios.

No doubt, creating a tension between ratios was entirely by design, but as the latest regulatory ratio to be added, the liquidity ratio may end up being the most disruptive. Banks have already optimized their balance sheets to a risk-weighted world where excess liquidity is encouraged. But if they now have to think in non-risk-weighted terms, some retooling of business models will need to occur. As Figure 13 shows, the capital required as a percentage of notional varies substantially under Basel III's risk-weighted framework.

**Figure 13. Comparative illustration of CET1 required as a percentage of notional under risk-weighted framework for various bank business groups**



Source: Citi Research, Citi Capital Optimization Group

Note: Based on 100mm notional or carrying value; 9.5% Risk Based capital conversion was applied, 5% SLR capital requirement applied, 97% CET1 to Tier 1 Capital conversion rate was used

1. Corporate Derivatives- 5yr pay fixed IRS; 95% CVA hedge effectiveness; BBB rated counterparty

2. Reverse Repo and Repo- BBB rated counterparty; AVC charge applicable; 5% trade haircut; 2% Basel haircut

3. TRS Financing- assumed de-minimis credit risk and market risk is fully hedged

4. IG Cash Trading Inventory- average RW% was implied based on GCM Credit Trading Portfolio (as of Jun 2013)

5. IG Lending Commitment-100% drawn; 5 year commitment; BBB rated counterparty

6. IG Securitization- 20% RW was used

7. Agency Trading- average RW% was implied based on GSM Agency Trading Portfolio (as of Jul 2013)

Theoretically, an easy-but-credit-negative step that banks could take would be to reduce any excess liquidity held over and above that which is required to maintain their liquidity coverage ratio. Yet, we're not quite sure banks will take that route. On Goldman Sachs' 2Q earnings call, management noted that the bank is "not going to modulate our liquidity down because of a given metric that's in the marketplace, even if an incentive exists for that."

To our minds, it's far more likely that banks target other balance sheet-intensive businesses where returns are relatively low and the exposure measure is high. Repo, in particular, is likely to be a target given the spread that banks earn from much of the repo business associated with high-quality assets can be as little as 10bp, and banks tend to target a return on assets of closer to 100bp. But there's an equally compelling case to be made for reevaluating the businesses of derivatives (which we discuss below) and unfunded lending commitments (unconditionally cancelable commitments receive a 10% weighting, whereas other commitments that can't be canceled at a bank's discretion are weighted 100%<sup>4</sup>).

In any case, simply going the route of reducing liquidity is unlikely to work very well in the long term. By and large, the Fed determines the level of deposits or excess reserves in the system through its control of short term rates. Presumably, if G-SIBs were less willing to take those deposits, they would flow to the US operations of foreign banks or supra-regionals whose leverage ratio targets are lower and as a result could offer more attractive interest rates. Ultimately, though, such an outcome would probably incentivize regulators to raise the leverage ratio for foreign bank operations, which, likely means that shedding deposits or excess reserves could prove difficult in the long-run.

What's more, there's no guarantee that regulators will countenance a reduction in liquidity or assets on the balance sheet. In the cases of UBS, CS, and DB, there

<sup>4</sup> CRD IV actually has a sliding weight scale for commitments that are noncancelable or cancelable with conditions. The weights vary depending on the riskiness of the item. The BCBS's proposed revisions would remove this sliding scale and apply a 100% weight, as the US rules already do.

seems to have been no opposition from regulators to those banks' public proposals to do just that. But based on media reports surrounding Barclays' recent rights issue, it appears as if UK regulators were far more sensitive to any actions the bank might take that could be perceived as a reduction in lending to the real economy.

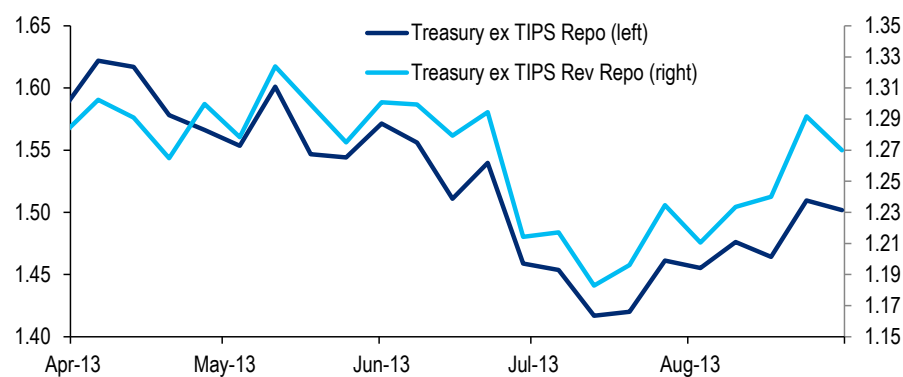
**A retraction in repo markets is likely:** Regardless of whether the BCBS's proposed revision are adopted and a portion of repo can remain off-balance sheet for the purpose of calculating the leverage ratio, the profitability of the repo business is likely to be under the microscope. Compared to other businesses in which banks engage, repo is generally more balance sheet-intensive with lower margins and less risk, which, on the face of it, doesn't bode well for its future in a world of non-risk-weighted capital ratios. Of course, the truth is a little more complicated.

One of the reasons that regulators have expressed concern over the size of the repo market in the past is that it's intimately linked to the shadow banking sector, which largely remains unregulated and is perceived to be a source of systemic risk. Indeed, repo is one way in which the leverage inherent in a bank's balance sheet can be parceled out to non-bank market participants. During the great financial crisis there was intense focus on banks that finance (and lever) themselves in the interbank and repo markets. But the flip side of the coin (or the book, for that matter) is that the repo market—in particular, banks' reverse repo activity—acts as the primary conduit through which many institutional investors source trading leverage.

When it comes to scaling back repo activity, the fundamental problem for markets is that it's difficult to trim just one half of a matched book. Broadly speaking, a bank can easily reduce the amount of high quality collateral that it repos with the money market industry (i.e., a trade in which a bank borrows money from a money market fund at the general collateral rate (GC) and collateralizes the "loan" with securities), but such a reduction is also likely to curtail a bank's appetite for reverse repo trades where a bank lends money to an investor, say a hedge fund, so that they can enter into a leveraged trade.

As such, if repo is to be reduced, so will the "matching" reverse repo. And that's likely to reduce the supply of leverage and drive up costs, given that easy substitutes to bank-provided leverage are lacking. Indeed, judging by the New York Fed data, repo and reverse repo outstandings tend to move in near lock step with each other.

**Figure 14. High correlation between repo and reverse repo volumes, in \$tn**



Source: NY Fed, Citi Research

Moreover, it's important to note that when a bank provides financing through reverse repo trades it's engaging in a business that, viewed in isolation, is not terribly profitable from a return on assets perspective—at least when the trade involves

high-quality securities, like Treasuries or Agencies. But reverse repo is rarely viewed as a stand-alone business. Banks tend to allocate balance sheet to active clients that drive trading revenue across multiple trading desks. As a result, the rationing of reverse repo is not likely to be uniform, in our opinion. In all likelihood, the pressure to cut back will disproportionately fall on the lowest margin trades where the security being purchased is of very high quality, and on recipients of reverse repo financing that are less profitable clients to the banks—i.e., those that generate little trading and/or underwriting revenues.

An example of the type of client that could come under pressure is the mortgage REIT industry. While a mortgage REIT does do some amount of Treasury hedging, they typically are buy-and-hold investors of mortgage product and rely on the leverage provided by banks to generate attractive dividends to their shareholders.

Unfortunately, there's no great way to estimate by how much repo might decline. In a world where the BCBS's proposed revisions are not implemented, the US banks could meet their deficiency with respect to the 5% leverage ratio target entirely by reducing their repo operations. Doing so would require reducing repo operations at the six deficient US G-SIBs by \$557bn, a roughly 29% reduction in the gross amount of repo outstanding. On the other hand, if the BCBS's proposed revisions were implemented, the reduction in repo needed to offset the leverage ratio impact would rise to 77% of the gross amount outstanding. And in some cases, like JPM, achieving the reduction solely through repo would essentially mean the bank would have to exit the repo business entirely. As a result, we believe repo will end up being only one lever that banks pull to bring themselves into compliance with the leverage ratio.

**Downward pressure on general collateral rates:** It is likely that a direct consequence of a reduction in repo would be lower general collateral (GC) rates, which are already well below the rate at which the Fed pays interest on excess reserves (IOER). With money market demand unlikely to decline much after the expiration of the FDIC's guarantee on noninterest bearing deposits at the end of 2012, a reduction in repo means banks would scale back their borrowing from the money market industry. Moreover, the trade in which borrowed funds are deposited at the Fed in order to earn IOER would be likely to be curtailed in the process. As a result, general collateral rates are likely to fall even closer to zero, if not below.

**The liquidity of high-quality fixed income product suffers:** Undoubtedly the consequences of a decline in repo outstandings will be more acute for fixed income investors. Indeed, high quality fixed income collateral dominates the repo numbers with roughly 66% of repo and reverse repo involving US Treasuries, and agency/MBS debt contributing another 20%, according to the New York Fed's data. In contrast, lower quality collateral only makes up a small proportion of the repo market, with corporate and equity markets coming in at 2.8% and 6.3%, respectively.<sup>5</sup>

Moreover, it stands to reason that any reduction in repo will directly impact levered investors in markets with a high percentage of repo activity. For instance, as much as 20% of the treasury market by outstanding notional and 16% of the mortgage market is involved in repo transactions at any given time<sup>6</sup>, whereas less than 1% of

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<sup>5</sup> Our suspicion is that the New York Fed data does not fully included securities lending transactions on the equities side, many of which are legally-distinct-but-functionally-equivalent to reverse repo. Please see footnote 2 for a brief note on the potential size of this market.

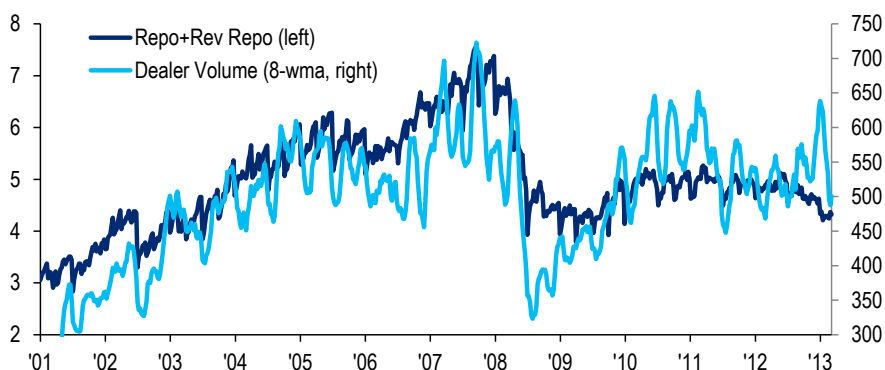
<sup>6</sup> In calculating these numbers we use the outstanding notional of the Treasury and mortgage markets not owned by the Federal Reserve.



the equity market and 1.5% of the corporate market is tied up in a repo trade. Consequently, we expect the treasury and mortgage markets to take the direct brunt of any reduction in repo, although other markets, like credit, will undoubtedly experience second order effects.

What should be most alarming to fixed income investors is that there is a strong correlation between the volume of Treasuries traded and repo outstandings, suggesting that a retraction in repo may lead to lower liquidity, higher bid-offer, and greater dislocations across the curve—all of which *could* drive yields higher as investors seek greater compensation in order to hold a more volatile asset with rising transaction costs.<sup>7</sup> More likely yet, is that (as in credit) investors prove incapable of adding in a sufficient illiquidity premium because of pressure to perform in a rallying market, and the illiquidity is then manifested in sudden gap risk in a sell-off.

**Figure 15. Primary dealer repo/rev-repo outstanding vs. average US Treasury volumes,**  
in \$tn (left) and \$bn/wk (right)



Source: NY Fed, Citi Research

It's an open question how much impact a less liquid Treasury market might have on other fixed income instruments that trade at a spread to Treasuries. That being said, we presume that many of the dislocations that would appear in the rates market would filter through to credit and other spread product. If the cost to "arbitrage" inconsistencies in the interest rate curve increases, then the cost to "arbitrage" inconsistencies in credit curves should also increase—at least partially, as credit hedge funds need to execute a Treasury leg on each corporate bond they buy or sell.

**Tighter spreads for higher risk fixed income:** While inconsistencies in curves could grow, the spread of higher beta fixed income instruments to Treasuries is likely to compress with the advent of the leverage ratio over the longer-term, all else equal. Indeed, the attractiveness of credit should increase relative to higher quality fixed income for investors operating in a world where banks provide less repo-funded leverage. In particular, we reckon that high yield bonds, leveraged loans, and lower quality investment grade bonds should derive the most benefit at the margin, simply because their relative illiquidity becomes less of an issue.

In the short term, optimizing bank balance sheets to the leverage ratio has the potential to create spillover risks to credit, particularly if forced deleveraging were to result in wider mortgage spreads. Over the past five years, hiccups in the mortgage

<sup>7</sup> Presumably, this could be a compelling reason why the US Treasury might weigh in on the various leverage ratio proposals, of which they have definitely taken note. See the section entitled "Assessing fixed income market liquidity" in the Q3 [Treasury Presentation to TBAC](#).

market have had a direct impact on credit derivative spreads as investors have often turned to HY CDX as a hedge, rightly or wrongly.

**Collapse of derivatives, more clearing:** Instead of targeting repo, an alternative route that banks could pursue to bring down their exposure measure is to reduce the gross notional of outstanding derivatives. Indeed, in some derivative markets, like credit, the gross notional of all active trades dwarfs the net notional exposure, suggesting that many offsetting trades sit on the books of derivative counterparties.

To a significant extent, clearing should help drive compression of gross notionals going forward as banks end up centralizing their derivative exposure to just a few counterparties (i.e., the clearing houses) and offsetting trades can be compressed more easily, at least from an operational perspective.

Likewise, standardization of derivative contracts is just as important for compression purposes. When the CDS market underwent its “Big Bang” standardization effort in 2009, contracts became more fungible with each other and hence easier to compress. Prior to the Big Bang Protocol, CDS contracts would trade with a unique coupon/strike determined on the day of initiation. As such, a portfolio of offsetting legacy trades all referencing the same entity is often far more difficult to compress than one might think, leaving investors to manage the counterparty and interest rate risk associated with the annuities caused by CDS contracts that have different coupons but offset each other notional-wise.

Unfortunately, not all derivative markets lend themselves to standardization quite as smoothly as the CDS market. The ability to customize many rates derivatives is what makes them so appealing, and the fact that end-users are often exempt from clearing requirements compounds the problem. As such, the prospects for compression are likely to vary by product, and banks with heavier exposure to derivative markets where standardization is difficult may derive far less leverage ratio relief from efforts to reduce gross notionals—which are likely to intensify in coming years.

A growing focus on compression and the balance sheet usage of the derivative business is likely to have pricing implications for less liquid contracts. In the CDS market, we believe that bid/offer will widen for less frequently traded contracts that are unlikely to be cleared, which will likely reinforce liquidity disparities between reference entities. But elsewhere too, we expect less customization in the derivative market in an effort to concentrate derivative liquidity. In the single name CDS space, moving from quarterly roll dates to semiannual seems highly likely over a longer-term horizon.

**CDS curves may steepen:** Should national regulators adopt the BCBS’s proposed revisions to the leverage ratio and, specifically, the written credit derivatives provision, we expect CDS curves to steepen. While a handful of banks have provided the notional of all credit derivative protection sold along with protection bought on the same entity, the net amount of written credit derivatives exposure is likely substantially higher than the disclosed numbers suggest because the purchased protection must be of greater maturity than sold protection. In essence, the capital charge associated with a CDS steepener position would be far lower than that of a CDS flattener from the perspective of a bank. As a result, banks would likely be incentivized to purchase longer dated protection and curves could become noticeably steeper in regions that implement the BCBS’s proposed revisions.

## **Additional Citi research pertaining to bank leverage ratios**

***Short-End Notes: Repo matched-books and the supplementary leverage ratio,*** Andrew Hollenhorst, August 16 2013.

***Short-End Notes: Basel III Supplementary Leverage and Short-Term Markets,*** Andrew Hollenhorst, July 12 2013.

***Leverage Ratio May Get Even Tougher,*** Keith Horowitz, September 9 2013.

***Initial Read On Supplementary Leverage Ratio,*** Keith Horowitz, July 9 2013.

***Final Basel 3 Rules Largely Benign,*** Keith Horowitz, July 2 2013.

***Supplementary Leverage Ratio Update: Potential Excess Liquidity Carve Out Could Mitigate Impact,*** Josh Levin, July 1 2013.

***Dial Back in Leverage Pulls Back Repo Funding: Funding Indicators,*** Kinner Lakhani, August 27 2013.

***US & European Wholesale Banks - Not All Banks Equal on Netting & Collateralisation,*** Kinner Lakhani, August 15 2013

***Leverage-in but Not Sweatin': European Banks & Leverage Ratios,*** Kinner Lakhani, July 15 2013.

***US Leverage, European Read-through: Path to Greater Clarity,*** Kinner Lakhani, July 9 2013.

***US & European Wholesale Banks - First look at netting disclosure; favourable for Deutsche Bank,*** Neil Dawson, June 6 2013.

# Appendix A-1

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