Opportunities and Challenges for Hedge Funds in the Coming Era of Optimization

Part 2: Changes Driven by Regulation

Citi Investor Services

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Key Findings

The factors driving change in the hedge fund industry are shifting. For the five years since the Global Financial Crisis (GFC), major industry evolution occurred primarily in response to a shift in the investor base.

Part I of this year's survey explored the circumstances that caused institutional investors to emerge as the industry's main source of capital and how demands from this audience changed key structural aspects of the market. In turn, these structural changes allowed for expanded understanding of hedge fund strategies, the broader placement and use of hedge fund managers in the core of institutional portfolios, and the emergence of a multi-tiered industry structure in which different profile hedge funds face off to unique investor audiences. The continuation of these trends is likely to help drive the amount of assets being managed by hedge fund firms from $2.9 trillion in 2013, of which $305 billion is in liquid alternatives, to $5.9 trillion in 2018, of which $977 billion will be in liquid alternatives.

Throughout this period of change, a broad and significant set of global regulations was being formulated. The complexity and scope of the rule-making has allowed these programs to hang over the market for the past several years without significantly impacting much of the day-to-day hedge fund activity. Yet, with major implementation deadlines upon us or looming, these **regulatory drivers are now becoming the predominant force of industry change.**

Some of the changes wrought by the emerging regulations are providing hedge funds new opportunities, each of which involves them optimizing their business approach.

- The exit of proprietary trading talent from sell-side organizations resulting from the Volcker Rule and Liikanen Proposal has allowed key aspects of market-making, inventory management and direct lending to shift from a dealer-dominated activity to one where major hedge funds have a key role in taking on market risk. In many instances, hedge funds have leveraged their institutional relationships to be co-investors or even direct investors in these deals—shifting the dynamics of the marketplace and blurring the lines between investor and investment manager.
- The pool of collateral that hedge funds control is likely to continue to expand at a time when demand for high quality liquid assets (HQLA) hits all-time record highs. This could position hedge funds to begin treating collateral as an asset class with which they can supplement their trading book profits by effective use and pricing of their collateral pool. The strategies likely to attract the bulk of assets in the coming five years lie in a convergence zone where not only hedge funds, but traditional asset managers and private equity firms are looking to build new products. Hedge funds are likely to develop new roles with these competitors and leverage an increasingly interoperable collateral landscape to swap, transform and either upgrade or downgrade collateral to help meet demand from their counterparts or the clients they introduce as agents.
- The costs of financing are likely to rise as Basel III liquidity coverage ratios and net stable funding ratios negatively impact prime broker balance sheets and force broker-dealers to re-price their offerings. Hedge funds that move from a service-based to a relationship-based model with their counterparts are likely to have better access to financing and realize less extreme price increases. Leading firms are likely to concentrate their efforts to achieve financing efficiency with their top prime brokers as a tool in their relationship arsenal. Such efficiency will focus on the placement of debits and shorts. If done with an eye toward the prime broker's funding and coverage needs, this will decrease the clients' balance sheet utilization and increase their return on assets.

Achieving these optimization opportunities will not be easy, however. There are a number of challenges that hedge funds will need to overcome.

- The number of pools of collateral that hedge funds must now consider in administering their daily operations is expanding exponentially. A desire to protect cash assets in the wake of the Lehman Brothers bankruptcy already created a major challenge for the industry as new third-party custodial accounts were introduced into the equation and hedge funds were forced to step in to manage many of the interactions between their prime brokers, swap dealers and these new counterparts.

- These challenges are being multiplied several fold by the introduction of Dodd-Frank and EMIR OTC derivative rules. Now there are likely to be a minimum of five types of collateral pools that hedge funds need to consider across prime brokers, swap dealers, cash custodians, third-party custodians and FCMs. Moreover, there are likely to be several types of counterparties in each of these categories and multiple funds that need to be administered. This could result in literally hundreds or even thousands of collateral pools to oversee.
- Most hedge funds still manage their products in silos that split their view of their collateral. Securities lending teams will manage the cash and HQLA assets that result from financing activities and look for opportunities to better leverage the firm's fully paid-for assets. OTC and listed derivative operational teams manage margin and collateral with FCMs, swap dealers and custodians. Treasury teams oversee the organization's passive FX risk and operational currency, and HQLA reserves. Market leaders are bringing these different parts of their organization together to create liquidity management utilities that have a consolidated view of all the firm's assets. Some are even allowing these units to leverage the collateral pool to generate a P&L for the firm.
- Increasingly, leading hedge funds are looking to create scorecards to measure the value of their wallet and engagement with their key counterparties. These scorecards are becoming important relationship management tools. Determining the right metrics to track and method of using these outputs to shape their engagement with the sell side will become a critical component of counterparty management. This will be especially important for hedge funds to capture and demonstrate the financing efficiencies and benefits they provide their set of prime brokers, and how they have increased their value as a counterpart.
- New data inputs, analytics and tools will be required to support the effective use of hedge fund collateral assets and efficient deployment of financing positions. Hedge funds will need to extract the terms of their key prime brokerage, clearing, ISDA and other documentation. They will need to be able to mimic margin calculations across their set of counterparties and model the impact of individual trades on their portfolio and on their collateral needs. They will have to be able to ladder their collateral for delivery and perform "what if" and other types of trade analysis to support the ability of the firm to step into certain market-making opportunities and accurately price collateral transformation, upgrade and downgrade trade margins.

As the demands of the new regulatory environment emerge, market leaders are going to be looking to build out new capabilities, platforms and processes to transform their organizations. Smaller firms are going to need to reassess their set of service providers to identify those organizations able to help them navigate in the new environment through outsourced offerings or new toolsets. Understanding how the landscape is changing is a first step to that process.

Methodology

The 2014 Citi Investor Services 5th Annual Industry Evolution report is the synthesis of views collected across a broad set of industry leaders involved in the global hedge fund and traditional long-only asset management industry. Comprehensive interviews were conducted in the US, Europe and Asia, with hedge fund managers, asset managers, beneficial owners, agent lenders, consultants, fund of hedge funds, pension funds, sovereign wealth funds, endowments and foundations.

To better comprehend evolving industry dynamics and changes, we conducted 138 in-depth interviews. Collectively, our survey participants represented $1 trillion in hedge fund assets and $14.8 trillion in overall assets managed or advised. The interviews were conducted as free-flowing discussions rather than constructed, one-dimensional responses to multiple choice questionnaires. The idea of this approach was to ensure that we do not conduct interviews with any preconceived notions. We gathered more than 150 hours of dialog and used this material to drive internal analysis and to create a holistic view of major themes and developments. Given the breadth and scope of this year's research, we have decided to release the report in two complementary pieces:

Part I will focus on the investor landscape for hedge funds and projections for asset-raising in the industry

Part II will turn its attention to the significant regulatory changes that are affecting the financing industry and its impact on financing relationships

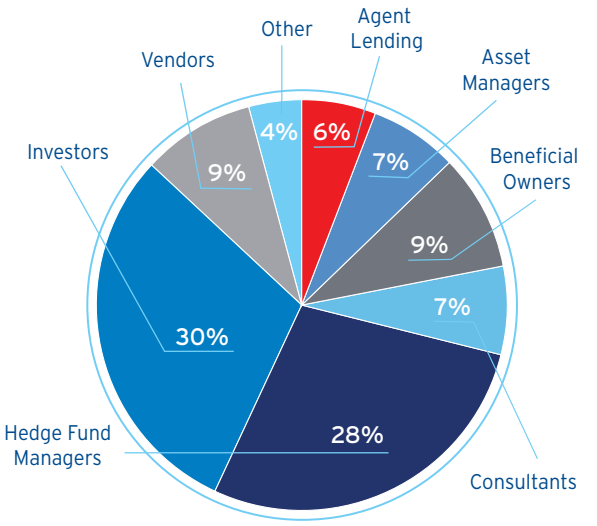
These reports are intended to be a qualitative and quantitative prediction of future industry trends that have been constructed around the comments and views of the participants we interviewed. We have also built indicative models based on those views to illustrate how the hedge fund industry will evolve given the ongoing regulatory changes.

The structure and presentation of the report is intended to reflect the voice of the participants and our interpretation of their views on the market trends. To highlight key points, we have also included direct quotes from our interviews; however, citations are anonymous as participation in the survey was done on a strictly confidential basis.

As can be expected, there are a number of topics that this survey has touched upon that have been covered in more detail by prior Citi Investor Services publications. In these instances, we have referenced the document and, where necessary, we have included direct charts from previous publications.

The following chart shows the survey participants that we interviewed this year, representing all major global markets.

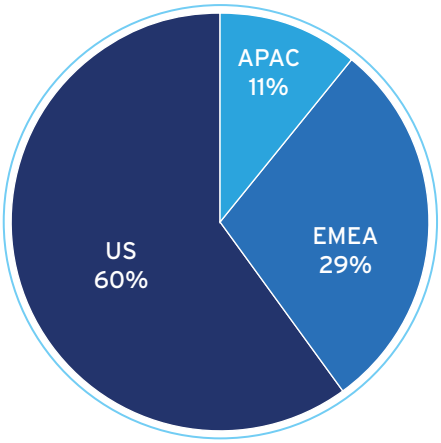
Survey Participants



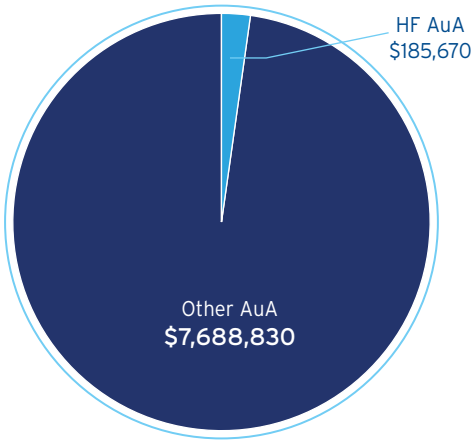
138 Total Interviews

Overview of Survey Participants

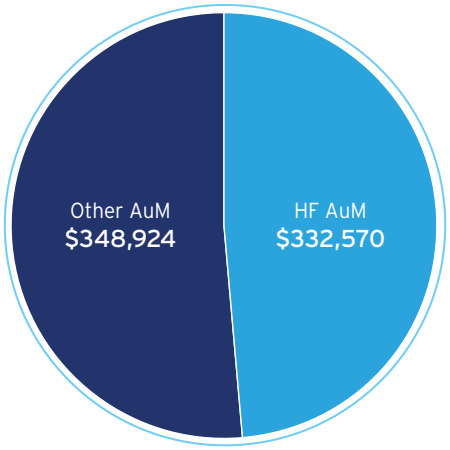
Regional Survey Participants



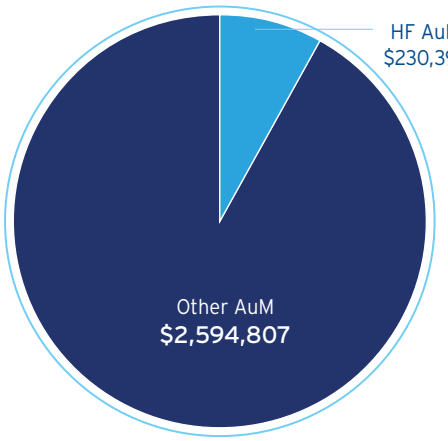
Consultant Participant AuA (Millions of Dollars)



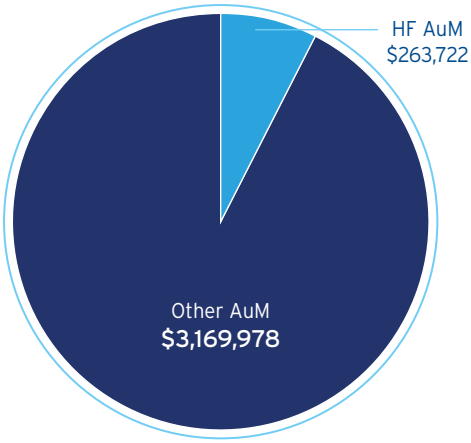
Hedge Fund Participant AuM (Millions of Dollars)



Investor Participant AuM (Millions of Dollars)



Asset Manager Participant AuM (Millions of Dollars)



Introduction: Three Key Strategic Imperatives Drive the Industry Post-GFC

Five years on from the Global Financial Crisis (GFC) we are now able to see the broader themes of how the financial industry has changed in response to structural issues uncovered in the crisis period.

Initial Industry Changes Driven by Investors

Part I of this year's Industry Evolution survey focused on changes driven by investors. As shown in Chart 1, these changes were split into two main strategic imperatives.

"Survive" refers to the changes driven by the emergence of institutional investors as the primary audience for investing into the hedge fund industry post-GFC. In 2002, institutional investors only accounted for 20% of the source of the industry's assets and by 2010, that figure was up to 61%. Institutionalization of the industry has continued since that time, with our analysis showing these participants at 65% in 2013, rising to a projected 74% by 2018 (see Part I of this year's survey report for additional details).

By pouring large amounts of capital into the industry in a concentrated period, institutional investors were able to dictate new terms on how they wanted their investment managers to behave. Such terms included a requirement for greater transparency, better alignment of liquidity terms to the underlying assets held in trading portfolios, more considered use of leverage and risk, enhanced operational controls, and a more robust reporting and technology infrastructure.

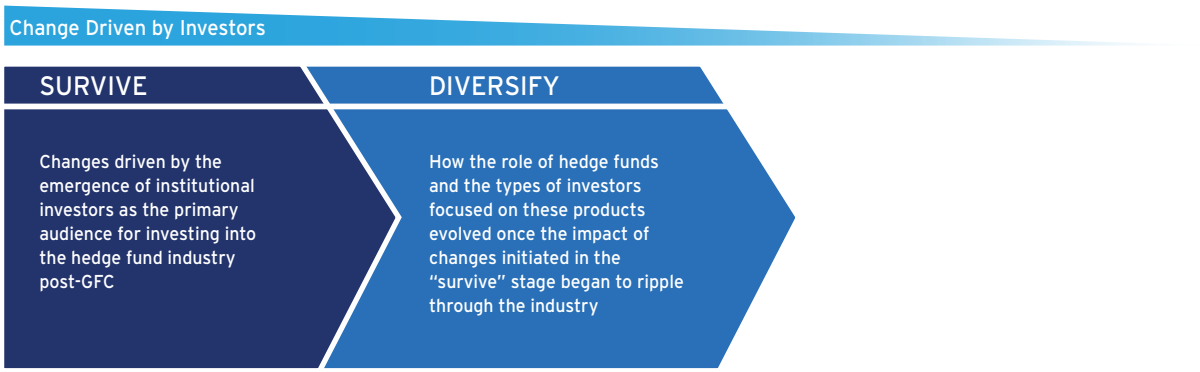
As this new framework developed, there started to be a set of secondary benefits that have allowed investors to "diversify" their use and consideration of hedge fund managers.

Greater transparency into co-mingled funds and the introduction of new fund-of-one and separately managed account vehicles that allowed for position-level transparency into hedge fund holdings enabled leading institutions to run risk factor analysis and better understand (1) how their hedge fund strategies achieved returns and (2) how the positions held in their hedge fund portfolios related to their broader set of securities and investment positions.

Armed with this insight, leading investors created "buckets" of different types of hedge fund exposures and then repositioned those buckets in risk-aligned portfolios to achieve different aims. Fundamental hedge fund strategies with a high directional component were used to provide shock absorption; macro strategies were leveraged for their ability to provide alternative beta, and absolute return strategies were targeted to contribute isolated alpha streams.

This more nuanced use of hedge funds in investor portfolios has allowed more managers to compete not only for the alternative or opportunistic allocation pools that constitute the satellite of the investor's portfolio, but also for their core equity and bond

Chart 1: Shift in Strategic Imperatives



Source: Citi Investor Services

allocations. As discussed in Part I of this year's report, by 2013, total institutional investment across hedge funds and mutual funds (passive and active) had reached a record $16.9 trillion and hedge funds' share of that total had risen to 10.2%—its highest post-GFC performance. This was despite hedge funds having significantly underperformed in this period—illustrating their new roles in investor portfolios.

The other diversification trend in the past five years was the emergence of a multi-tiered structure for the hedge fund industry through which different profile managers lined up against specific sets of investors. This development has forced hedge fund managers to place more emphasis on not just their investment strategy, but their comprehensive business strategy and to align their marketing approach to those investors most likely to favor their type of firm. It is forcing hedge fund managers to be more deliberate in setting and controlling their capacity, volatility, size and product mix. This includes decisions about whether and how broadly managers wish to explore the new retail and defined contribution audience potential in 40 Act alternative mutual funds and alternative UCITS.

As discussed in Part I of this year's report, our outlook for the hedge fund industry is very positive. We see assets in traditional hedge fund 3(c)-1 and 3(c)-7 products increasing from $2.6 trillion in 2013 to $4.8 trillion in 2018 and we see the share of 40 Act alternative mutual funds and alternative UCITS being run by hedge fund managers rising from $286 billion to $977 billion in that same period. Thus, the total pool of assets being managed by hedge funds is seen doubling in the next five years from $2.9 to $5.8 trillion.

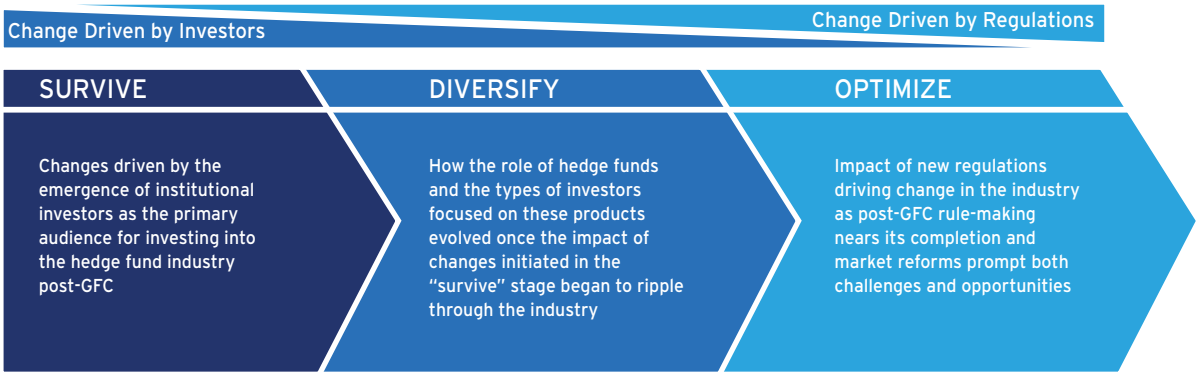
Industry Changes Driven by Regulation

Amidst this positive growth outlook, there is, however, a major shift in the strategic imperative likely to occur. Investors have, and will continue to be a major influence on the hedge fund industry, but as shown in Chart 2, it is likely that the shape of the industry in the next five years is going to be driven more by changes in regulation. These changes are going to force hedge funds to optimize as the post-GFC rule-making nears its completion and the operating parameters of the new financial landscape emerge.

Such optimization is likely to focus on the role hedge funds provide in offering market liquidity, their need to effectively and strategically manage collateral across an increasingly fragmented set of counterparties and the new approach required of hedge funds to maximize their value to their financing partners. Enabling these optimizations will require significant change in hedge funds' organizational construct, their platforms and their processes. All of these topics will be explored in this paper.

To understand just how far-reaching the coming period of change will be, we want to quickly revisit the key changes in the global regulatory approach that began post-GFC. Because it takes an extended period for these changes to ripple through and actually impact the day-to-day activities of market participants, it is often easy to ignore the regulatory work streams unfolding in the market until an actual implementation deadline is upon us. Thus, the actual scope and scale of the changes occurring can easily be lost. For that reason, we want to re-set the regulatory stage and remind participants about how sweeping and historic the past five years have been for the industry.

Chart 2: Shift in Strategic Imperatives



Source: Citi Investor Services

Global Regulatory Cooperation & the Focus on Systemic Risk

The past five years have witnessed an unprecedented focus on the systemic risk within the global capital markets and the participants who make up the ecosystem of borrowing, lending and trading. Two primary topics have dominated central governments' and regulators' response to the crisis—liquidity and risk taking.

This focus has led to the implementation of many new banking regulations and many structural reforms in the securities financing and OTC derivative markets, which have combined to put growing pressure on market-making, collateral management and financing functions within the industry.

To understand the different responses and implications of those regulations, it is necessary to revisit the key events since 2008 and understand how different initiatives have introduced new change drivers to the OTC derivatives and securities financing markets.

In the immediate aftermath of the Lehman Brothers collapse and subsequent central bank actions to stabilize the global economy, the G20 collaborated on a sweeping expansion of the Financial Stability Forum (FSF), which had originally been founded by G7 finance ministers and central bank governors to promote stability in the international financial system.

In November 2008, the leaders of the G20 countries called for a larger membership of the FSF and in April 2009 the outcome of these discussions led to the creation of the **Financial Stability Board (FSB)**, which was given a broad mandate to address the issues perceived to have created the GFC.

The mandate of the FSB is broad and encompasses efforts to assess vulnerabilities in the financial system, promote coordination between national authorities responsible for financial stability, monitor market developments and their impact on stability, review policies set by the international standard-setting bodies, manage contingency planning for cross-border issues, and collaborate with the International Monetary Fund (IMF) on early warning exercises. As an obligation of membership, each G20 country must commit to pursue the maintenance of financial stability, ensure the openness and transparency of their financial sector, implement international standards and undergo periodic peer reviews.

Membership includes compliance by the three main controlling bodies in a national economy—a country's central bank, treasury department and primary securities market regulators. In the US, as an example, this encompasses policy making for the Federal Reserve Bank (FRB), the US government's Treasury Department, and the principle regulator of the securities markets, the Securities & Exchange Commission (SEC). This is the case for all members of the G20 and therefore gives the FSB extraordinary powers to influence the policies of its members and the respective banking institutions and capital market participants.

The ecosystem of each G20 country is essentially the same, with more advanced programs developed in the leading financial markets, such as the US and Europe.

The diagram in Chart 3 is an extract from an International Monetary Fund (IMF) paper published by Manmohan Singh, Senior Economist, which provides a high level overview of the key participants in each market and describes the "financial plumbing" in place to facilitate the orderly extension of credit and provision of daily liquidity in a market.[1]

In 2008, these systems constricted so severely in each market and across borders that the newly expanded FSB responded with a wide, sweeping set of policies that have, over the past four years, dramatically impacted the capital markets and their participants. These policies cover monetary policy, fiscal policy transparency, financial regulation and supervision, and market infrastructure. They are delegated to different "issuing bodies" that set the policy direction for the member states. For this year's survey, the most important policies relate to the financial regulations imposed on the banking, securities and insurance markets.

We will begin with the impact of rules on the sell-side's ability to maintain its internal proprietary trading functions and explore how this has led to a new role for hedge funds.

1. Link to "The Economics of Shadow Banking" by Manmohan Singh, IMF: http://www.rba.gov.au/publications/confs/2013/singh.html

Chart 3: Overview of Financial Plumbing Considered by Regulators Post-GFC

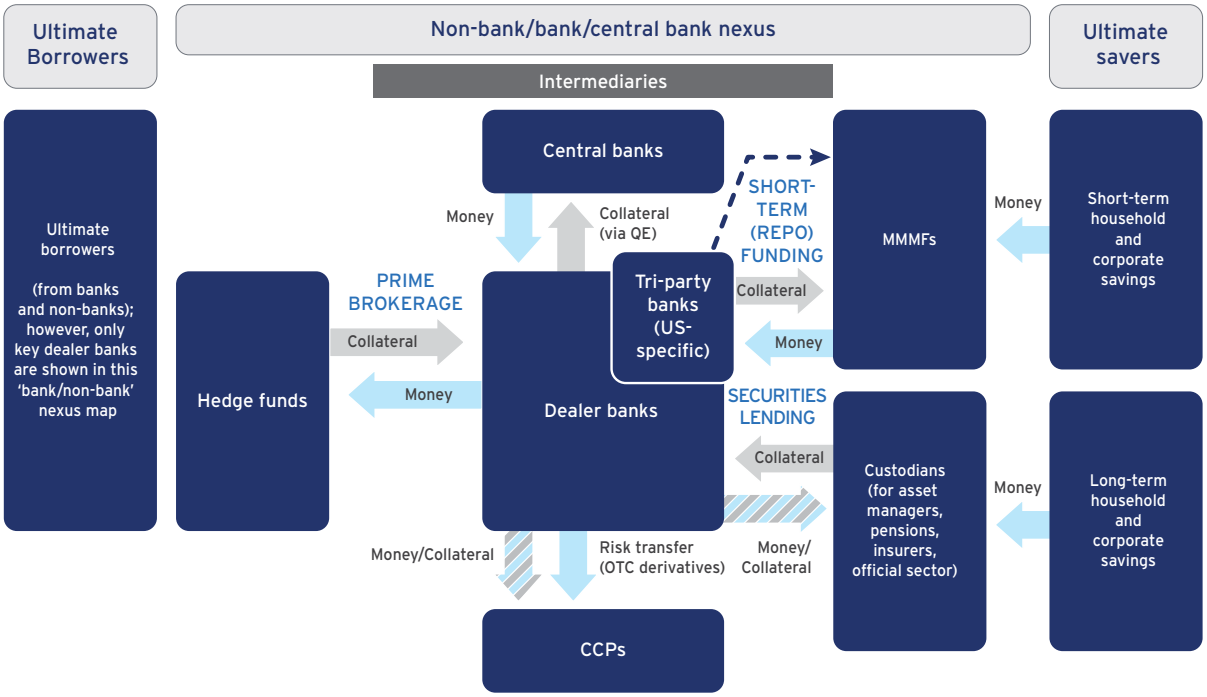


Figure 1 is a snapshot of z or the non-bank/bank nexus explained in the analytical framework. The dealer banks depicted above are active in cross-border collateral intermediation. So z, is important for the dealer bank i. The ultimate borrowers also borrow directly from commercial banks. However, they are not shown in this figure as their interaction with non-bank is minimal; hence z, is negligible.
Source: International Monetary Fund

Section 1: The End of Sell-Side Proprietary Trading and a New Role for Hedge Funds

One facet of the GFC that drew criticism from regulators was a perception that internal risk-taking by banks from their proprietary trading desks spurred decisions that were not always in line with the best interests of those organizations' clients and shareholders. After the crisis, the focus of regulators turned to these proprietary trading activities.

Volcker & Liikanen Rules Limit Banks' Proprietary Trading

Proprietary trading units (commonly known as "prop desks") of the banks had increased in size during the period leading up to the GFC. Due to the complexity of trading and the leverage being employed by these groups, they became a lightning rod for banking and securities regulators. These units behaved in a similar fashion to hedge funds, employing sophisticated trading techniques and financial leverage to enhance the returns for those units and the overall division.

In the US, the Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank) was signed into law in July of 2010 and included under Title 1 the "Financial Stability Act of 2010," which outlined two new agencies in the US government. The Financial Stability Oversight Council (FSOC) and the Office of Financial Research (OFR) were put in charge of identifying threats to the financial stability of the US, promoting market discipline and responding to emerging risks to the US financial system.

Title VI of the Act introduced the so-called "Volcker Rule," with the aim of reducing the amount of speculative investments on large firms' balance sheets and limiting banking entities to owning no more than 3% of any hedge fund or private equity fund. In addition, under the rule, the total of all of the banking entity's interests in hedge funds or private equity funds cannot exceed 3% of Tier 1 capital of the banking entity.

The original rule outlined in 2010 has undergone various revisions and expansions, and a final version was intended to be implemented as part of Dodd-Frank on July 21, 2012, but was delayed and became effective on April 1, 2014. A number of lawsuits bought by community banks affected by the rule are ongoing as of the publication date of this year's industry survey.

In Europe, the European Commission (EC) established a parallel working group in November 2011, led by Erkki Liikanen, governor of the Bank of Finland. In October 2012, this group recommended separating higher-risk trading activities from banks exceeding certain size thresholds. Following this initial Liikanen report, a stakeholder consultation was held in May 2013, and a proposal on banking structural reform was offered in January 2014.

Similar to Volcker, the Liikanen proposal seeks to ban proprietary trading in financial instruments and commodities at the "largest and most complex EU banks." These are set to be defined as those institutions deemed systemically important under the EU's Capital Requirements Directive IV. This ban would come into effect in January 2017.

Some are pointing out that this rule is more limited than Volcker, which also applies to mid-tier, small and community banks. The Liikanen proposal also contains a number of exemptions, particularly where national supervisors have already taken steps to ensure separation of activities that could create financial instability.

Some of the apparent "watering down" is to facilitate adoption of the legislation across each of the member states, many of which have already taken steps to address potential risks from trading. For example, Britain's "Vickers" reform requires deposit-taking activities to be ring-fenced from trading activities. This is likely a nod to France and Germany, which desire to leave their large universal banks intact, and Brussels has already signaled it would stop short of radical measures given political unease over breaking up big banks.[2]

Others, however, are criticizing the proposal for being more stringent than Dodd-Frank when it comes to market-making activities. The Commission's statement said supervisors would have "the power and, in certain instances, the obligation to require the transfer of other high-risk trading activities (such as market-making, complex derivatives and securitization operations) to separate legal trading entities."[3] Volcker, however, allows banks to continue to engage in market-making and concerns are

2. http://www.reuters.com/article/2014/01/06/us-eu-banks-idUSBREA050SE20140106

3. http://ec.europa.eu/internal_market/bank/structural-reform/index_en.htm#maincontentSec3
http://ec.europa.eu/internal_market/bank/docs/structural-reform/140129_citizens-summary_en.pdf

Chart 4: Overview of the Volcker Rule & Liikanen Proposal

KEY CHANGES

- Bank required to exit proprietary trading activities
- Certain commodities and derivative businesses restricted
- Liikanen extends to transparency in financing transactions

IMPACT

- Proprietary desks close or spun out of banks–reducing access to key talent
- Banks refocus on agency businesses
- Liikanen proposes central repository for financing transactions

Source: Citi Investor Services

being voiced that EU banks will be competitively disadvantaged.

Interestingly, the Liikanen proposal also calls out financing activities, "especially repo and securities lending transactions" as having been a source of contagion and leverage in the financial crisis, and offered, in January 2014, an additional proposal on transparency of securities financing transactions. This additional proposal seeks to improve transparency around all Securities Financing Transactions (SFTs), including borrowing and lending of securities and commodities, repo and reverse repo trades and buy-sell-back / sell-buy-back transactions. While it is still nascent, it seems the proposal primarily calls for reporting details of all such transactions to a central database; however, it is yet unclear how this would differ from the transparency and reporting to the new Trade Repositories required under EMIR and a potential FTT.

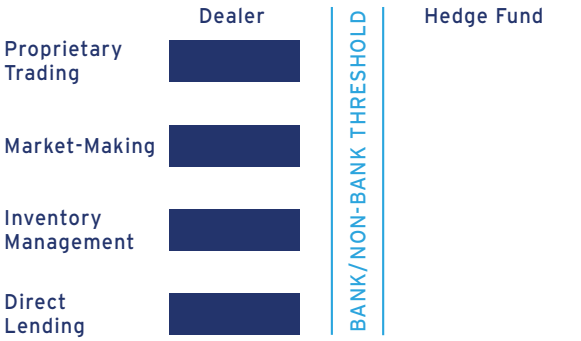
Chart 4 provides an overview of the key aspects and impacts of these regulations.

Broader Set of Bank Trading Activities Affected

The focus of the Volcker Rule was on speculative risk-taking by banks and on their proprietary trading activities, but there were a number of functions that proprietary traders performed to facilitate orderly markets and trading that have also been impacted by the new regulations. To some extent, Liikanen acknowledges this broader role by trying to extend some of its oversight to market-making activities.

Chart 5 shows the set of activities usually handled by the proprietary trading units of the major banks. Proprietary trading involves the initiation and management of positions that are purchased or sold for the exclusive purpose of creating an independent P&L for the desk. Market-making, in contrast, involves determining the widest bid-ask spread that can placed on a tranche of securities or the most aggressive pricing that can be assigned to a derivative transaction that simultaneously draws trading interest, but also maximizes the profits of the market-maker. These are very different activities, but the skill set required is nearly identical.

Chart 5: Proprietary Trading Pre-Volcker & Liikanen



Source: Citi Investor Services

Inventory management involves determining the optimal amount of supply to be held on the organization's books so that it is in a position to benefit from rising demand but is not stuck with excess in case demand were to fall. Like market-making, this is an activity that requires a proprietary trading mindset, but that does not necessarily constitute speculation in the way that regulators were looking to limit.

Finally, there is a separate category of proprietary trades that focus on choosing which counterparts to extend direct loans to and at what terms in order to generate a strong return on capital for the lending organization. This requires analysis of the applicant, understanding of where to set terms, effective allocation of the pool of available capital, determinations on how much if any leverage to apply to the portfolio of loans and planning on how to hedge the exposures taken on by the sponsoring organization.

"Most analysts understand that the Volcker rule is not responding to any problem…it was a populist attack for political reasons…that prop trading had anything to do with the crisis is absurd and may have helped banks limit losses"

– Professor, Harvard Law School

In forcing banks to divest of their proprietary trading desks, the regulators have also impacted their ability to support these other activities of market-making, inventory management and direct lending. Top talent is leaving the banks in response to their more limited opportunity set. Our survey participants noted that to some extent, all of these functions have begun to shift to the buy-side and hedge funds are beginning to step into opportunities where banks are seen as having been "dis-intermediated."

Hedge Funds Take on Expanded Role in Managing Market Risk

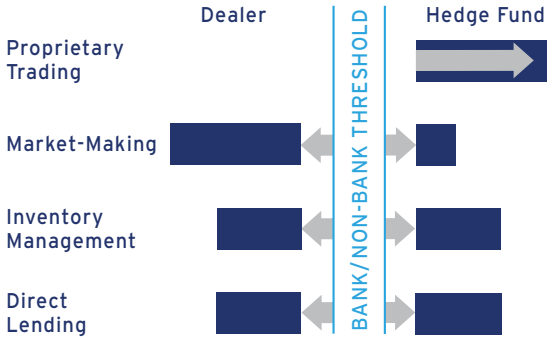
Chart 6 shows how the impact of the Volcker Rule and anticipation of the Liikanen proposal have begun to move proprietary trading activities onto the opposite side of the bank/non-bank threshold.

By this point, most proprietary trading desks have moved out of dealer organizations and found homes on the buy-side—joining existing hedge funds or asset manager organizations, or starting their own investment management firms. The departure of this talent from dealer organizations has shifted their model increasingly toward an agency-trading model as their ability to engage in principal transactions has been negatively impacted by the loss of individuals with the required skill set.

Market-making has also been adversely affected as the risk tolerance of those traders remaining in dealer organizations is down. While they still have the network to monitor supply and demand trends as they unfold within the trading day, and the contacts to understand where pockets of interest may lie, their ability to target large tranches of securities has been impaired because of the reluctance to hold too much inventory. Overall deal flow and the size of deals are down. This relates to the balance sheet impact of these holdings, which will be discussed later in the report.

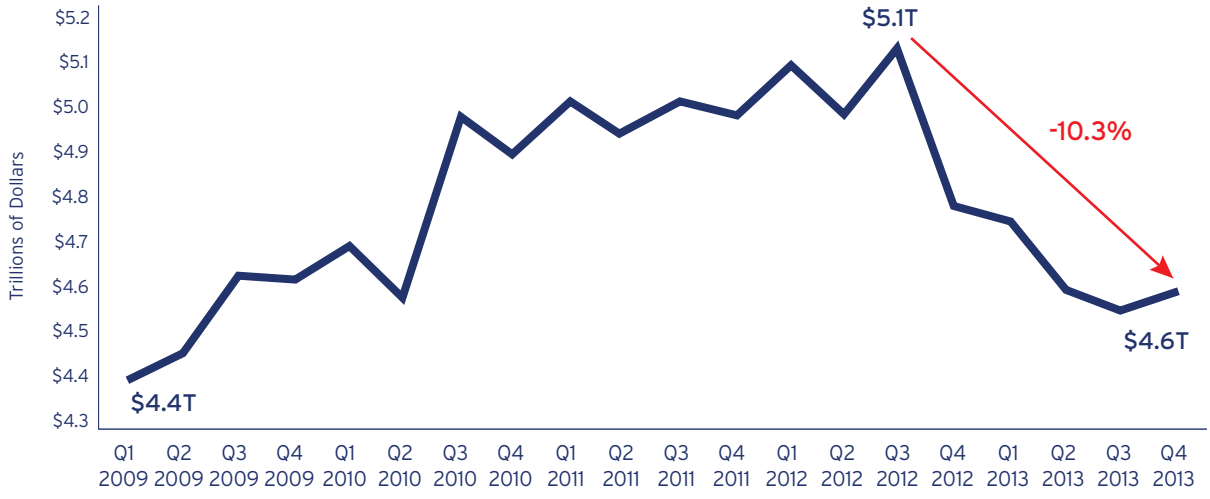
Chart 7 shows how inventories of securities held on US bank balance sheets have fallen by more than 10% since Q3 2012, dropping from $5.12 to $4.59 trillion in Q4 2013. This comes at a time when other assets held on bank balance sheets have actually grown from $12.55 to $12.66 trillion in the corresponding period—a gain of 1%. This is shown in Chart 8.

Chart 6: Trading Environment Post-Volcker & Liikanen



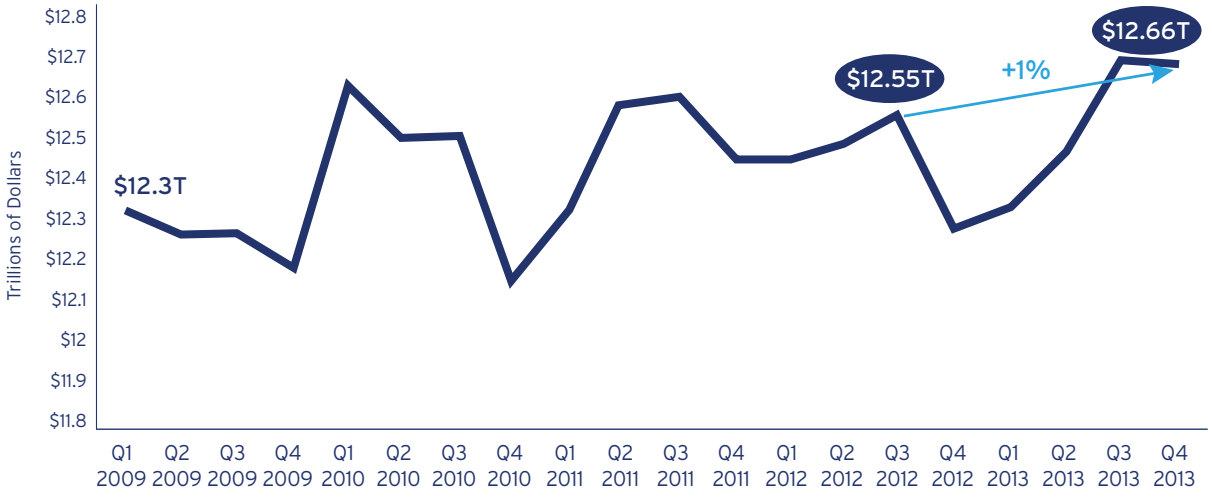
Source: Citi Investor Services

Chart 7: Securities & Trading Assets Held on U.S. Commercial Bank Balance Sheets – Combined Banks & Bank Holding Companies



Source: New York Federal Reserve

Chart 8: Other Assets Held on U.S. Commercial Bank Balance Sheets – Commercial Banks & Bank Holding Companies



Excludes securities & trading assets. Includes cash, interest-bearing balances, fed funds sold, reverse repo, loans & other assets.
Source: Federal Reserve Board of New York

Hedge funds are increasingly stepping into the market-making and inventory management space to help fill this gap in securities and trading assets. Sell-side dealers are coordinating more extensively with their hedge fund counterparts to understand where they would be willing to price and their interest in holding supplies. This partnership is allowing hedge funds to take a more active role in being a liquidity maker for the market at large.

Similarly, there has been a sharp increase in hedge funds offering direct lending funds. Several survey participants noted that they have begun to create levered loan funds and that they are finding active interest from investors looking to rotate out of vanilla fixed-income investments ahead of an expected change in the credit cycle over the next 12–18 months.

> "If you look at bank balance sheets, their inventories are about 20% of their size from a few years ago, and their ability to act as liquidity providers has somewhat gone away. We obviously aren't a bank or a broker, but there are times when we can be a liquidity provider and this allows for really good returns"
>
> *– $10.0 Billion AUM Hedge Fund*

> "We see ourselves in many different asset classes having more of a role of liquidity provider, especially where dealers are less actively taking positions. Dealer inventory is generally down across the street. This has provided opportunity for us as we see a lot of flow in different businesses we didn't trade in years ago. This isn't because we have increased our counterparties, rather they are seeking liquidity from us rather than trying to take it"
>
> *– $10.0 Billion AUM Hedge Fund*

> "We think there is an opportunity as banks are dis-intermediated. We are considering a listed loan fund or listed convertible fund. We may hire a senior FIG banker to help explore these opportunities further"
>
> *– $10.0 Billion AUM Hedge Fund*

New Hedge Fund–Investor Relationship Develops

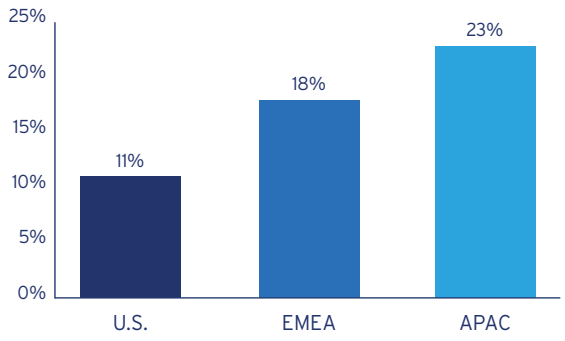
As hedge funds have stepped into some of the proprietary trading functions and taken on more risk from the dealers, they have expanded their relationship with their investors and begun to engage in a new way.

As noted in Part I of this year's report, there is a growing set of institutional investors that have opted to build out their own internal asset management capabilities. For many public pensions, this was an effort to save paying external fees for more vanilla parts of the portfolio's management, such as ETFs, large cap stocks and liquid credit. For private corporations and many sovereign wealth funds that can afford to pay more for portfolio management professionals, it has been an effort to take more direct control of their assets to try and realize enhanced returns.

In Institutional Investors' Top 300 US money managers in 2013, there were 27 public pensions and five private pensions or sovereign wealth funds included on the list—more than 10% of the total. An even more pronounced trend was noted in Europe where, of the Institutional Investor's Top 100 money managers, 18 were from the pension or sovereign wealth fund space. In APAC, the percentage was even greater, with 23 pensions or sovereign wealth funds listed on their Top 100 money managers list. This is illustrated in Chart 9.

This growing pool of institutions able to manage their own securities positions has proven to be a ready counterparty for hedge funds. There were numerous reports in our survey interviews this year of institutional investors being approached by hedge funds soliciting them to either be a co-investor or a direct investor into deals that they were taking on from the sell-side. This is illustrated in Chart 10.

Chart 9: Pensions & Sovereign Wealth Funds As a Percentage of Region's Top Money Managers Based on Institutional Investor's 2013 Ranking

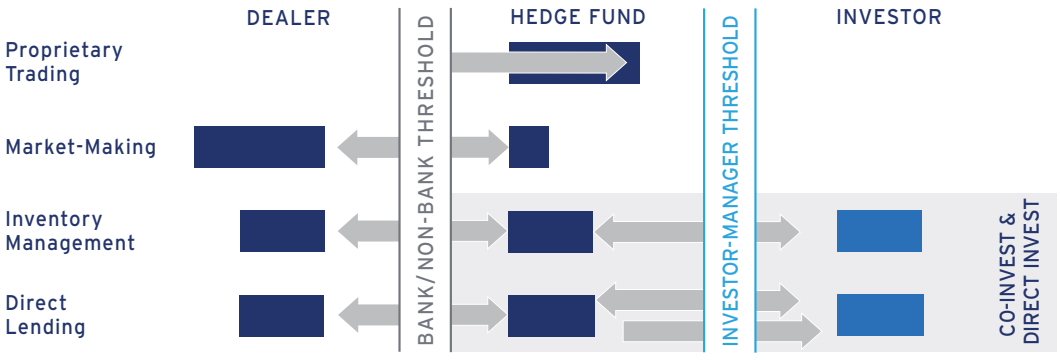


All data from 2013. Institutional Investor's Top 300 Money Managers in U.S.; Top 100 Money Managers in EMEA and Top 100 Money Managers in APAC. Source: Citi Investor Services analysis of Institutional Investor data

Historically, there was a prescribed set of interactions that took place across the investor-manager threshold. Investors provided hedge funds capital that the hedge fund manager then invested and either earned a profit or loss upon. This P&L was then passed back across the threshold to the investor net of fees. In the emerging model, this line between the investor and manager is becoming blurred.

Hedge funds and many of their key investors are now jointly taking on positions—primarily in instances where the hedge fund manager identifies a good trading opportunity but cannot, because of their portfolio limits or their strategy, take on the full position. They are in those instances approaching investors about participating in the deal and taking on a portion of that exposure. Direct lending opportunities are also moving in both directions. Sometimes it is the hedge fund manager who has identified an opportunity and sought to include the investor in the deal, and sometimes it works in the opposite direction—particularly for privately arranged loans.

Chart 10: Co-Investment & Direct Investment Between Hedge Funds & Investors



Source: Citi Investor Services

There is much debate about whether this transfer of risk-taking from the sell-side to the hedge fund industry is a positive or negative development.

Hedge funds have traditionally survived or fallen on their ability to be smart risk takers and the entire segment is becoming much more regulated. Also, in sharing the risk with large institutions that have long-term investment horizons and that are able to weather market fluctuations without being pressured to liquidate assets, hedge funds may have found suitable counterparties to help dampen concerns about their new role in market-making, inventory management and lending. The new hedge fund-investor partnership may prove to be a sustainable solution.

On the other hand, there is a lot of talk about this activity re-invigorating the very "shadow-banking" type of interactions that the regulators were looking to negate in their tighter regulation of the banks and their proprietary trading. Rather than removing risk from the system, these new interactions illustrate that there has simply been a shift in where that risk is being taken.

It remains to be seen whether regulators latch on to activity in this space or allow market forces to run their course. Survey participants noted that there is a significant difference between banks using their capital to take on proprietary and risky trades versus investors taking positions in privately offered hedge fund vehicles bearing that risk. They noted that all participants in hedge fund vehicles must meet qualified investment professional thresholds and are thus better positioned to withstand potential negative outcomes.

" One thing that is a little concerning is that there may be more short-term volatility in asset prices, because the shock absorbers have been removed. Those traders that used to be able to take down large trades and work them out, don't really exist anymore. That might be okay, and the regulators may be fine with this new construct if the longer term trading in these securities doesn't change much and the banks are more stable and sound"

– $10.0 Billion AUM Hedge Fund

" More of these larger, nontraditional counterparties / providers of liquidity (beneficial owners, insurance companies, pension funds and endowments) are going to start facing off against the bigger hedge funds. These larger hedge funds will be essentially commanding more of their assets and taking on a higher degree of importance, and at a certain point, these firms will become much more comfortable facing hedge funds"

– $10.0 Billion AUM Hedge Fund

" What is nirvana for the buy side? End user facing off against end user with the elimination of intermediaries"

– $10.0 Billion AUM Hedge Fund

" Collectively, hedge funds will play a very important role in providing liquidity to the markets, especially those that don't have central exchanges, like the government bond market or the corporate bond market"

– $10.0 Billion AUM Hedge Fund

Section 2: The Impacts of Product Convergence Set the Stage for a Pending Collateral Conundrum

Whereas there used to be distinct divisions between the types of investment funds being offered and the category of manager overseeing those offerings, the trend in recent years has been toward each type of investment manager—asset managers, hedge funds and private equity firms—to offer an increasingly overlapping and indistinguishable set of products. There are now a whole set of strategies that exist in a "convergence" zone that are being offered by multiple types of firms.

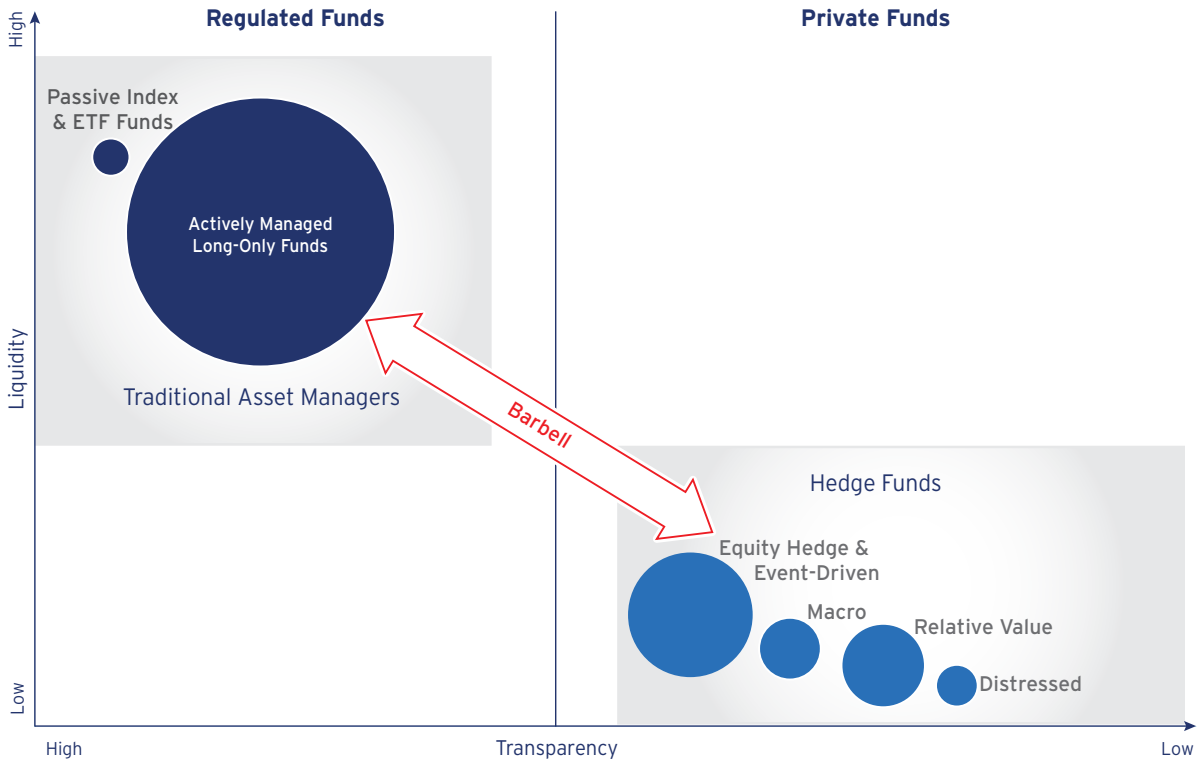
Initially, this trend has re-focused the investment community on what skills are required to run increasingly less liquid portfolios. As this section will explore, that calculation is now shifting to what capabilities will the managers offering these strategies need to create to be able to effectively manage the collateral and financing requirements of these funds in the new regulatory environment.

Asset Managers Extend Product Range to Protect Market Share

Part I of this year's report went into a detailed analysis of how institutional investors increasingly moved out of actively managed, long-only equity funds in the years immediately following the Technology Bubble in 2000–2001, splitting their allocations between cheaper, passively managed ETF and index funds on one hand, and between hedge fund strategies that offered an illiquidity premium and alpha opportunity on the other. This shift in portfolio construction disproportionately impacted "real money managers" who specialized in long-only, fully paid-for funds that sought to measure their effectiveness on a relative basis to a broad industry benchmark.

These participants responded by beginning to break out of the traditional "barbell" that defined product offerings in the industry pre-2002. This is illustrated in Chart 11. As shown, prior to 2002, traditional asset managers offered a set of regulated funds that offered

Chart 11: Investment Structures in the Public Markets: 2002



Source: Citi Investor Services

high transparency and liquidity, and for the most part consisted of benchmarked, long-only offerings. At the opposite side of the barbell were privately offered hedge fund vehicles that provided little transparency and long lock-ups on investor liquidity.

The initial forays outside standard fund offerings came from traditional asset managers.

Pre-GFC, a number of long-only portfolio managers began to offer a new investment product that they called the 130/30 structure. These products allowed an investment manager to short positions in their portfolio and use those proceeds to buy more of their favored long bets. Although gross exposures in these structures could go as high as 200% (150% long by 50% short), by keeping the proportion of shorts equal to the extended investment on the longs, the portfolio manager was able to show that the net market exposure remained 100%. This technically allowed these products to fit within the construct of the US Investment Act of 1940 (40 Act) mandate and allowed investors to consider allocations to these funds from their traditional equity and bond portfolio buckets.

Revisions to the UCITS regulations that allowed traditional asset managers to begin using derivatives in their portfolios also helped give rise to the nascent alternative UCITS funds in this period. Since outright shorting of securities is not allowed in UCITS vehicles, these new products relied on swap positions to create hedges on the portfolios and enhance their long-only returns.

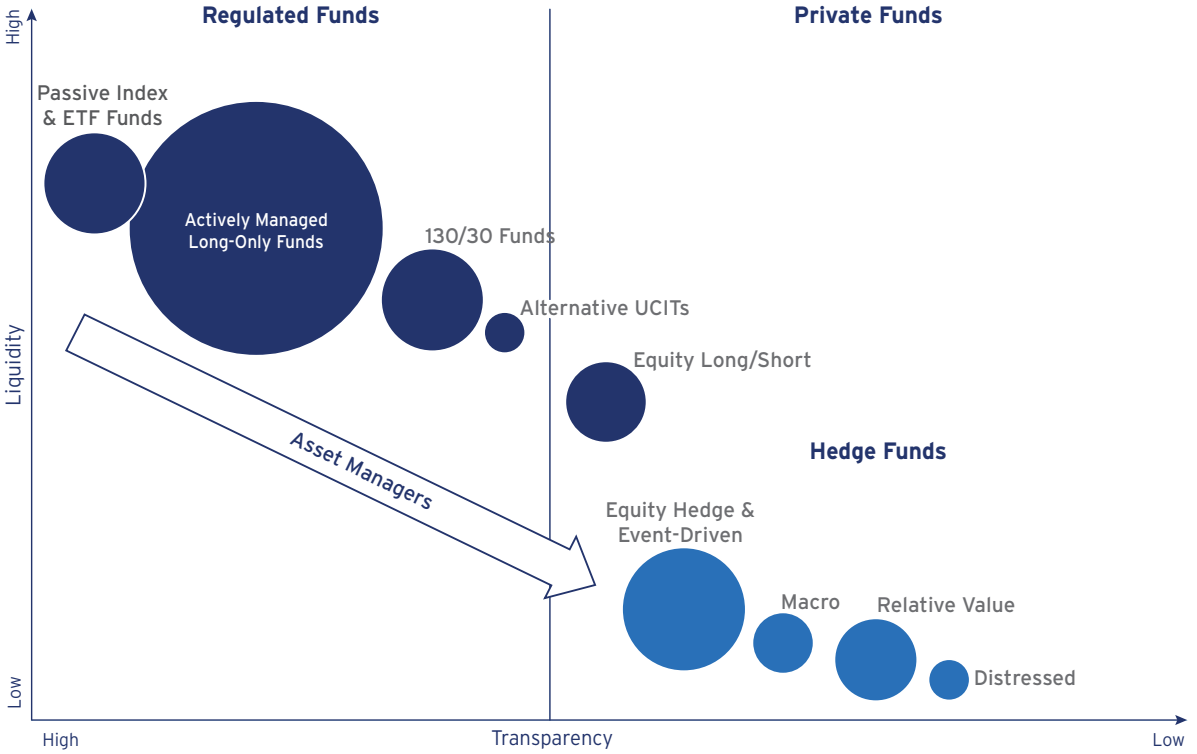
Several traditional asset managers also allowed their favored long-only portfolio managers to "cross the privately offered fund threshold" and launch long-short hedge funds. This accommodation was made to keep their talent in-house and prevent these managers from going out to establish their own hedge fund organizations. In most of these arrangements, the portfolio manager would continue to run their publicly offered long-only funds alongside their private hedge fund products.

The impact of these actions on the investment product landscape is illustrated in Chart 12.

Efforts from traditional asset managers to protect their allocations by offering investors an extended set of products that employed more "alternative" techniques to realize returns had mixed results.

The 130/30 fund structures performed poorly in the August 2007 "Quant Quake" that shook the markets in a precursor to the GFC. Long-only managers employing the structures had little experience running a short book and this led to excessive losses when investors sought to redeem allocations. Similar problems affected many of the traditional portfolio

Chart 12: Investment Structures in the Public Markets: 2003-2007



Source: Citi Investor Services

managers that chose to launch hedge funds in the pre-GFC years. Either these managers got bought in on their short trades in 2007 or their investors realized that they had been paying 2&20 for strategies that were simply shorting ETFs or indices. This gave rise to a market perception that many traditional asset managers battle through the present day—that long-only fund managers are not able to realize short alpha.

On the other hand, the foothold that traditional asset managers created in the alternative UCITS space was quite successful. By 2007, according to SEI/Strategic Insights, alternative UCITS AUM had reached $212 billion—almost all of which was being run by traditional asset managers.

Hedge Fund Responses to the GFC Create First Convergence Zone

Convulsions that occurred in the GFC and pressures from institutions that emerged as the predominant category of hedge fund investors in the post-GFC era began to significantly change the investment landscape by 2009–2010.

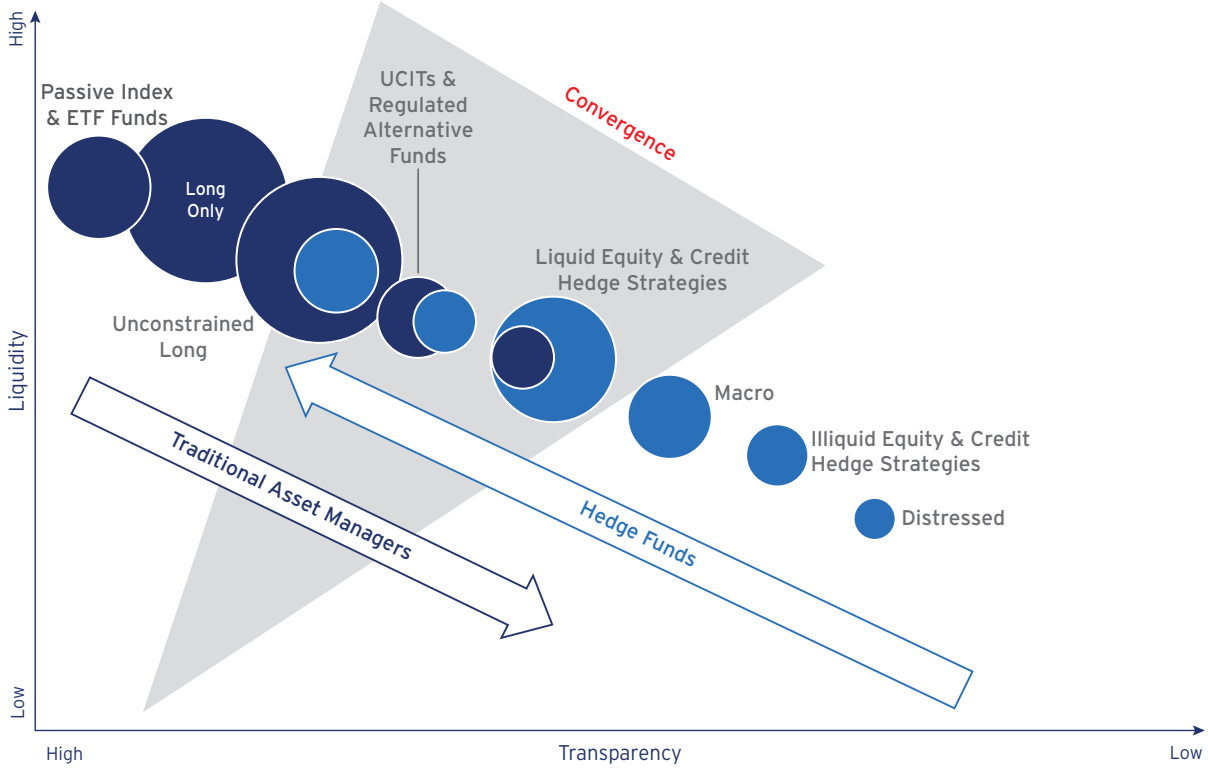
Pressure was put on hedge fund managers to create a better alignment between the liquidity of their underlying investment products and the terms that they were offering on their funds. There was also a move toward demanding more transparency in hedge fund portfolios, either through expanded reporting on commingled fund holdings or through the establishment of funds of one and separately managed accounts. An in-depth discussion of these developments is provided in Part I of this year's survey.

There was also a move by many European hedge fund managers to launch alternative UCITS products. This related to the backlash against fund of hedge funds that occurred post-Madoff, and to the demand from insurance companies and other institutions for a more transparent and liquid trading product. Although alternative UCITS AUM fell 55% in 2008 from $212 billion to only $117 billion, the market had recovered fully by 2010.

Yet, the composition of which investment managers were running the funds was quite different. Whereas pre-GFC the alternative UCITS space was almost wholly comprised of traditional asset managers, post-GFC that mix included these re-launched hedge fund products. The moniker "Newcits" was coined to differentiate the hedge fund-sponsored alternative UCITS funds from those being offered by traditional asset managers.

Asset managers for the most part abandoned the 130/30 trading structure, but many began to leverage revisions in the US mutual fund laws to launch true 40

Chart 13: Investment Structures in the Public Markets: 2010



Source: Citi Investor Services

Act alternative products. While these new funds could also go up to 200% gross exposure, they typically ran a net position well south of 100% and used shorting, derivatives and leverage much like privately offered hedge fund products. 40 Act alternative mutual funds were also much more liquid than traditional hedge fund products. Only 15% of the fund's holdings could be in illiquid instruments that could not be exited in a single trading session. While it was traditional asset managers that initially offered these products, over the following few years, an increasing number of hedge funds also moved into this space. Evolution of the 40 Act alternative space is discussed in depth in Part I of this year's survey.

Finally, there was a backlash against benchmarking in the long-only fund space and more managers opted to become "unconstrained" in their investment approach. This meant that they could choose to have smaller portfolios, forgo holding the full set of benchmark components and keep a larger share of their available cash on the sidelines rather than being 95% or more invested at all times. This move was matched by many investors asking hedge fund managers to run long-only funds for them at lower fees than in their traditional hedge fund product.

The impact of these changes in fund offerings is illustrated in Chart 13.

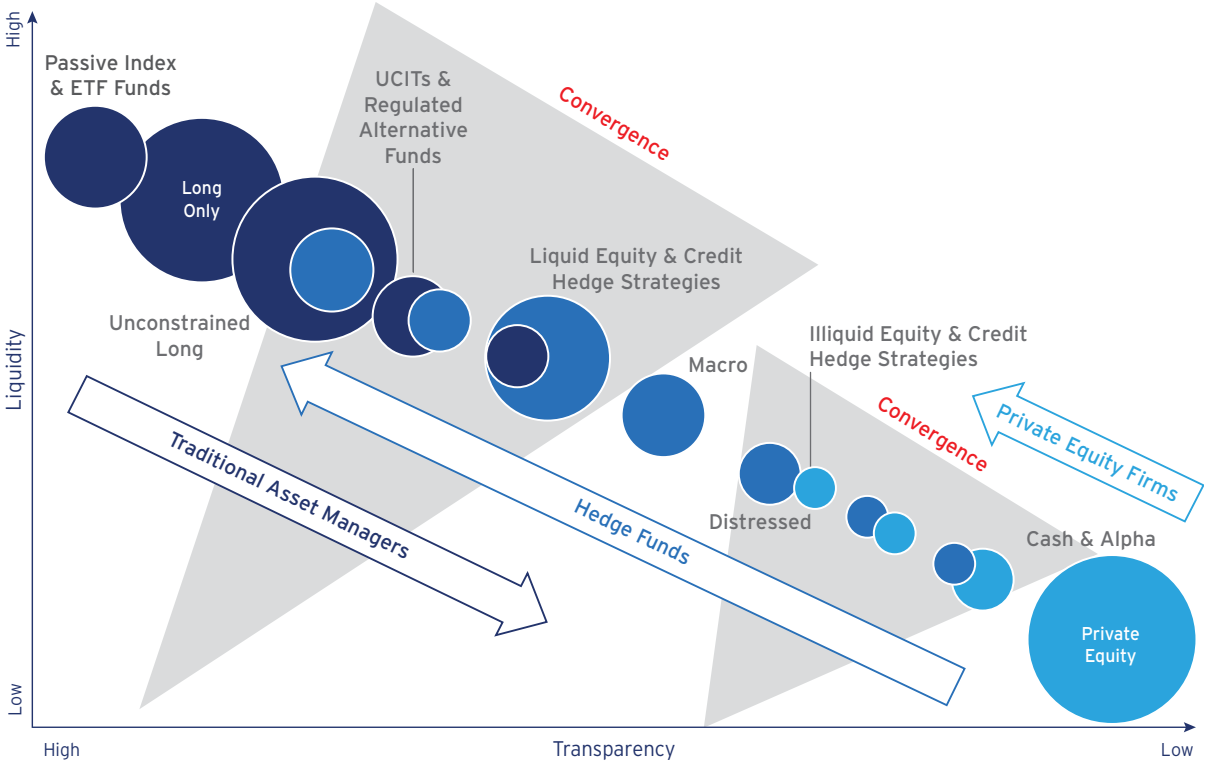
The End of Distinctions by Type of Investment Manager

By 2010–2011, many of the leading private equity firms also began to evolve their business strategy to become more of a full service financial firm. A key part of that evolution was to begin to launch more actively traded funds that encroached into the traditional hedge fund space—either by recruiting the trading talent that was leaving the sell side in response to the Volcker Rule or by outright purchase of hedge fund firms.

Private equity firms began to launch their own versions of less liquid credit hedge funds and distressed funds. They also mirrored the hedge fund trend noted in 2011–2012 to begin to create "cash+alpha" offerings that featured an alternative trading fund that, in addition to having an ability to realize gains on the underlying assets, also had a revenue stream associated with those assets that they could pass back to investors in search of yield. An example of these new fund offerings can be found in a fund that invests in railroad freight car leases that increase in value over time but that also generate monthly cash streams, part of which is channeled back to underlying investors each period.

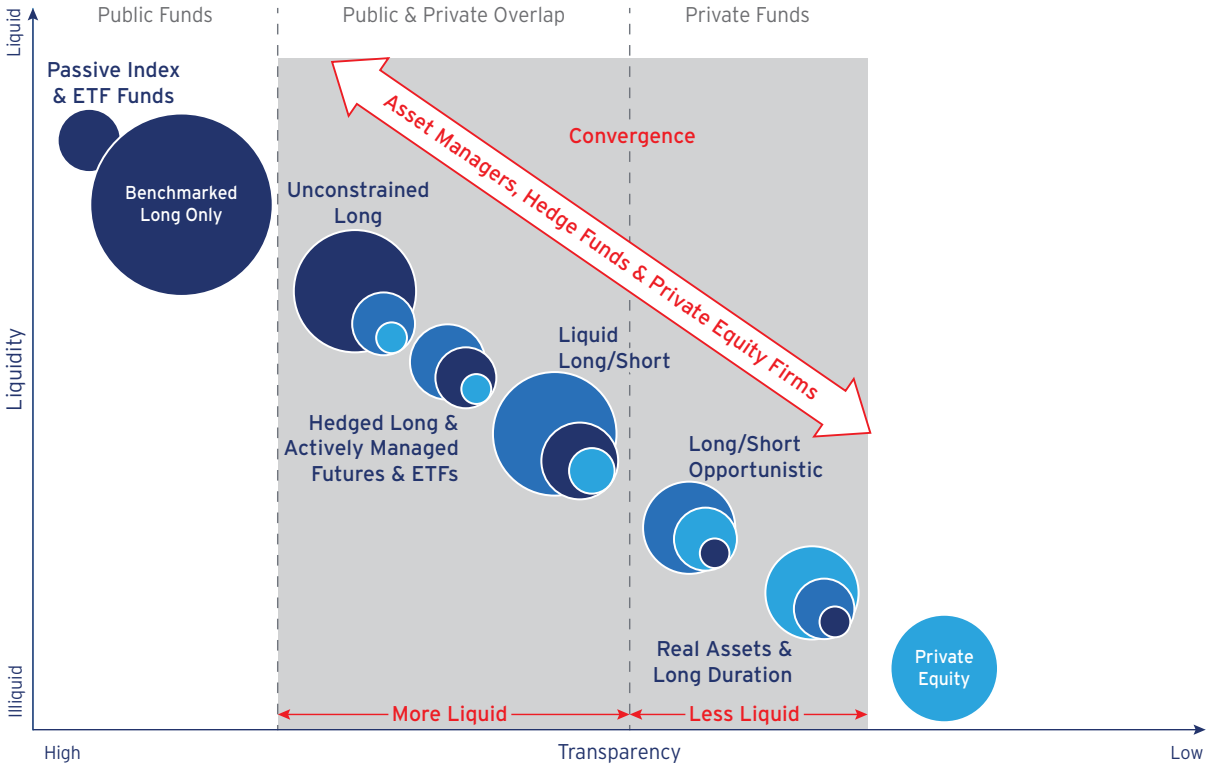
These actions by private equity firms helped to create a secondary convergence zone in the markets by 2012 as illustrated in Chart 14.

Chart 14: Investment Structures in the Public Markets: 2012



Source: Citi Investor Services

Chart 15: Product Offerings: 2013 Onward



Source: Citi Investor Services

These trends continued to unfold and gain speed in the past 24 months. The old terminology for the types of fund offerings became less relevant. Increasingly, as asset managers, hedge funds and private equity firms began to offer a full range of different products, the focus in the market place shifted to the investment techniques that were used to realize returns in each type of strategy and to the skill set of the investment manager required to apply those techniques.

What became clear was that it was the hedge fund skill set that was in growing demand as funds ventured into increasingly less liquid strategies. Asset managers and private equity firms alike have been actively recruiting hedge fund managers to join their platforms. As this is a slow and painstaking process to negotiate, both sets of market participants have sought to accelerate their acquisition of hedge fund talent by purchasing fund of hedge funds to act as a conduit to hedge fund managers in the meanwhile.

By 2014, we see the investment landscape comprised of a set of different investment products that run the full gamut from highly liquid to illiquid. With the exception of ETFs, index funds and benchmarked long-only funds on the liquid end of the spectrum and pure private equity funds on the illiquid side, almost all other types of funds can now be sourced from an asset manager, a hedge fund or a private equity firm as shown in Chart 15. This marks the culmination of the convergence trend of the past decade and lays the stage for an important new set of market dynamics in the coming period.

Market Growth Projections Point Toward Looming Collateral Conundrum

In Part I of this year's report, we did an in-depth analysis of expected growth in traditional hedge fund 3(c)-1 and 3(c)-7 products and in the expected growth of 40 Act alternative mutual funds, ETFs and alternative UCITS. These two sets of investment pools are wholly contained within the convergence zone illustrated in Chart 15. Together, we see assets in this convergence zone nearly doubling from $3.4 trillion in 2013 to $6.6 trillion in 2018. (Note: these figures encompass the entire pool of 40 Act alternative mutual funds and alternative UCITS, not just the share of those asset pools being managed by traditional hedge fund firms.)

This growth is likely to have a significant impact on demand for financing and collateral in the market. Chart 16 shows the various types of products in the convergence zone and the set of collateral and financing techniques those products use in pursuit of their investment returns.

Chart 16: Financing or Collateral Techniques Used in Convergence Zone Products

Financing or Collateral Techniques Used	Need for High Cash Reserves	Listed &/or OTC Derivatives	Shorting of Indices, ETFs or Securities	Margin Financing	Repo Financing
Unconstrained Long	✔				
Hedged Long, Actively Managed Futures & Alternative ETFs	✔	✔	✔	✔	
Liquid Long/Short (40 Act Alternatives & liquid equity & credit long /short funds & macro strategies)	✔	✔	✔	✔	✔
Long/Short Opportunistic (event driven, distressed and relative value funds)	✔	✔	✔	✔	✔
Real Assets & Long Duration	✔	✔			✔

There are five main types of collateral or financing techniques used in these investment strategies. All of the products in the convergence zone have a need for high cash reserves. This cash requirement may reflect reserves the manager is looking to maintain to meet potential investor redemptions (particularly in daily or weekly liquidity products) or it may reflect a desire to have dry powder on hand to respond to evolving market conditions. In both instances, there is an increased need to manage the cash in these funds beyond that of a normal long-only fund offering that is typically 95% or more invested at all times.

Since the need for cash reserves is the only differentiating trading consideration between long and unconstrained long, we have opted to forgo including this asset pool in our analysis. The growth in AUM from $3.4 trillion to $6.6 trillion discussed above only applies to the other four investment strategies listed in Chart 16.

All of the other strategies in the convergence zone are likely to be using either listed or OTC derivatives (or potentially both) in some manner. This could be to create a hedge against unwanted interest rate, currency or credit exposure, to create synthetic access to a product or to obtain leverage in the portfolio in instances where assets are not available for margin or repo financing. As will be discussed in the coming section, the increase in AUM expected for strategies that all use derivatives in some form is coming just as new derivative regulation is coming into effect, the impact of which will be to make accessing collateral more difficult and supplies of high quality collateral required to meet margin calls more limited.

All of these other strategies in the convergence zone will also require some type of financing, whether that be via short coverage, margin or repo financing or via some combination of these options. Emerging bank regulations are placing more focus on the risk weighting of certain trades, on the quality of capital being held on bank balance sheets and on the tenor of bank holdings. These new rules are making it more difficult for banks to extend leverage and provide financing, and are increasing their focus on a client's profitability as measured by the bank's ability to realize return on assets (ROA) for a balance sheet that is extended to a specific client.

It is for this reason we note that the market is heading toward a collateral conundrum. There are more types of market participant trading strategies that require collateral and/or financing, and the strategies these participants are trading are likely to experience significant asset growth, all at a time when the supplies of available collateral are tightening, the demands for high quality supply are rising, and the ability of banks to provide financing are likely to be constrained.

The next two sections will delve more deeply into the factors working against the ready supply of collateral and financing in the market.

> "Collateral is a good thing used to offset risks in the system, but regulators are starting to see collateral itself as a new risk because so much of it moves through the system so quickly. What if the music stops? There is a sense of wanting to slow things down and make it more difficult to move collateral around, which could be considered a push, while at the same time regulators are trying to encourage more collateralization, which could be considered a pull"
> — *Industry Trade Organization*

Section 3: Demand for Collateral Rises as Accessing Supplies Becomes More Complex

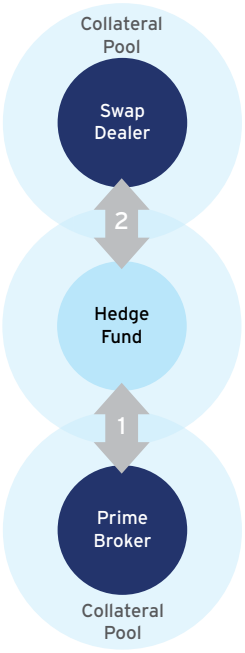
Actions taken by regulators to create better asset protections and regulations meant to exert stronger control over the OTC derivative space are coming together to add an exponential amount of complexity into daily margin calls and the management of collateral. This challenge is emerging just as hedge funds must compete against other buy-side participants and against the sell side as well for access to high quality liquid assets (HQLA).

More Hedge Funds Sweep Excess Cash to Bank Custody Post-GFC

While a handful of market leaders in the hedge fund space had begun to sweep their excess cash out of their prime brokerage accounts and shift those assets into bank custody holdings pre-GFC, the majority of managers continued to have the bulk of their assets positioned with broker-dealers, either in their prime broker accounts or held as collateral against OTC derivative positions with their swap dealers. This is illustrated in Chart 17.

Tracking their available and committed pools of collateral in the pre-GFC environment was relatively simple for these firms. Most hedge funds in this period still used a single prime broker for the majority of their activity. Though their portfolio may have been spread out across multiple swap dealers, there was an increased trend toward using a derivatives prime broker to consolidate those exposures. Most often, the derivatives intermediary selected was part of the same broker-dealer as the hedge fund's main prime brokerage account.

Chart 17: Hedge Fund Cash Management Pools: Pre-Crisis



Source: Citi Investor Services

When the Lehman Brothers bankruptcy was announced in September 2008, the majority of broker-dealers at least temporarily froze access to cash held in their legal entities to ensure that they were properly reconciled. This event was quickly followed by the Reserve Fund breaking below $1.00.

Though actions were quickly taken by the Federal Reserve and other central banks to reassure the markets about the stability of the dealer community, for many hedge funds the damage was done.

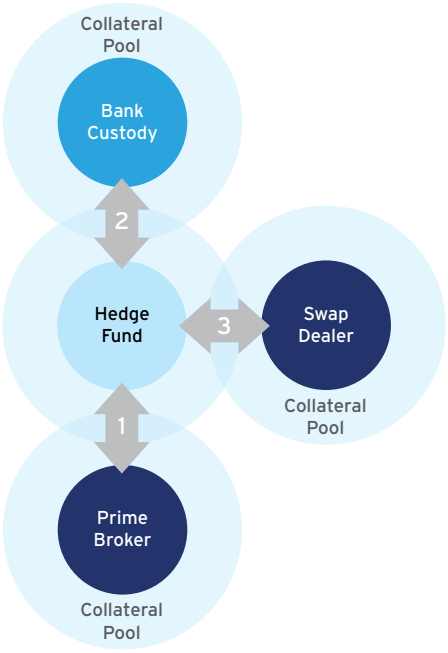
The majority of hedge funds sought to diversify their set of prime brokers in the immediate aftermath of the Lehman announcement, in an effort to both ensure financing and to expand their set of counterparties. They also began to set up bank custody accounts and sweep excess cash and securities into these entities.

The impact of these decisions expanded the types of entities against whom hedge funds had to manage collateral from two to three counterparts, as shown in Chart 18.

On the surface, this expansion of the collateral pools looks relatively straightforward, but the reality was that for most hedge funds, dealing with a custodian was a new experience that created much more complexity in their daily operations. Custodians were used to dealing with long-only fund managers that had low portfolio turnover and that primarily traded in funds that settled delivery versus payment in a T+3 or longer environment.

The vast majority of custodians were not used to dealing in trade date settlement accounts or in OTC derivatives. Their systems were not set up to calculate or report in this manner. They were also not used to dealing directly with clients looking to actively manage their cash. Most traditional asset managers provided daily allocation and settlement instructions

Chart 18: Hedge Fund Cash Management Pools: Post-Crisis



Source: Citi Investor Services

to custodians via entrenched securities settlement systems at the central security depositories, and would expect those same settlement systems to communicate changes in their portfolios directly to their designated custodian on settlement date. Very few traditional asset managers traded on margin and therefore had to manage daily portfolio and account reconciliations.

Moreover, custodians used different data models and communication networks than the prime brokers and dealers that were the typical counterparties to hedge funds. Payment and settlement instructions between traditional asset managers and custodians were typically done via SWIFT messaging—a standard that few if any hedge funds and dealers had exposure to in the period immediately after the GFC.

Enhancements were done across the industry to facilitate this new approach toward hedge fund cash management. Custodians upgraded their capabilities, dealers and prime brokers began to institute SWIFT or XML protocols and map their data models to enable automated communication, and hedge funds began to build out their own cash management platforms that provided those views across their pools of collateral. By 2014, this system was seen working fairly efficiently.

The implementation of new OTC derivative rules is starting to have an even more disruptive impact, however.

> " Since the crisis, standard operating procedure for our larger clients is to sweep free cash to a custodian. Many are doing this via SWIFT, and they are exploring the movement of securities via SWIFT as well"
>
> *– Hedge Fund Technology Vendor*

> " Within a couple months of financial crisis, we decided to open up an account with a custodial bank. We don't use a lot of leverage and we had all these assets lying around in our prime broker unnecessarily. Today, we have 80% of our assets at custodial banks"
>
> *– $10.0 Billion AUM Hedge Fund*

> " Today we have all of our initial margins for all of our derivatives in a tri-party relationship at a custodian bank"
>
> *– $10.0 Billion AUM Hedge Fund*

> " As we have grown, we have thought about ways to mitigate the risk of being too concentrated with our core partners. Over the last 2-2.5 years, we have put tri-party relationships into place for our FI counterparty exposures and we now have two custodians"
>
> *– $10.0 Billion AUM Hedge Fund*

Dodd-Frank Title VII & EMIR Transform the OTC Derivative Landscape

Since the crisis, the OTC derivative markets have undergone a major transformation under the lens of both the Dodd-Frank Act in the US and the European Market Infrastructure Regulation (EMIR) in Europe.

OTC derivative markets had nearly $600 trillion in notional outstanding as of year-end 2012.[4] The majority of these derivatives were not centrally cleared with recent FSB reports, indicating that ~45% of interest rate derivatives were centrally cleared at the end of 2012, up from just 35-40% in prior years, but that only 10-12% of credit derivatives were processed by CCPs.

Dodd-Frank, under Title VII, sought to address the gap in US financial regulation of the OTC derivative market by providing a comprehensive framework for the regulation of the global swaps market. The legislation divided regulatory authority for oversight of OTC derivative transactions between the Commodities & Futures Trading Commission (CFTC) and the Securities & Exchange Commission (SEC).

The SEC has regulatory authority over "security-based swaps," which are defined as swaps based on a single security or loan or a narrowly based security

4. http://www.bis.org/publ/otc_hy1305.htm

index. The CFTC has primary regulatory authority over all other swaps, such as energy and agricultural swaps, with some shared authority over "mixed swaps" which are securities-based swaps that have a commodity component.

Since Dodd-Frank became law in 2010, both securities regulators have completed significant rule-making efforts to define a new market structure that includes centralization of clearing risk with CCPs and increased transparency in trade execution via Swap Execution Facilities (SEFs). The implementation of the rules has been staged, but for designated OTC types, the US market has now fully migrated to a model in which risk is centralized with the CCPs and high quality collateral is posted to an authorized Futures Clearing Merchant (FCM) for onward posting to the CCP.

EMIR officially came into force later than Dodd-Frank—in August 2012—but many provisions only became active after technical standards took effect in March 2013. EMIR regulates derivatives, central counterparties and trade repositories with a goal of improving transparency and reducing the risks associated with the derivative markets. The regulation sets out a series of guidelines for reporting, requires central clearing of certain derivatives and applies risk-mitigation standards for uncleared trades—although these technical standards are yet to be finalized. The legislation also lays out guidelines for CCPs and trade repositories.

Generally, EMIR captures financial institutions and non-financial counterparties (NFCs) transacting above certain clearing thresholds (NFC+). Interestingly, it is still not entirely clear how EMIR applies to non-EU entities that have branches in the EU. As recently as April 2014, there were articles that certain large hedge fund managers might be exempt from EMIR due to the offshore nature of their management companies.

In February 2014, market participants began reporting information on derivative activity to trade repositories. All counterparties to all derivative contracts, whether OTC or exchange traded, are required to report post-trade contract details to a registered trade repository. While all counterparties are required to report each trade, they can arrange for one party to report on behalf of each; this may be a third-party, including a CCP or trading platform.

In March 2014, the final EMIR technical standards with respect to clearing were published and in April they entered into force. Under EMIR, all OTC derivative contracts that ESMA has determined are subject to mandatory clearing must be cleared by an authorized central counterparty (CCP) with high quality assets posted as collateral for margin purposes (cash or G20 government bonds). While the clearing obligation is broadly defined, it does exclude certain hedging activities for non-financial counterparties.

March also noted the first CCP to be reauthorized under EMIR. On 18 March, 2014, Nasdaq OMX received its reauthorization; this kicked off a six-month deadline for the ESMA to define the clearing obligation for any of the classes of OTC derivatives that require central clearing and it also essentially started the clock for other CCPs to seek similar reauthorization from ESMA.

For non-cleared derivatives, EMIR defined certain risk mitigation requirements, including timely confirmation, dispute resolution, reconciliation and portfolio compression. There are also new margin requirements, including pre-determined minimums for initial and variation margin from both swap participants and a requirement for daily valuations. In the past, only clients, not dealers, had to post initial margin on swap transactions.

> "Collateral optimization…a big driver for the buy side is the EMIR push to CCPs. Synthetic derivatives can be traded bilaterally today and your counterpart may have wider acceptable collateral requirements. Now margin requirements are changing. You need higher grade securities for initial margin and cash for variation margin"
>
> *– Agent Lender*

> "The main driver for us internalizing our repo is EMIR. You get called for initial margin on your derivative trades and you give securities as collateral. You want to give the cheapest to deliver securities to cover this and then repo the rest out for cash. When you take the cash in, you need to find the collateral need that it can cover and then have an efficient way to handle it operationally. This is what we view as optimization"
>
> *– Asset Manager*

> "The new EMIR regulations are forcing fund managers that would normally be 99% invested and 1% in cash to go down to 80% invested and 20% in cash to meet calls. This is making it hard to hold any type of derivative in the funds. Some may say that this is a good outcome and what the regulators wanted"
>
> *– Asset Manager*

Chart 19: Dodd-Frank Title VII & EMIR Rules

KEY CHANGES

- Central clearing of majority of OTC derivative contracts mandated by U.S. and European regulators
- Creation of trade repositories & CCP model to centralize risk
- Introduction of Swap Execution Facilities (SEFs) *(MIFID)

IMPACT

- CCP's largely limit acceptable collateral to cash and government bonds
- Significant increase in demand for High Quality Liquid Assets (HQLAs)
- Broker-dealers required to margin their positions

Source: Citi Investor Services

Many hedge funds and asset managers view central clearing as a step toward making markets more efficient and facilitating the move toward a more electronic environment. However, the consistent theme in the industry is concern that collateral demands under the new regimes are likely to become too extreme and tie up excessive amounts of HQLA.

With all CCPs limiting collateral to either cash or G20 government bonds, and in some cases corporate bonds (HQLA), the global demand on the collateral with the lowest risk-weighted asset assignment has been rapidly increasing across CCPs in the US and Europe. Many interviewees expressed concern about the future state requirements for collateral posting.

Chart 19 provides an overview of the key changes and impacts of the Dodd-Frank Title VII and EMIR rules.

Increased Demand for Collateral & Emphasis on HQLA Already Evident

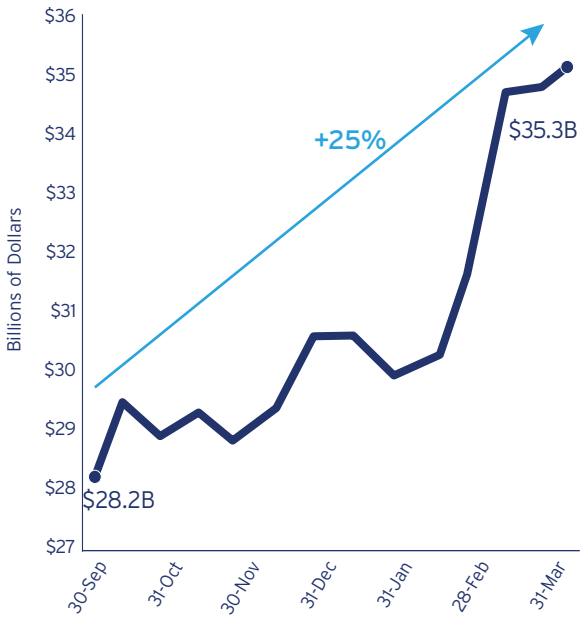
Mandatory clearing of OTC derivatives under the Dodd-Frank Act began in March 2013 for Category I participants, June 2013 for Category II participants and September 2013 for Category III participants. This represented the full suite of required entities and the shift to the new market structure was fully underway by Q4 2013 in the US market.

The National Futures Association (NFA) began publishing a new data series on the amount of customer collateral held in segregation at the end of September 2013. This pool represents the required collateral postings from all the FCMs involved in the OTC clearing space in the US. Chart 20 shows the progression of collateral postings from the inception of this reporting series to mid-April 2014.

As shown, when mandatory OTC clearing under Dodd-Frank was fully implemented at the end of September 2013, customer collateral held in segregation was $28.2 billion. By mid-April 2014, the figure had risen to $35.3 billion—an increase of 25% in just the first six months of activity.

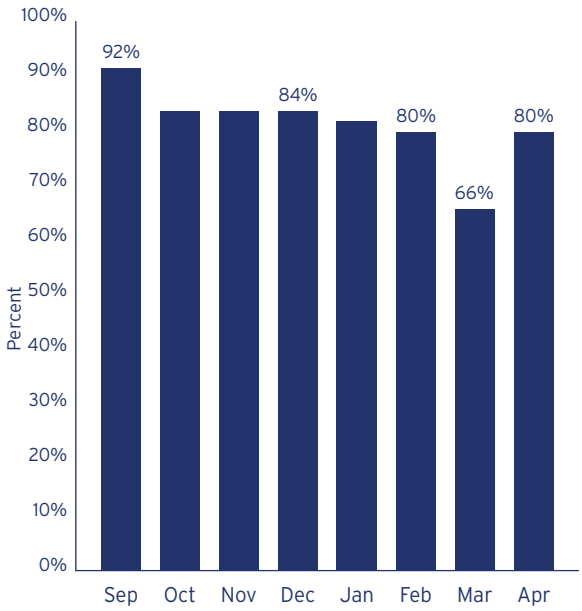
The composition of that collateral also confirms the market perception that the new OTC clearing rules will be tying up HQLA. Chart 21 shows the percentage of collateral being posted by the FCMs that is represented by cash held at banks or by postings of US treasuries. When the data series began in late September 2013, that figure was over 90%. While there has been some diversification since that time, by mid-April 2014, cash and US treasuries still accounted for 80% of the collateral pool.

Chart 20: FCM Cleared Swaps Customer Collateral Held in Seg: September 30, 2013 – April 15, 2014



Source: Citi Investor Services

Chart 21: FCM Cleared Swaps Percent of Collateral Held in Cash at Banks & in U.S. Treasuries



Source: Citi Investor Services

Hedge Funds' Collateral Management Challenge Expands Exponentially

The inclusion of new industry participants into the OTC derivative space and anticipation of new rules around having dealers post collateral for non-cleared swaps are causing hedge fund managers to rethink their current infrastructure and consider how their collateral management capabilities may need to change in the emerging landscape.

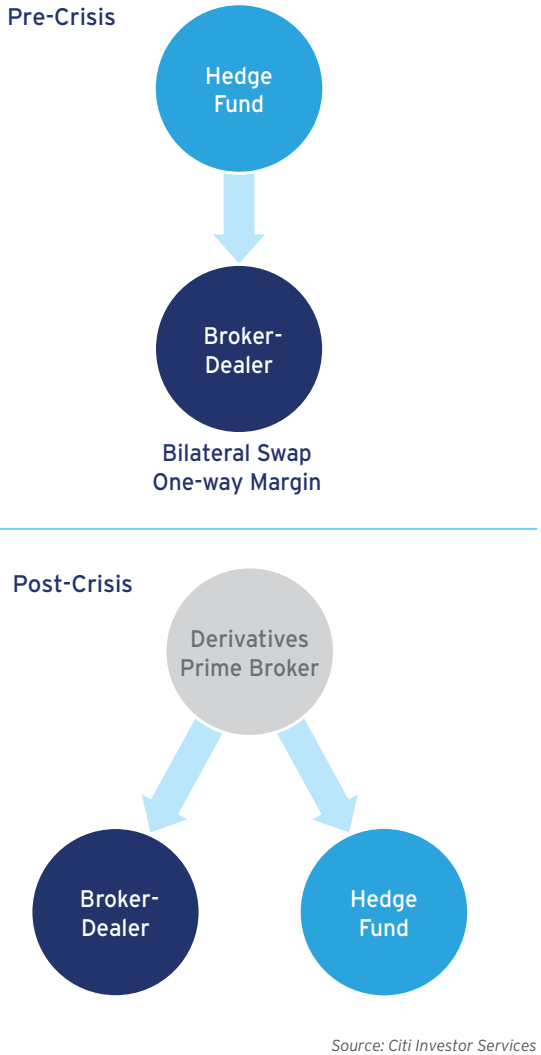
In the traditional swap model, activity was done bilaterally between a hedge fund client and its designated swap dealer. The hedge fund posted its initial margin upon initiating the swap position, then the dealer calculated variation margin requirements daily and called on its client to deliver additional collateral if warranted. In instances where a hedge fund was using an OTC derivative intermediation provider, that agent would typically be associated with one of the hedge fund's existing prime brokers and the same margin treatment would be handled by the prime broker across the client's set of intermediated trades. This model is illustrated in Chart 22.

New OTC clearing rules are changing that equation. For firms trading OTC in the US under the new Dodd-Frank rules, the client must now engage with an FCM that will handle the collection of initial margin requirements and manage the client's side of daily collateral calculations and margin transactions for all of their cleared swaps. For non-cleared swap transactions, the hedge fund will still be working with a dealer, but the rules around initial and variation margin treatment of non-cleared swaps is changing.

In 2011, the G20 added margin requirements for non-cleared swaps to the list of agreed-upon reforms. At the end of 2012, non-cleared swaps still represented 57% of the total OTC derivative market, according to ISDA. Since differing margin rules across regional regulators could undermine the G20 effort, Basel and the International Organization of Securities Commissions (IOSCO) were jointly tasked with developing consistent standards. This Basel/IOSCO working group issued its near final principles in February 2013 and the final principles in September 2013.

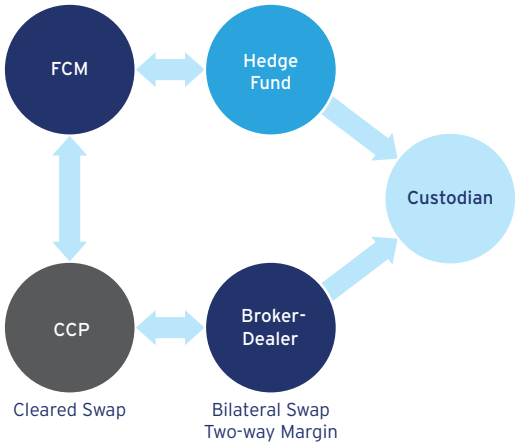
These principles set a baseline for national regulators to eventually implement in their home countries. The main mandate of the Basel/IOSCO Margin Principles is that they would only apply to entities or affiliate

Chart 22: OTC Derivative Trading



Source: Citi Investor Services

Chart 23: OTC Derivative Trading Present



Source: Citi Investor Services

groups with over €8.0 billion gross notional non-cleared derivatives outstanding and completely exempt sovereigns, central banks and certain international agencies. Except for physically settled FX forwards and swaps, the principles will apply to all other non-cleared swap categories.

Requirements for the margin of non-cleared swaps would phase in from December 2015, when those organizations with the largest outstanding notional (over $3.0 trillion) would be required to post initial margin and calculate variation margin for all new swap trades across both counterparts to the transaction. Beginning in Q4 2014, financial and non-financial systemically important entities must begin to calculate their gross outstanding notional on non-cleared swap exposure to determine if they qualify.

Moreover, there was a requirement that the initial margin collected from both participants be protected to the extent possible from either party's default. Application of that rule has meant that participants be given the option to hold such initial margin in a segregated account (typically with a third party custodian).

Going forward, both swap dealers and major swap participant counterparties (MSPs), inclusive of hedge funds in most instances, will need to provide notification about their intention to hold initial margin for non-cleared swaps in a segregated account. Dodd-Frank amended the Commodity Exchange Act to provide swap dealers and their MSP counterparty the right to have any initial margin posted in connection with a non-cleared swap held by an independent custodian.

Recently adopted Commodity Futures Trading Commission (CFTC) rules require swap dealers and MSPs to notify counterparties of their right to segregate initial margin, to obtain confirmation of receipt of the notice and to obtain the counterparty's election of whether to segregate initial margin.

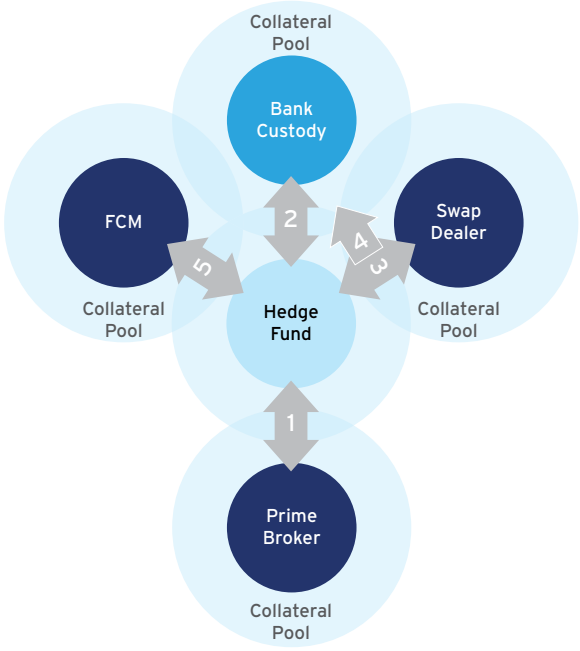
These rules went into effect in January 2014. All new counterparties that set up ISDAs post this date already have to comply with the segregation notification rules. Those market participants with existing ISDA relationships have until November 2014 to comply.

The impact of these rules is shown in the revised engagement model noted in Chart 23.

This revised engagement model is likely to have a significant impact on the number of collateral pools that a hedge fund client will be required to manage. As noted back in Chart 18, decisions made post-GFC to sweep excess cash from broker-dealer entities and place that collateral into bank custody accounts had already extended the number of collateral pools managed by the hedge fund market participant from two to three types of pools.

Chart 24 shows that the new OTC derivative legislation is likely to cause an increase again, from three to five types of pools.

Chart 24: Hedge Fund Collateral Pools Post-Dodd-Frank & EMIR



Source: Citi Investor Services

The first three collateral pools highlighted in Chart 24 remain unchanged. Hedge funds will still be required to manage a collateral pool with (1) their prime broker, (2) the custodian where they have opted to sweep cash and (3) the daily variation margin with their swap dealer on bilateral non-cleared swap transactions. Additionally, the hedge fund must also now monitor the custodian account where its initial margin on non-cleared swap transactions may be held as a fourth pool of collateral. The final pool of collateral to be managed is with the hedge fund's FCM that is managing cleared swap transactions on its behalf.

Just as the expansion from two to three collateral pools looked simple when laid out in an illustrative diagram, the increase from three to five collateral pools looks more complex, but not revolutionary, when presented as we have done in Chart 24. This is far from the truth, however.

The first layer of complexity comes from the fact that this diagram only shows the type of collateral pool—not the number of counterparties the hedge fund is likely to engage across. In reality, most hedge funds will have at least two to three prime brokers, five or more swap dealers, at least one to two FCMs and probably two or more custodians. Taking the outside range, this could mean that instead of five collateral pools, the hedge fund will be managing at least 50 collateral pools across its set of counterparties. This is calculated by considering that there will be an account for each swap dealer with each prime broker and FCM as well as a set of these total accounts with each custodian. This is a very conservative forecast. For larger hedge funds, the figure may be twice as large or even larger.

The second layer of complexity is that the hedge fund is likely to have multiple funds trading with each of these counterparties and it will need to assess the margin requirements and track the collateral usage for each of these funds. Sticking with our conservative forecast, if we figure that the hedge fund has three funds trading with each of those counterparties, the number of collateral pools has now expanded to 150 accounts. Large hedge fund managers may have as many as 10 funds trading as well as a number of separately managed accounts, for which they are also calculating collateral requirements.

The third layer of complexity relates to the likelihood that many hedge funds trade global portfolios that span multiple currencies, and that each currency will need its own sub-account to ensure the proper calculation and margin adjustment each day.

When all of these factors are considered, there could be hundreds or even thousands of separate pools of collateral the hedge fund will be required to monitor and manage in the emerging environment. Add to that challenge the lack of any industry standards around data exchanges and the fact that most of the FCMs are still working on the build-out of their own collateral management platforms, and that the connectivity and automation of these functions is currently low. This provides a good sense of how complex this challenge is likely to prove.

" If a client has five PBs and 10 OTC counterparties across three funds, that's 150 accounts. Add multiple currencies to the mix, and that number goes up. A large firm may have 9,000 accounts. This presents a basic cash management challenge"

– Hedge Fund Technology Vendor

" You need a collateral sub-ledger to track security pledges and releases that's independent of the books and records system"

– Hedge Fund Technology Vendor

" Not only is there NOT a tool in the marketplace for collateral optimization, there really isn't any DATA yet"

– $10.0 Billion AUM Hedge Fund

Section 4: New Industry Ecosystem Emerges to Unlock Collateral and Enhance Movements of Supply

The collateral challenge facing the hedge fund industry, and the types of counterparts these participants must think about in terms of monitoring and managing their pledges, are only the topmost layers of a multi-tiered network.

There are deeper layers to this collateral ecosystem where pools of assets are also held. Actions being taken by leading market participants are working to create more interoperability, a more open architecture and greater access to these lower layers to unlock all the pools of potential collateral to meet rising demand in the emerging landscape.

Tri-Party Repo Participants & Market Reforms

Beyond the cash and collateral posted to prime brokers, swap dealers, FCMs, CCPs and in bank custody accounts, there is also a group of key tri-party repo market participants that collectively control vast pools of collateral on behalf of their clientele. These participants are shown in Chart 25.

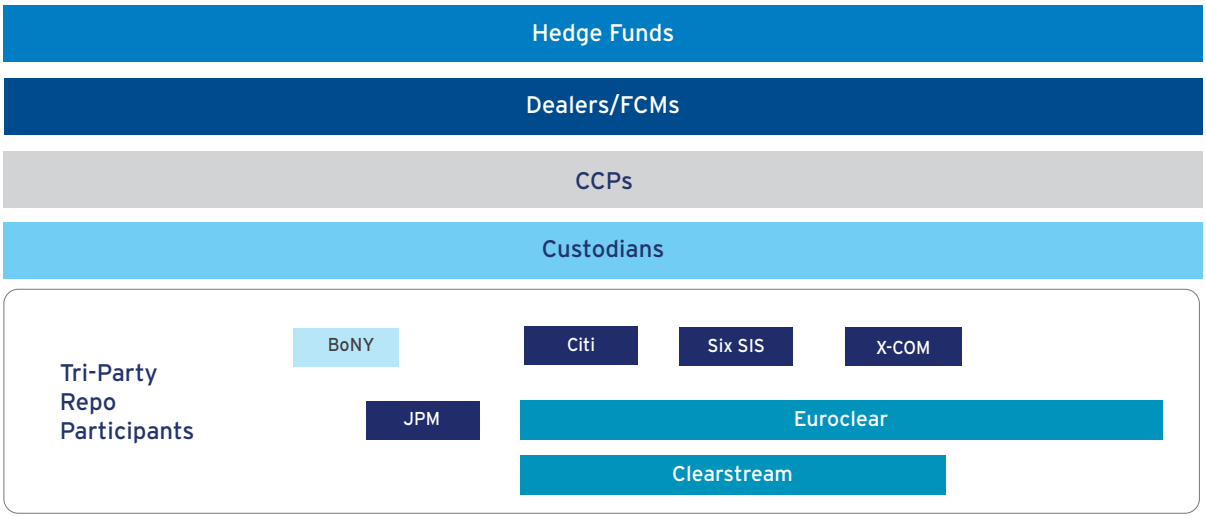
In the US, tri-party repo is only handled by two authorized clearing banks—JP Morgan Chase and Bank of New York Mellon. At their peak levels in 2008, these two banks were providing tri-party services that covered over $2.8 trillion in securities.

Given the significance of the tri-party market and its role in providing collateralized repo services for cash investors (money market funds, mutual funds, asset managers and corporations), in 2009 the Tri-Party Repo Infrastructure Reform Task Force was formed by the Federal Reserve Board of New York (FRBNY). The task force issued a report in 2010 with recommendations to modify the tri-party repo settlement process to reduce the markets' dependence on intraday credit provided by clearing banks.[5]

The areas focused on included operational efficiency to reduce intraday credit exposure, enhanced dealer liquidity risk management (and the dependence on the two tri-party clearing banks), margining practices, cash investor contingency planning, and overall transparency into the program. A series of recommendations was made by the task force in 2010 which were then concluded in a final report in 2012.

Such recommendations included the introduction of functionality to eliminate the intraday credit

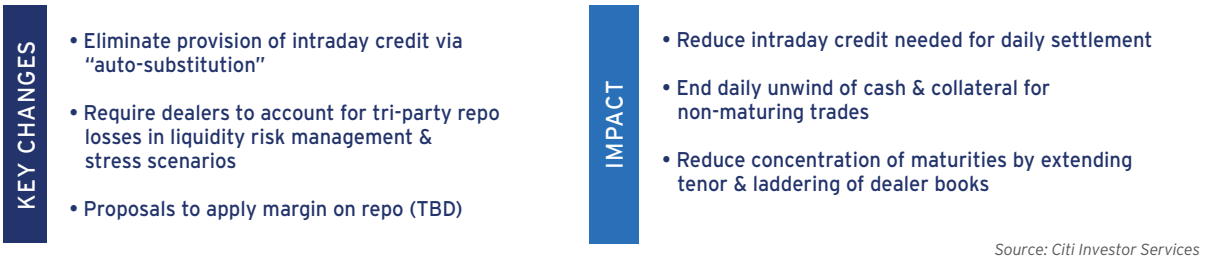
Chart 25: Participants in the Global Collateral System



Source: Citi Investor Services

5. FRBNY tri-party reform paper published in 2010
http://www.newyorkfed.org/prc/files/report_100517.pdf

Chart 26: Overview of Tri-Party Repo Infrastructure Review Taskforce Recommendations



Source: Citi Investor Services

provided by the two clearing banks, known as "auto-substitution," which allowed for the near real-time substitution of securities collateral supporting the tri-party transaction while the trade was in place. Dealers were required to account for a potential loss in secured tri-party funding in their liquidity risk management and stress test scenarios, including efforts to lengthen and stagger the maturity of other bilateral financing.

Operational enhancements were also introduced into the system to reduce the requirements for intraday credit usage from the clearing banks. Such changes included ending the daily unwind of cash and collateral for non-maturing trades and redesigning the process for maturing trades in a more liquidity-efficient manner.

According to the FRBNY, changes in process and practice have already resulted in a sharp reduction in intraday credit usage, from 100% of daily volume in late 2012, to about 20% of daily volume in Q1 2014. In dollar terms, the two clearing banks are providing over a trillion dollars less in intraday credit to market participants on a daily basis today than in February 2012. By the end of 2014, the FRBNY expects that intraday credit usage will reach, and may even fall below, the Task Force's benchmark of 10% of daily tri-party repo volume.

Proposals on repo margin have not yet been finalized, and a number of enhancements have been proposed and debated since the task force was formed. The principal debate relates to the minimum haircut that should be in place on tri-party and bilateral repo contracts, and whether this should be standardized across participants, with the intention of increasing stability when market prices fluctuate in a period of stress.

The key goals and impacts of the Tri-Party Repo reforms are summarized in Chart 26.

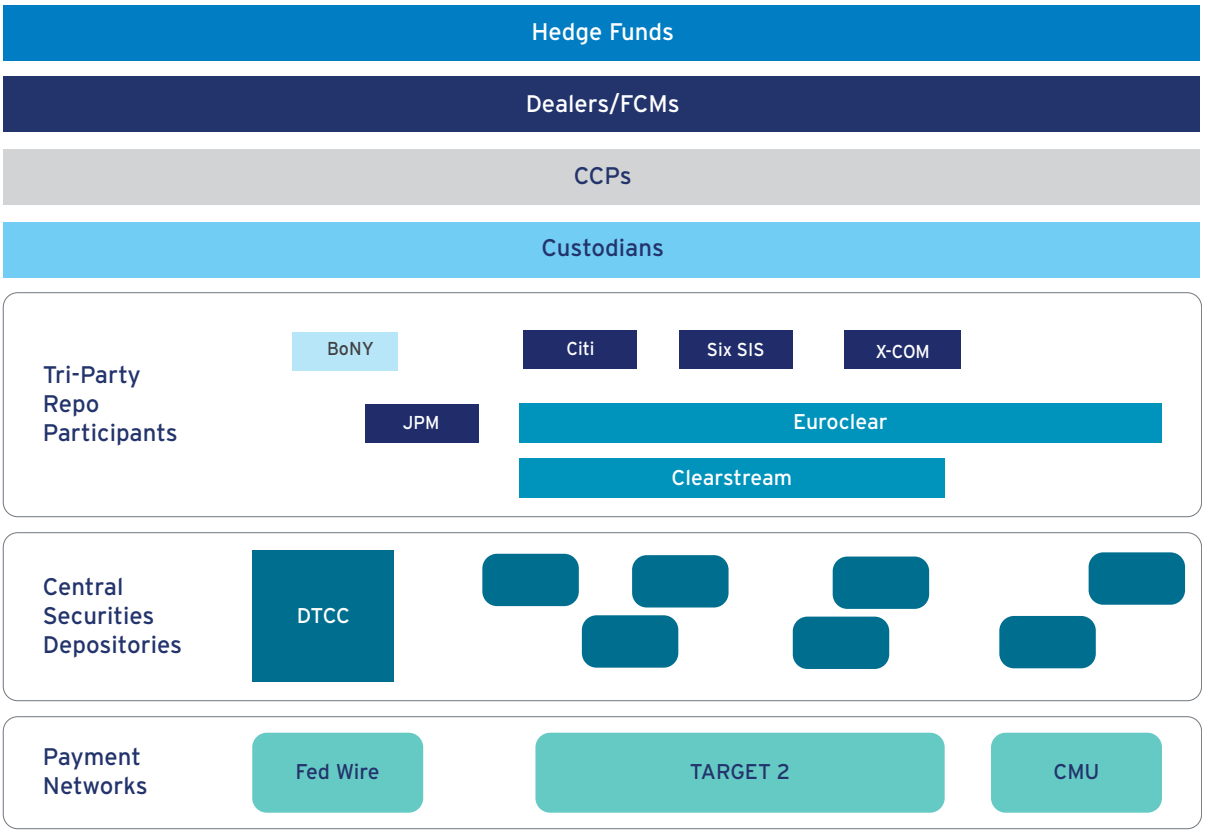
Tri-party reforms in the US are bringing the market into closer alignment with the European tri-party repo model. In Europe, they trade true-term repo, and the need to unwind tri-party repo daily has been avoided by the use of direct substitution and margining. Unlike in the US, where tri-party repo accounts for nearly two thirds of the market, tri-party repo in Europe has historically been a much smaller part of the overall repo market, with estimates showing it at only 10–12% of dealer and bank repo activity. The focus of repo transactions also differs. According to ICMA, European tri-party repo is normally used to manage non-government bonds and equity (although the proportion of government bonds has more than doubled since the crisis), whereas US tri-party is focused on Treasury and Agency debt.

There is also a broader set of tri-party repo participants in Europe. Beyond the two US clearing banks, JP Morgan and Bank of New York Mellon, there are other banks that also participate in the tri-party repo system, including Citi, Six SIS and Monte Titoli via their X-Comm system. There are also two large International Central Securities Depositaries (ICSDs)—Euroclear and Clearstream. Unlike the clearing banks, these ICSDs are not principals to any repo transactions. They are also purpose built to offer fully automated systems for selection, allocation and substitution of collateral related to repo—eliminating the need for the daily unwinding / rewinding process.

The ability in Europe, unlike in the US or UK, to have continuous substitution of collateral may have allowed markets to more rapidly adjust throughout the crisis, limiting intraday counterparty credit risk and improving confidence. Further, in many European countries the re-use of collateral is permitted, further improving liquidity. In some countries, like Switzerland, full re-use is permitted, while in others re-use is limited to a specific system (e.g., Euro GC Pooling segment of Eurex Repo). In the United States, however, re-use was not permitted.

In 2009 the FSB, through the Committee on Payment and Settlement Systems, commissioned a Working Group on European Repo Market Infrastructure. The group observed that during the crisis, some European tri-party repo service providers and other

Chart 27: Participants in the Global Collateral System



Source: Citi Investor Services

key parties took a number of risk-reducing actions, including requiring higher quality collateral, excluding less liquid assets such as MBS, ABS and CDO, and increasing margin and haircut levels—either at the request of clients or on their own.

In their September 2010 report, the Working Group highlighted seven key concerns about the European repo markets and made suggestions for potential reforms around intraday credit extension, transparency, protection against counterparty credit, processes for liquidating, the use of high quality collateral and risk management best practices.[6] Following that report the FSB established an effort to focus on securities lending and repos to further assess financial stability risks and form policy recommendations. In August 2013, the FSB published its final Policy Framework, which largely adopted the recommendations made by the Working Group.[7]

At the core of the recommendations is a requirement for increased transparency through reporting from counterparties, CSDs and CCPs. It is proposed that data would be captured by new national trade repositories and then aggregated monthly at the FSB. The framework also highlights guidelines for collateral reinvestment and re-hypothecation, haircut methodologies and floors, and the use of CCPs. While these are currently policy recommendations, expectations are that national regulators will finalize their positions in spring 2014 with implementation to shortly follow.

Central Security Depositories & Payment Networks

Operating at a layer below the tri-party repo agents are central security depositories (CSDs). In the US, the Depository Trust Company (DTC) is the predominant CSD, but in Europe and in other regions of the world, there are often many smaller, nation-based CSDs. This creates a fragmented environment. This is illustrated in Chart 27.

At their core, CSDs perform crucial services related to the registration, safekeeping, settlement of securities in exchange for cash and efficient processing of securities transactions in financial markets. While securities markets traditionally relied on the physical exchange of paper, CSDs now assume a critical role to guarantee a safe and efficient transfer of securities that exist to a large extent only in book entry form.

6. http://www.bis.org/publ/cpss91.pdf
7. https://www.financialstabilityboard.org/publications/r_130829b.pdf

Each CSD can have an extensive pool of securities that it controls. Demand for access to these securities is on the rise. Several CSDs, particularly in Europe, work with the national regulators to facilitate the issuance of new securities, including government securities that can constitute HQLA. A CSD has to be authorized to accept settlement of such securities, and non-authorized CSDs cannot be involved in the settlement of those issues.

Supporting the CSDs, tri-party agents, CCPs, depository banks and broker-dealers are the payment systems.

In the US, the Federal Reserve banks provide the Fedwire Funds Service, a real-time gross settlement system that enables participants to initiate fund transfers that are immediate, final and irrevocable once processed. Depository institutions and certain other financial institutions that hold an account with a Federal Reserve bank are eligible to participate in the Fedwire Funds Services.

In Europe, a similar network is used called TARGET2, which stands for Trans-European Automated Real-Time Gross Settlement Express Transfer system. This network is owned and operated by the Eurosystem. Payment transactions in TARGET2 are settled one by one on a continuous basis, in central bank money with immediate finality. There is no upper or lower limit on the value of payments. TARGET2 settles payments related to monetary policy operations, interbank and customer payments, and payments relating to the operations of all large-value net settlement systems and other financial market infrastructures handling the euro (such as securities settlement systems or central counterparties).

In Asia, the Hong Kong Monetary Authority established the Central Moneymarkets Unit (CMU) and created a fully integrated interface between the CMU and its real time gross settlement system, the Clearinghouse Automated Transfer System (CHATS). As of April 2014, there were 317 global financial institutions active in this network.

Creating Interoperability & an Open Architecture in Collateral Movements

In the past two years, key participants at the lower levels of this collateral stack have taken actions to promote more interoperability between institutions and to foster the creation of a new open architecture. The goal of these efforts has been to "unlock" the potential pools of collateral and create the mechanisms to effectively access and direct that collateral. As a result, there is a new web of interconnectivity starting to tie these organizations together, as illustrated in Chart 28.

Actions taken to create interoperability have accounted for one set of enhancements in recent years. In May 2013, the DTCC and Euroclear announced that they would create the margin transit utility (MTU) to enable interoperability between their two networks. The goal of this partnership was to allow clients to manage collateral held at both firms' depositories as a single pool. Euroclear is a part of the LCH.Clearnet system and features direct connectivity to CSDs in the UK, France, Belgium, the Netherlands and Portugal.

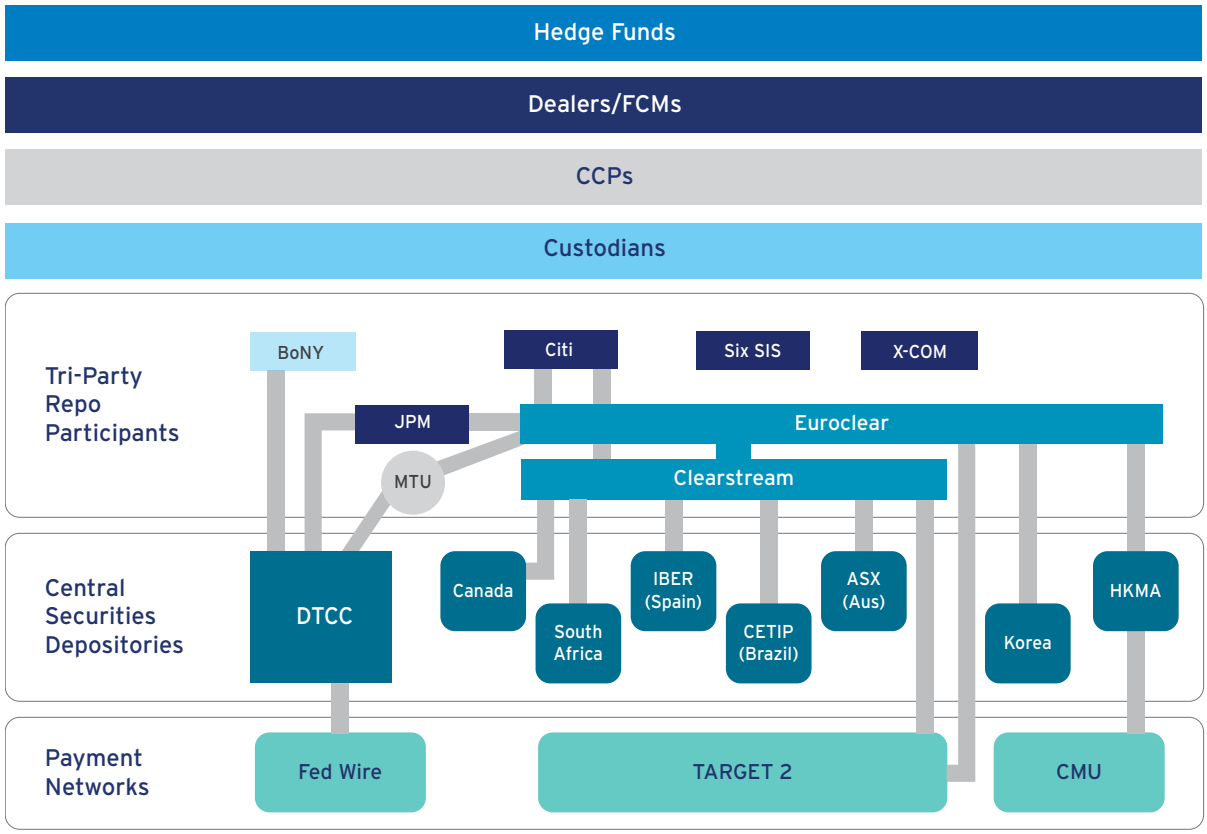
In July 2013, Euroclear and Clearstream announced that they would work to establish tri-party repo settlement interoperability. Clearstream is owned by the Deutsche Borse Group and is part of a network that includes Eurex Clearing. The agreement will allow Eurex Clearing to extend the connected settlement locations for its secured funding GC pooling with Clearstream Banking to include Euroclear Bank. Pending the completion of a feasibility study, the new connections are seen as being ready by the end of 2015.

Both Clearstream and Euroclear have also begun to forge direct connectivity with leading global custodians, including Citi's global custody network. These efforts will allow for the ready movement of supply between the various systems via tri-party swap models—allowing the collateral in such instances to stay within the sponsoring organizations' own network, but be recognized by the other entity.

Clearstream and Euroclear have also launched initiatives to open their architecture and create direct connectivity with other CSDs and industry participants.

Clearstream announced its Liquidity Hub GO initiative in July 2011. This service allows institutions—typically central banks, CSDs or exchanges—to connect directly to Clearstream's collateral management engine. The service handles the allocation, optimization and substitution of collateral, but the assets do not leave the domestic market, which is a legal requirement in many jurisdictions. As of April 2014, Clearstream had signed on CDS, the Canadian central security depository; CETIP, the Brazilian CSD; Strate, the South African CSD; Iberclear, the Spanish CSD; and ASX, the Australian securities exchange into its Liquidity Hub GO initiative.

Chart 28: Participants in the Global Collateral System



Source: Citi Investor Services

Euroclear has taken a different approach, launching its Collateral Highway in July 2012. This initiative seeks to open up the Euroclear collateral management capabilities to a broader number of market participants by creating entry points for collateral providers, such as agent banks, custodians and CCPs, and then creating exit points for collateral receivers, CCPs and central banks. All collateral shuttled via the highway stays within the Euroclear system, which is in contrast to the Clearstream approach. Euroclear has been able to sign on several market participants, such as BNP Paribas, Citi's global custody network and Newedge/MTS for its agency cash management tri-party repo system. It has also created alliances with the Korean Securities Depository and the Hong Kong Monetary Authority.

It will be important for hedge funds to stay attuned to how these networks develop, and understand how their main prime brokerage and custody counterparties are tied into this ecosystem. Those organizations able to effectively automate the movement of collateral into and out of these networks are likely to prove better options for hedge funds that are looking for operational and collateral efficiency, particularly those that trade a global portfolio.

Section 5: Bank Regulation and the Shifting Repo Financing Landscape

The set of regulations that is likely to have the most impact on hedge funds and their daily operations are, however, the Basel III accords focused on supervising the banking system. These regulations have laid out a significant set of liquidity measures and thresholds as well as mandated the risk treatment of assets that are making it increasingly costly for banks to extend financing.

A new program initiated by the Federal Reserve Board of New York to offer reverse repo facilities is exacerbating these concerns and has already had significant impact on market volumes. This has led hedge funds to focus first on their repo finance arrangements as they look to lock in financing lines.

Basel III Rules Create Significant Liquidity Hurdles that Tighten Bank Balance Sheets

In 2009, the Financial Stability Board delegated one of its most significant policy areas, banking supervision, to the Basel Committee on Banking Supervision (BCBS), which was mandated by the G20 to revise the core principles for banking supervision, originally established in October 2006. The subsequent review led to the rollout of a new set of minimum standards for supervising the banking system and increased the number of core principles from 25 to 29, the most relevant for this year's survey being Principal 16, which relates to capital adequacy, and Principle 24, which relates to liquidity risk.

Reforms developed to address these two principles became the proposals known as Basel III (a global regulatory framework for more resilient banks and banking systems),[8] which were developed centrally to improve the banking sector's ability to absorb shocks arising from financial and economic stress, improve risk management and governance, and strengthen banks' transparency and disclosures. Basel III completed its regulatory capital proposals in June 2011, and then released its initial liquidity proposal in January 2013, updating that proposal in January 2014.

The premise of Basel III was that one of the main reasons for the GFC and its severity was that the banking sectors of many countries had built up excessive on- and off-balance sheet leverage. The excessive leverage build up in global banks was accompanied by gradual erosion in the level and quality of the capital base, with this trend occurring at a time when banks were also holding insufficient liquidity buffers. The banking system therefore was not able to absorb the resulting systemic trading and credit losses, nor could it cope with the re-intermediation of large off-balance sheet exposures that had built up in the shadow banking system. The crisis was further amplified by a deleveraging process and by the interconnectedness of systemic institutions through an array of complex transactions.

During the most severe episode of the crisis, the market lost confidence in the solvency and liquidity of many banking institutions, and the weaknesses in the banking sector were rapidly transmitted to the rest of the financial system and the real economy, resulting in a massive contraction of liquidity and credit availability.

With Basel III finalized, the impact on the balance sheets of the banking sector has been gradually realized over the course of the last three years, with a growing awareness of the implications by the counterparties to the banks over the past 12 months.

The reforms raise both the quality and quantity of the regulatory capital base of banking institutions and enhance the risk coverage of the capital framework. They are underpinned by a leverage ratio that serves as a backstop to the risk-based capital measures, and is intended to constrain excessive leverage in the banking system and provide an extra layer of protection against model risk and measurement error. With a focus on Tier 1 capital (common shares, retained earnings, preferred shares), the Basel committee proposed a more stringent Tier 1 capital ratio to help contain the use of innovative instruments to fund a bank's operations.

Risk-weighted asset (RWA) calculations significantly impact the securities financing that a bank provides within the fixed income markets (repo) and the

8. http://www.bis.org/publ/bcbs189.pdf

equity markets (securities lending or stock loan). The reforms raise the capital buffer backing the exposures to bank counterparties and also provide additional incentives to move OTC derivative contracts to central counterparties, with the intention to reduce systemic risk.[9]

Determining the capital requirement, or Capital Adequacy Ratio (CAR), using an RWA calculation allows central bank regulators to look at a bank's on- and off-balance sheet exposures, and is a way for global regulators to compare banks across different geographies. RWA is calculated based on a set of standardized rules defined by the BCBS and then delegated to the central banks to be implemented locally. Chart 29 shows the RWA calculation treatment across different asset classes involved in financing and highlights the importance of high quality debt when calculating RWA.

In addition to the RWA framework in Chart 29, the BCBS proposed measures for derivative exposure to a Central Counterparty (CCP) based on mark-to-market calculations. Collateral posted as margin to these entities is subject to a low risk weight, and a 2% RWA calculation was finalized by the International Organization of Securities Commissions (IOSCO) as part of structural reforms in the global OTC derivative markets. This has become significantly important as it incentivizes banks to move any OTC trading onto a CCP model to relieve their balance sheets and improve their CAR and Tier 1 capital ratios.[10]

By applying RWA calculations to a bank's Tier 1 capital ratio, central banks are able to better control the lending and risk-taking activities of the banks. In addition to this control, the BCBS has also focused on the ability of a bank to use leverage to provide credit to its counterparties, another perceived root cause of the GFC.

As part of Basel III, the BCBS introduced a leverage ratio requirement to constrain leverage in the banking sector, to be calculated in a comparable manner

Chart 29: Risk Weights Mandated Under the Basel III Mandates

	AAA to AA-	A+ to A-	BB+ to BBB-	BB+ to B-	Below B-	Unrated (*)
Cash	0%					
Government Debt	0%	20%	50%	100%	150%	100%
Central Bank Debt	0%					
Bank & Securities Company Debt	20%	50%	100%	100%	150%	100%
Corporate Debt	20%	50%	100%	100%	150%	100%
Retail Products: Credit Cards, Overdrafts, Car Loans, Personal Loans	75%					
Residential Mortgages	35%					
Commercial Mortgages	Less than 90 days overdue: 100%			More than 90 days overdue: 150%		

(*) Unrated assets can use bank internal rating systems based on Foundation IRB (Internal Ratings Based) approach

9. The Tier 1 capital ratio is the ratio of a bank's core equity capital to its total risk-weighted assets (RWA). Risk-weighted assets are the total of all assets held by the bank weighted by credit risk according to a formula determined by the regulator (usually the country's central bank). Most central banks follow the Basel Committee on Banking Supervision (BCBS) guidelines in setting formulae for asset risk weights. Assets like cash and currency usually have zero risk weight, while certain loans have a risk weight at 100% of their face value.
10. Standardized definition of RWA by asset class: http://en.wikipedia.org/wiki/Standardized_approach_(credit_risk)

across jurisdictions. The leverage ratio focuses on additional metrics, including the margin requirements and supervisory haircuts posted against financing and derivative transactions. It offers a proposed a set of minimum standards to be implemented by the G20 central banks.

The final major provision of Basel III that has been a driving force behind structural change in the financing and collateral markets is the introduction of a global liquidity standard in addition to the capital and risk-focused provisions finalized in 2011. With a view that strong capital requirements are not alone sufficient to stabilize markets, the BCBS introduced a set of global standards, which were finalized and adopted by the central banks of the G20 in January 2013.

These standards were developed to achieve two separate but complementary objectives. The first objective is to promote short-term resilience of a bank's liquidity risk profile by ensuring that it has sufficient **High Quality Liquid Assets (HQLA)** to survive an acute stress scenario lasting for one month. The Committee developed the **Liquidity Coverage Ratio (LCR)** to achieve this objective.

The second objective was to promote resilience over a longer time horizon by creating additional incentives for a bank to fund its activities from more stable sources on an ongoing structural basis. The **Net Stable Funding Ratio (NSFR)** has a time horizon of one year and has been developed to provide a sustainable maturity structure of assets and liabilities.[11] The liquidity standards proposed have also been accompanied with required bank **stress tests** that have been ongoing since the crisis and, as a result, have to provide reporting in accordance with LCR and NSFR guidelines.

The critical implication of these rules is that **Secured Financing Transactions (SFTs)**, typically repo and securities lending trades, come under a central focus in the exposure measures defined by the LCR as they are considered an important source of balance sheet leverage that is included in the leverage ratio.

In the January 2013 proposal on the LCR, the netting of securities finance transactions was excluded from the exposure measure, which led to significant industry pushback on the proposal. The result was a revision of the rules in January 2014 that proposed a final standard allowing for "limited regulatory netting."[12]

Many derivatives also have balance sheet implications and may be treated based on the netting rules defined in Basel III. Various other off-balance sheet transactions relating to extensions of credit, including lock-up "dry powder" facilities, are also included in the LCR and are therefore coming under the scrutiny of the central bank and securities regulators.

Following clarifications provided in January 2013 and amendments to the definition of HQLA and net cash outflows, the LCR will be introduced by the G20 central banks on January 1, 2015 with an initial minimum standard of 60%, rising 10% a year to reach 100% in 2019.[13]

In the US, the Federal Reserve Bank (FRB) proposed a significantly tougher LCR in October 2013 that will apply to US banking organizations and other **systemically important financial institutions (SIFIs)**[14] or to nonbank financial companies designated by the **Financial Stability Oversight Committee (FSOC)**. These organizations must have an adequate stock of HQLA that can be quickly liquidated to meet liquidity needs over a short period of time.

The FRB LCR applies to all banking operations with assets greater than $10 billion, and applies various criteria based on size of organization, the numerator for and quality of the HQLA, and the denominator of net cash outflows over different liquidity periods. The proposal is complex but essentially encourages banking institutions to hold a higher quality of collateral in more liquid tenors to provide stability in times of market stress, and discourages the lock-up of cash-based assets. The proposal also accelerates deadlines for full compliance to LCR standards by January 1, 2017, two years ahead of international banks under the supervision of other central bank regulators.

In summary, all three key principles of Basel III, capital requirements, the leverage ratio and liquidity requirements, are drastically impacting the ability of the banks to provide secured and unsecured financing to their clients and counterparties, and in each jurisdiction, central banks of the G20 are at different stages of finalizing and implementing the agreed Basel III standards. Securities financing transactions have therefore become a central focus of the global banks as they impact all three key principles of the regulation.

An overview of the key changes and impacts of the Basel III rules are provided in Chart 30.

11. Available at www.bis.org/publ/bcbs144.htm Basel III: A global regulatory framework for more resilient banks and banking systems
12. http://www.bis.org/publ/bcbs270.htm
13. http://www.bis.org/publ/bcbs238.htm
14. SIFI defined as a financial services firm with >$50 Billion in assets by Basel III

Chart 30: Key Changes & Impacts of the Basel III Rules

KEY CHANGES	IMPACT
• New Capital Adequacy Ratio ('CAR') incorporating Risk Weighted Assets ('RWA')	• Focus on quality of capital on bank balance sheets
• New Liquidity Coverage Ration ('LCR') and Net Stable Funding Ratio ('NSFR')	• Focus on extension of leverage
	• Focus on tenor and quality of funding - liquidity stress tests

Source: Citi Investor Services

" EMIR, AIFMD and FACTA are really 'blue collar' regulatory work from our perspective. Dodd-Frank and Basel III are big concerns to us. Financing is going to become significantly tougher"

– $10.0 Billion AUM Hedge Fund

" Within each of the pillars of balance sheet, we need to better understand what the usage is as well as the return on assets and the return on balance sheet. We also need to understand the measurements used, as US, European and Asian banks may each calculate differently. Once this has been settled, we can then better understand how to optimize our financing and trading activities"

– $10.0 Billion AUM Hedge Fund

New Role of Federal Reserve Board's Reverse Repo Program Exacerbates Concerns

In response to a growing requirement since the crisis for investors to invest cash, the Federal Reserve Bank of New York (FRBNY) has gradually introduced and expanded a reverse repo program that is breaking new ground in terms of central bank intervention in the financing markets.[15]

The daily requirement to invest cash, led by FX reserve managers, corporations, asset managers and hedge funds, has grown since 2008 to around $6 trillion, and this demand for secure overnight and term financing has placed additional pressure on the capital markets lending community on the asset side of their respective balance sheets.

This increase in cash has been the outcome of various economic stimulus programs and central bank efforts to increase the supply of money in the economy. These efforts included lowering interest rates on government bonds and "quantitative easing" (QE)—governments buying bonds to inject cash into the economy. The outcome of these actions has helped to revive global equity markets and provided a growth environment for global corporations, contributing in turn to the increase in cash reserves.

The initial reverse repo program was announced in 2009 and then implemented for the 22 primary securities dealers and money market funds (MMFs) in April 2010. In August 2013, the Fed further expanded the reverse repo program to 138 additional participants.[15] The Fed is providing this overnight and short-term funding at a floor of 0-25bps, which has had the effect of driving down spreads in the inter-dealer markets, as 116 of the participants are not primary dealers. The 22 primary dealers in the US had previously had exclusive access to the Fed reverse repo program for daily investment of excess cash.

The new market infrastructure resulting from this unprecedented move by the Fed is illustrated in Chart 31.

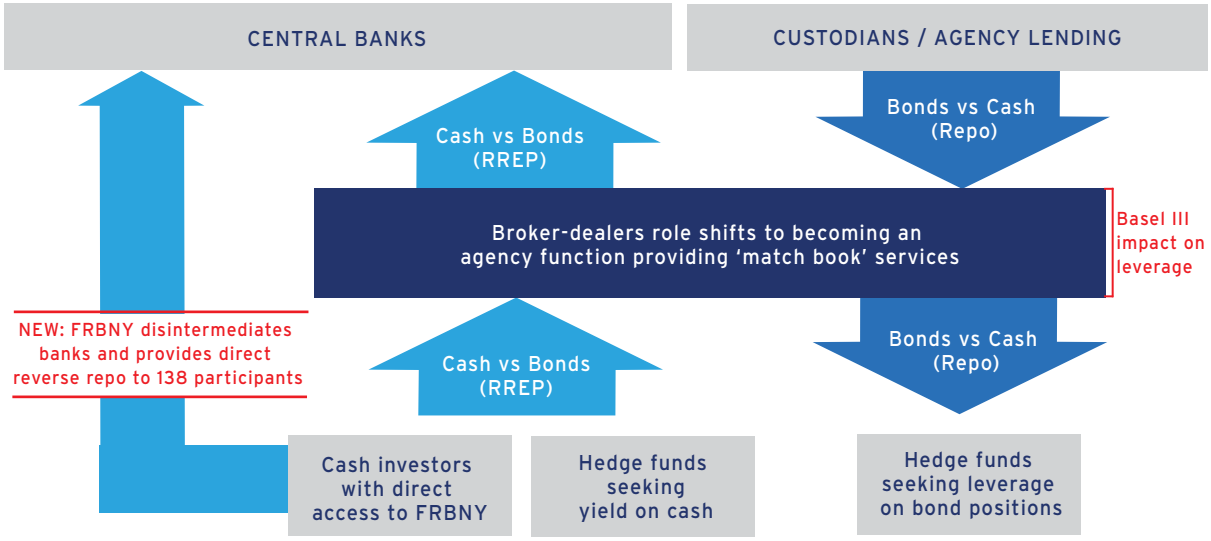
This dramatic expansion of the Fed's role in the US short-term funding market has increased the asset side of the Fed's balance sheet from $700 billion to around $4 trillion, and the cash is being controlled at record low rates of return by a zero-interest rate environment.

The owners of cash (corporations, pension funds) that were affected when money market funds "broke the buck" in 2009 are fearful of re-entering the money markets and prefer the safety of dealing directly with the Fed. Some projections made recently by the Fed

15. Note: In a direct reverse repo program, the government accepts cash in exchange for short-duration government securities, offering an overnight interest rate on the cash and providing security in terms of credit exposure.

16. http://www.newyorkfed.org/markets/expanded_counterparties.html

Chart 31: Shifting Landscape of Fixed Income Finance



Source: Citi Investor Services

show daily funding and investment requirements increasing from an average of $86 billion per day to ~$500 billion on a daily basis, with the $2.7 trillion in US Money Market funds looking for secure and steady return on cash.

Through this structural change in the US fixed-income financing markets, the FRBNY is now controlling the supply of cash to the system as well as tightly controlling interest rates and inflation in the economy. Chart 32 below shows the impact on fixed-income financing markets in the US since the expansion of the reverse repo program in August 2013.

In Europe reverse repo activities have remained between the dealers and their clients and there appears to be a growing interest in the benefits that this type of transaction can provide to stabilize short term funding and provide some incremental yield on cash.

> " The Fed facility has had a significant impact on our market so far and has successfully floored repo rates. Between January and March of this year, TSY GCF averaged right on top of the Fed facility with elevated participation. This is a clear example of the effects the facility has as a floor"
>
> *– Repo Finance Desk Head*

> " As Warren Buffet said, the Fed is the world's biggest hedge fund"
>
> *– Industry Consultant*

The US government's expanded role in directly influencing the fixed-income financing markets is in its early days, and the impact this may have on bank lending and financing spreads is yet to be fully understood, but it is clear already that the impact is going to be significant to the market.

Dealer Repo Financing Contracts Under Regulatory & New Competitive Pressures

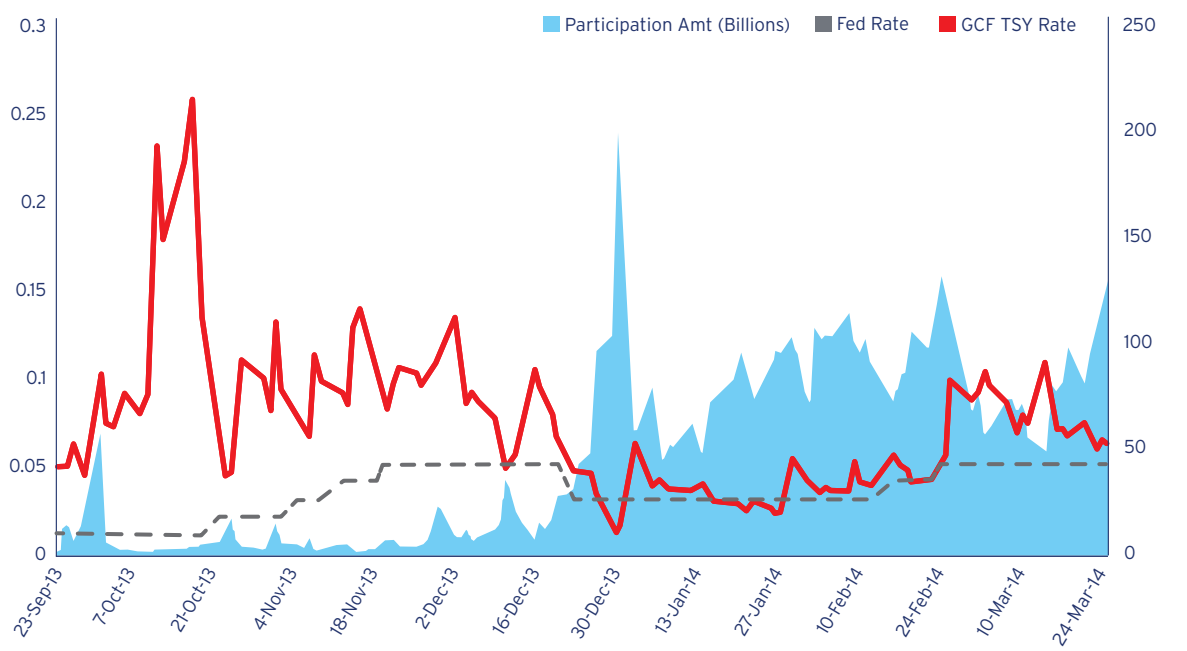
The number of US dealer-facilitated repo deals and amount of collateral being held at dealer organizations related to that financing have both contracted sharply in response to the balance sheet concerns tied to Basel III and to the entry of the Fed as a financing competitor.

Chart 33 shows that the number of deals taking place in the US repo market fell from 8,366 in January of 2013 to only 7,749 in March 2014, according to the FRBNY. This marks a decline of 7.4%. Collateral held against these positions has contracted even more sharply, dropping from $1.87 trillion to only $1.57 trillion—a decline of 15.7%.

The expansion has also impacted the tri-party market and we have seen volumes of tri-party shrink from ~$2.8 trillion in 2008 to ~$1.7 trillion in 2014 as a direct result of the FRBNY actions.

With the market contracting, ensuring their access to financing lines has become a major concern for hedge funds trading in fixed income relative value and some of the other credit-related strategies.

Chart 32: Impact of Federal Reserve Board Reverse Repo Program



Source: Federal Reserve

> " $20B+ hedge funds have former repo traders from banks, and smaller hedge funds are starting to form their own funding desks"
>
> *– Industry Consultant*

FIRV Hedge Funds Leverage Bank-Wide Relationships to Lock in Repo Financing Lines

Changes in the financing environment have already elicited a strong response from leading hedge funds that are active in the fixed-income domain—particularly those trading fixed-income, relative-value strategies.

Hedge funds' importance as a client base in equity financing arrangements is paramount as they are by far the largest users of these services from the sell side. In most broker-dealer organizations, there is a tight linkage between the firm's prime brokerage unit, its equity financing team and its equity division. This collaboration helps ensure that hedge funds are recognized as a key counterparty within the bank's relationship structure across all the various teams touching the equity world.

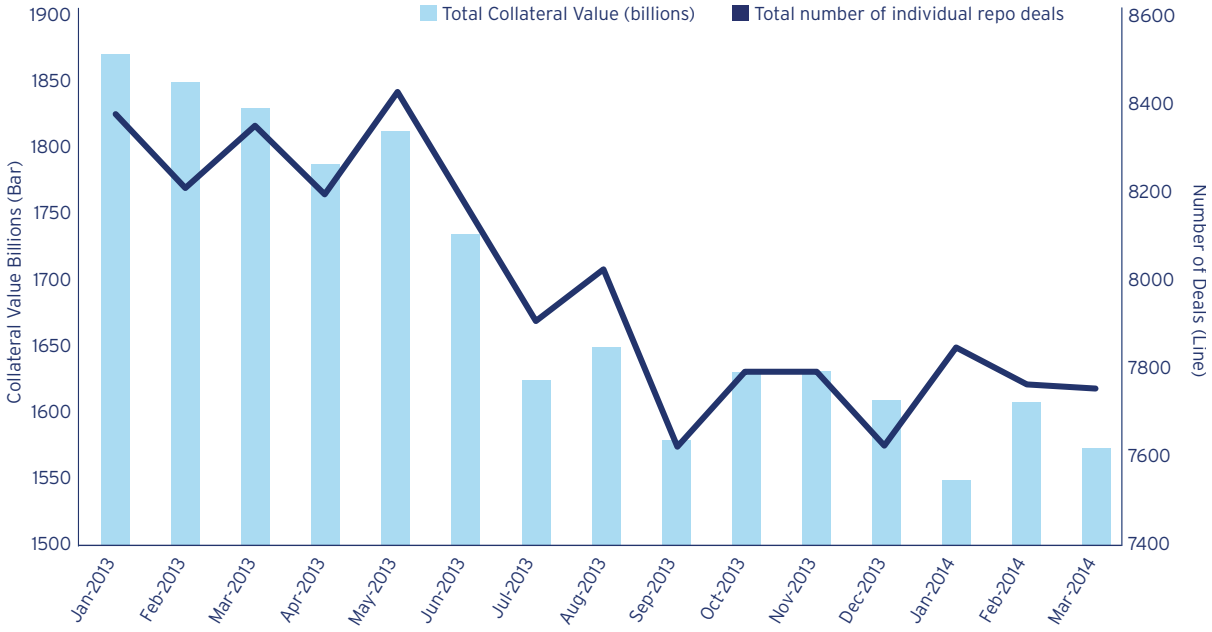
This contrasts sharply with the repo financing areas of the firm, where hedge funds are often among the smallest market participants when compared to the large corporations, public sector participants, insurance companies and financial firms that rely on repo financing in their everyday course of business. Moreover, many of these organizations are active across a broad array of fixed income and FX trading desks within the sell-side organization, whereas most FIRV-focused hedge funds are more limited in their trading scope, focusing primarily on the high-yield or investment-grade corporate desks.

> " With the Fed opening up the funding window to FX, money market Funds and buy-side participants directly in 2013, we have seen a dramatic reduction in tri-party repo volumes, reducing 18% last year compared to 2012"
>
> *– Industry Consultant*

> " Some banks are pulling back from providing leverage due to banking regulations. I think it will mostly affect the repo business by redefining what assets banks will accept and what are the haircuts"
>
> *– Outsourced CIO*

> " Repo generates low revenue but it's the grease that makes other things happen. If firms are making 7 bps on treasury repo but under new rules they will be charged 5 bps for balance sheet the trade won't be worth the rate of return"
>
> *– Industry Consultant*

Chart 33: Total Collateral Value of Repo Deals & Total Number of Individual Deals January 2013 to March 2014



Source: Citi Investor Services analysis based on data from Federal Reserve Bank of NY

To ensure their repo financing lines, many of the largest hedge fund participants in this year's survey note that they have been actively tracking their relationship value across all silos of the sell-side organization to make their case about their firm-wide importance. Hedge funds are expanding their definition of their overall "wallet" beyond the finance areas and are starting to incorporate their execution revenues and contribution as liquidity providers.

As will be discussed later in the report, hedge funds are now placing an increased focus on the production of scorecards that summarize their overall relationship and rank their counterparties on a relative basis. These scorecards are becoming critical relationship-management tools—another sign that the hedge fund industry is becoming more institutional and aligning more to the traditional asset manager world.

Leading hedge funds are using the results of this analysis to bring in senior leaders from sell-side organizations to create a holistic dialog about their importance to the firm. For many, a key goal of this exercise is to gain assurance that their access to repo financing will not be adversely affected in the shifting regulatory landscape. In this regard, they are relying on their value to other areas of the firm to carry through and provide them sway in their negotiations with the repo teams.

This focus on repo has been an early signal of the changing financing environment and the steps that hedge funds must take to leverage their relationship with their sell-side counterparts. As the impacts of new financing regulations take hold, the focus of hedge fund efforts is likely to swing more aggressively toward their core equity financing relationships.

> "Many banks are hitting their provisional leverage ratio allocations before they are hitting their RWA. This is a problem for the repo markets. These are high volume instruments that are not currently eligible for netting"
>
> *– Industry Trade Organization*

> "Basel III will directly impact fixed income relative value strategies because of the implication on bank's repo and treasury desks. The jury is still out on the full impact but I expect leverage to decrease and costs to increase"
>
> *– Industry Consultant*

Section 6: The Importance of Becoming an Efficient Financing Counterpart

Rather than focusing solely on the revenues generated by a client, prime brokers are likely to focus increasingly on that client's overall profitability to the firm as measured by their total return on assets (ROA).

Pricing in the emerging landscape will be tied to how efficient a counterparty the hedge fund is perceived to be. This will require a new focus on dialog and coordination between hedge funds and their financing counterparts, and more deliberate placement of debits and shorts across the manager's set of prime brokers.

Prime Brokerage Funding Costs Set to Increase Under Basel III Treatment

The treatment of securities-lending transactions under Basel III is leading prime brokers to reconsider core aspects of their business. Specifically, prime brokers are being forced to reassess their pricing and the terms they offer to clients in light of the risk weightings assigned to securities lending trades, the measurement of such transactions in the Liquidity Coverage Ratio (LCR) and their impact in the bank's Net Stable Funding Ratio (NSFR).

Earlier in this paper, we noted that original proposals published in January 2013 by the BCBS sought to measure the impact of securities-financing transactions as they affect exposure in the Liquidity Coverage Ratio (LCR) on a gross basis without any allowance for netting of transactions. This prompted alarm from industry organizations, such as the International Securities Lending Association (ISLA), that expressed strong views that this would dis-incentivize banks from taking part in these trades.

In a combined industry response in September 2013,[17] the BCBS was asked to consider allowing the exposure measure to factor in certain types of netting and hence provide relief in the LCR calculation. One of the foundations of the industry position is that these are transactions secured by liquid collateral, mainly cash, and conducted under master agreements that include well-tested netting provisions.

In January 2014, the BCBS came out with a set of revised rules that went some way toward diminishing the negative balance sheet treatment of securities-financing transactions. Limited netting of cash payables and receivables in securities-financing transactions will be permitted if the trade has the same final settlement date, the counterparties intend to settle simultaneously and the right to offset is available. However, collateral held against these positions will still be included in the calculation.

While this settles some questions on how securities-financing transactions will be handled, there are other cash outflow aspects of the prime brokerage business that remain affected. The revised LCR calculations still assume that (1) clients will remove 100% of their free credit balances in a stressed market situation; (2) they will draw the full value of all term facilities or dry powder; and (3) they will not renew any short-term (<30-day) collateralized funding. Moreover, LCR places focus on the internalization that a prime broker can recognize, in which it uses the unencumbered assets of one client to cover the shorts of another customer.

The LCR calculation also looks at cash inflows. The calculation assumes that only 50% of overnight or <30-day term customer debits would be collected in a stress scenario.

Finally, the rules require the prime broker to adhere to a 30 days or greater weighted maturity benchmark for its assets. This pushes the prime broker into securing its funding in a less liquid portion of the market, where there are fewer providers than in the short-term funding markets and where costs will be higher.

LCR calculation rules also encourage banks to try and match fund any term commitments that are greater than 30 days, including unfunded commitments. In this context, term facilities or dry power, even if undrawn, will have to be fully funded. (Note: this same line of reasoning is being applied to the indemnification coverage offered to beneficial owners for portfolios they turn over to agent lenders and could shrink the supply and/or drive up the costs of prime brokers' accessing supply from the agent lenders.)

Additional costs will be driven into the prime broker's organization because of changes related to the Net Stable Funding Ratio (NSFR). This measure looks at

17. http://www.isla.co.uk/images/PDF/RegulaoryIssues/BCBS_leverage_ratio_consultation_response.pdf

the minimum amount of stable funding that would be required to run the business over a one-year time horizon.

The NSFR looks first at the **available** amount of stable funding. This is done by categorizing the full set of assets that make up the bank's Tier 1 and Tier 2 capital, and then assigning an available stable funding (ASF) ratio to each category of assets based on their outstanding maturities. Any funded or unsecured maturity with greater than a one-year time horizon would be assessed at 100% of its value for the calculation and the full notional value of that contract could be included.

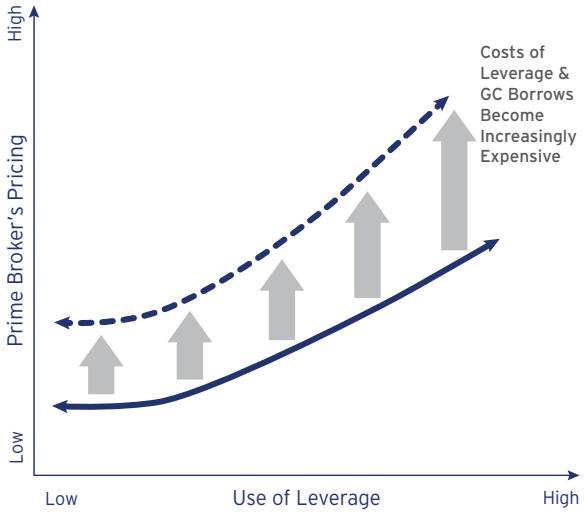
NSFR then looks at the **required** amount of stable funding. This measure sums the value of assets and off-balance sheet items that require funding and multiply that figure by a required stable funding (RSF) factor. This factor favors unencumbered assets with less than a one-year maturity (0% RSF) but takes items like an equity being held in inventory and assigns it some cost (50%).

One of the most challenging aspects of the NSFR calculation is that banks are required to hold long-term debt or equity capital against hard-to-finance assets. This is going to drive up the costs for the banks to cover these types of assets and in turn hedge fund strategies that rely on trading in instruments that do not meet the HQLA definition are going to be more adversely affected.

All of these factors are likely to increase prime broker funding costs and force them to pass some of the impact of those costs onto their clients. Most of the focus thus far has been on the LCR calculation, particularly since the Federal Reserve has released an accelerated implementation schedule for this measure for US banks that requires 80% compliance by 2015 and full compliance by 2017. For now, the deadline for NSFR is further out at January 2018.

> " The industry will be forced to get much smarter. The cost that will be passed along due to Basel III changes will be pretty onerous on many hedge fund strategies and the prime brokers, to service them, will have to be much more creative. I do not know what we will see, but the prime broker model will not be as plain vanilla as it is today"
>
> *– $10.0 Billion AUM Hedge Fund*

Chart 34: Impact of Basel III on Prime Broker Pricing



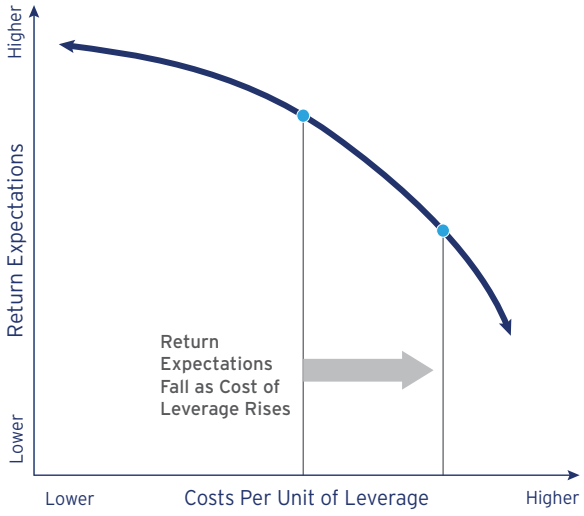
Source: Citi Investor Services

Economics of Obtaining Leverage Shift to Favor More Efficient Borrowers

The impact of increased funding costs will begin to force prime brokers in turn to raise the pricing on hedge funds looking to obtain leverage. This is illustrated in Chart 34. Not only is the overall level of pricing expected to go up, the slope of the increase for those firms that require higher amounts of leverage are likely to go up more steeply.

This increase in the costs of obtaining leverage or even of ensuring adequate short borrowing in the new environment is going to have an important impact on clients. As the cost per unit of leverage increases,

Chart 35: Investment Returns Per Unit of Leverage



Source: Citi Investor Services

the return hurdle that the hedge fund must achieve rises as well. This forces hedge funds to consider the incremental cost of leverage. There was much discussion in this year's survey from hedge fund managers on what constituted the "right" amount of leverage. This move to be more judicious in their use of leverage is likely to accelerate as the realities of the coming industry re-pricing ripple through the system.

Chart 35 shows that there is an inverse relationship between the cost per unit of leverage and the portfolio's expected return. As the cost of leverage goes up, the return hurdle that the manager must clear to ensure its NAV also goes up and the expected returns therefore go down. These relationships help explain why simply "passing increased costs on" to the investor is likely to prove a poor option in dealing within the new financing landscape.

By making its portfolio more efficient, however, the hedge fund will be able to improve its return on equity with its prime brokerage counterpart. More deliberate placement of debits and shorts could enhance the prime broker's ability to internalize its funding and in turn this would raise the value of the hedge fund and result in a higher return on assets measure. This is illustrated in Chart 36.

Return on assets (ROA) is a profitability measure derived from dividing a client's debits and net short position by its use of the firm's balance sheet. The greater the share of offset noted across the client's debits and shorts (i.e., debits funded by internal shorts or shorts covered by internal longs), the lower the impact on the firm's balance sheet. By reducing the balance sheet impact, the client drives down the denominator on the ROA calculation and increases the overall score.

While the new post-Basel III realities are likely to increase pricing across the entire prime brokerage industry, the extent of that increase to some degree will be within the hedge fund's control. One of the central tenets we are likely to see emerge in the coming funding landscape is that those clients that are able to be a more efficient counterparty, by reducing their balance sheet impact and driving up their ROA, are likely to see less of a price increase than hedge funds that are less efficient, take up higher balance sheets and thus register lower ROAs. This is illustrated in Chart 36.

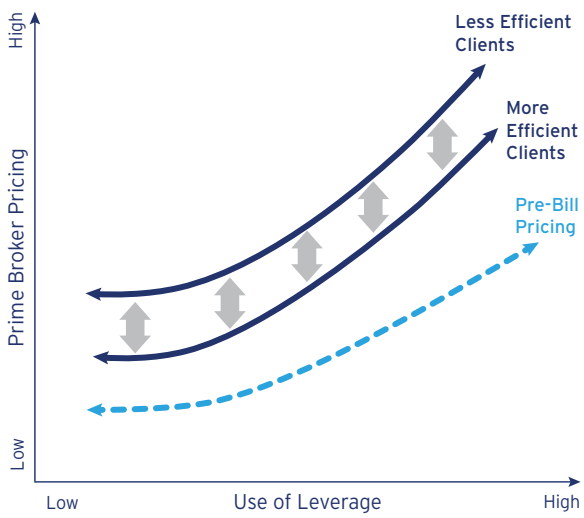
"Clients have to be ready to pay for balance sheet"

– Industry Consultant

"Hedge fund managers need to understand the implications of new regulations on trades and cost. They can't do things the way they did before"

– Asset Manager

Chart 36: Prime Broker Pricing in the Emerging Environment



Source: Citi Investor Services

"Financing has the biggest share of our wallet at about 60%. About 1.5% cost to the funds each year is financing"

– $5.0-$10.0 Billion AUM Hedge Fund

Measuring Portfolio Efficiency, Balance Sheet Utilization & Return on Assets

It is easy to throw around concepts, such as being more "efficient," but there is often a lack of clarity as to what specifically a prime broker means when asking this of its clients. To help illustrate the activities, we have put together a sample portfolio that we will analyze and apply changes to so as to illustrate the concept of making the portfolio more efficient. Let's start with a base level understanding of how prime brokers look at a hedge fund portfolio.

In the current environment, most hedge funds allocate their portfolios to their prime brokerage counterparts based on each prime broker's share of wallet. In our base example, we apply that same approach and split out a 1,400 debits by 1,000 short position portfolio across four prime brokers based on their wallet share. As shown in Chart 37, prime broker #1 is the lead prime on this account and receives 60% of the client's allocations. Prime broker #2 has

Chart 37: Portfolio Allocation Based on Share of Wallet: 1,400 Debits by 1,000 Shorts

	PB#1	PB#2	PB#3	PB#4
Share of Wallet	60%	20%	10%	10%
Net Debits/ Shorts	**+240**	**+80**	**+40**	**+40**

Source: Citi Investor Services

the second largest share of wallet at 20%, and prime brokers #3 and #4 have a 10% market share each.

Under this approach, prime broker #1 ends up receiving 840 debits and 600 shorts for a net +240 debit holding. This is in contrast to prime broker #2 that receives 280 debits and 200 shorts for a net +80 debit position and prime brokers #3 and #4 that receive 140 debits and 100 shorts for a +40 debit position. Given these figures, it seems clear that, from the hedge fund's view, it has given prime broker #1 the best portfolio with the largest number of overall positions and the largest net debit.

To show the full range of changes possible with this portfolio, we will assume that the allocations were done by rote with no consideration of the actual debit or short positions being sent to each prime broker. Every set of trades executed throughout the day was simply given up in line with the prime broker's percentage target.

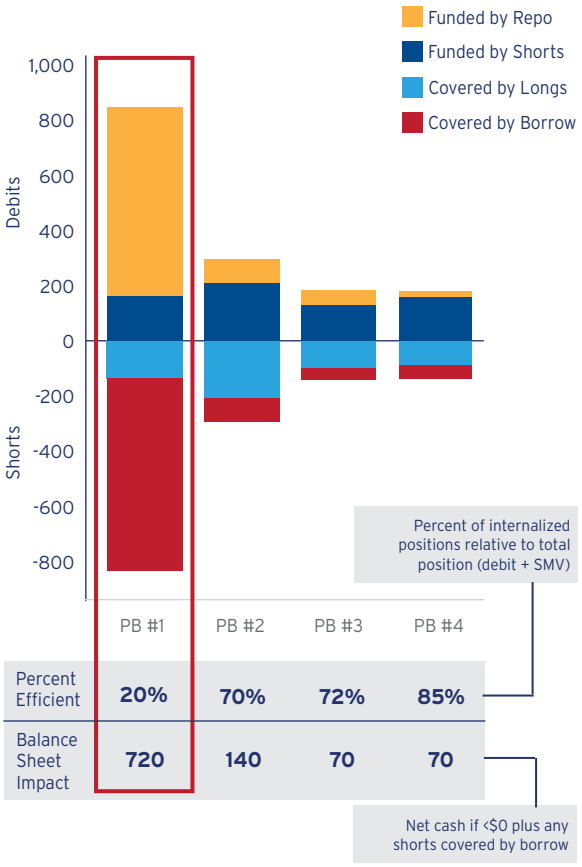
While this portfolio looks highly beneficial to prime broker #1 based on Chart 37, that same portfolio may look very different when viewed from the prime brokers' perspective. This is illustrated in Chart 38.

When receiving debits, the prime broker must determine whether those debits are funded by existing shorts in its book (dark blue bar) or whether those debits require funding by equity repo (orange bar). Similarly, when receiving shorts, the prime broker must determine whether those shorts are covered by longs (light blue bar) or whether the prime broker must look to cover those shorts via borrow (red bar).

The two blue bars—representing the portion of the book funded by shorts or covered by longs—are the portion of the portfolio that is considered **"efficient."** The percentage that those positions represent of the total position is the **"efficient percentage."**

Using prime broker #1 as an example, we see in Chart 38 that of the 840 debits provided by the client, there were 168 debits that were funded by existing shorts in the prime broker's book and 672 debits that required funding by equity repo. Of the 600 shorts provided, there were 120 that were covered by longs and 480

Chart 38: Total Portfolio Allocation Based on Share of Wallet 1,400 Debit by 1,000 Shorts



Source: Citi Investor Services

that required coverage by borrow. Thus, there were 288 "efficient" positions (168 debits and 120 shorts) out of a total of 1,440 positions (840 debits by 600 shorts) for an "efficient percentage" of 20%.

In contrast, we see that of the 140 debits provided to prime broker #4, there were 135 funded by shorts and only five that required repo, and of the 100 shorts, 70 were covered by longs and only 30 required coverage by borrow. Thus, prime broker #4 received 205 efficient positions (135 debits by 70 shorts) out of a total of 240 positions (140 debits by 100 shorts) for an efficient percentage of 85%.

Ironically, this is often the case. If a hedge fund does not make a deliberate effort to direct its debits and shorts, the prime brokers receiving a smaller portion of the hedge fund's portfolio are more likely to be efficient than the prime broker the hedge fund is looking to most favor. This reflects the likelihood that smaller portfolios are more easily offset by existing debits and shorts.

The reason that prime brokers want their book to be as efficient as possible is so they can reduce the amount of balance sheet they need to access to accommodate the hedge fund's positions.

To make balance sheet calculations simple, we determined that every position in the portfolio (debits and shorts) was worth $1.00. To calculate balance sheet utilization, we consider the net position (net debits plus net shorts) and add in the shorts covered by borrow.

For prime broker #1, this equation looks as follows: 840 debits (+$840) plus 600 shorts (-$600) equal to 240 debits (+$240) minus 480 shorts requiring coverage (-$480) to equal $720 of balance sheet utilization. This contrasts to prime broker #4, where there were 140 debits (+140) plus 100 shorts (-$100) equal to 40 debits (+40) minus 30 shorts requiring coverage (-$30) to equal $70 of balance sheet utilization.

Thus, despite the hedge fund allocating 60% of its wallet to prime broker #1, only 20% of the portfolio it assigned to the firm was efficient and the total set of positions required $720 of balance sheet. If the prime broker were charging 50 basis points on both debit and short positions, the return on assets (ROA) for this portfolio would only have been 100 basis points (total debits multiplied by 50 basis points plus total shorts multiplied by 50 basis points divided by balance sheet utilization). By contrast, the ROA for prime broker #4 was 171 basis points.

> " We feel that at this stage, most banks can only give indicative levels of how much balance sheet we are using"
>
> *– $10.0 Billion AUM Hedge Fund*

More Effectively Allocating Positions Across Prime Brokers

More deliberate placement of the debits and shorts by the hedge fund could have a significant impact on the portfolio and on the efficiency, balance sheet impact and ROA for prime broker #1.

There are two ways in which the hedge fund could have pursued this course. First, the hedge fund could have held back on allocating its positions to any of the prime brokers and instead examined the total portfolio to identify natural offsets. In many organizations, particularly ones that have multiple portfolio managers trading similar instruments, there are often some portfolio managers that may be long a certain security in one portfolio and other portfolio managers that may be short that same security in another portfolio. By identifying the offsetting longs

and shorts and directing both parts of the portfolio to the same prime broker, the hedge fund automatically increases its efficiency, lowers its balance sheet utilization and increases its ROA.

If we go back to our example in Chart 37 and look at the total set of positions, we find that there were 280 debits out of the 1,400 positions that were matched by 280 shorts out of the total 1,000 positions. The hedge fund could best reward prime broker #1 by allocating all of those positions to the prime broker. To stay within its 60% wallet allocation goal, the hedge fund then would need to direct another 560 debits (to equal 840) and another 320 shorts (to equal 600) to the prime broker.

Since there were no longer any natural offsets left in its set of positions, the hedge fund would need to contact prime broker #1 and understand how that prime broker is currently funding via rep and borrow. Armed with that information, the hedge fund could once again examine its portfolio to see if it had any of those positions that could be directed to prime broker #1.

In our example, we identified 200 debits that could be directed to prime broker #1 to offset short positions where it was seeking borrow, and we identified 80 shorts that could be directed to prime broker #1 to offset debits it was looking to fund via equity repo.

If all those positions were also directed to prime broker #1, the hedge fund would now have 480 debits that are funded by shorts with prime broker #1–280 that were an exact match to shorts the hedge fund itself sent over and an additional 200 that allowed the prime broker to avoid having to fund via repo. It has also placed 360 shorts with that same prime broker–280 shorts that were an exact match to debits the hedge fund sent over and an additional 80 shorts that allowed the prime broker to avoid seeking cover via borrow.

To reach its 60% wallet allocation goal, the hedge fund now only had to allocate an additional 360 debits (to equal 840) and another 240 shorts (to equal 600). Since there were no more offsets or efficiencies the hedge fund could manufacture, those positions were allocated from the remaining pool of trades.

The impact of these changes is illustrated in Chart 39.

Based on this more deliberate allocation of positions, there are now 840 positions that are efficient (480 debits and 360 shorts) out of a total 1,440 positions (840 debits by 600 shorts). This increases prime broker #1's portfolio to being 58% efficient versus only 20% efficient in the first rote allocation of positions.

Moreover, the balance sheet usage of these positions declined by 33%. The prime broker has the same position of +240 debits at $1.00 each for $240 (840 debits less 600 shorts) but the number of inefficient shorts that require coverage by borrow has fallen from 480 in the original allocation to only 240 in the more efficient allocation. Thus, the balance sheet usage has fallen from $720 (+240 debits minus 480 shorts at $1.00 per position) to only $480 (+240 debits minus 240 shorts at $1.00 per position).

Finally, the ROA on the portfolio has increased from 100 basis points to 150 basis points. Remember, this calculation reflects the total number of debits at 50 basis points each plus the total number of shorts at 50 basis points each divided by the balance sheet utilization.

> "Our conversations with primes are starting to get more granular around ROA / return on balance sheet. We're hearing that the good big funds are reaching out to their prime counterparties to better understand how they are using balance sheet: 'Walk us through this—how are we as a client in terms of utilization?' There may be some cases where clients can pull some levers and adjust the types of business they are conducting with banks that enhances their balance sheet utilization"
>
> *– Asset Manager*

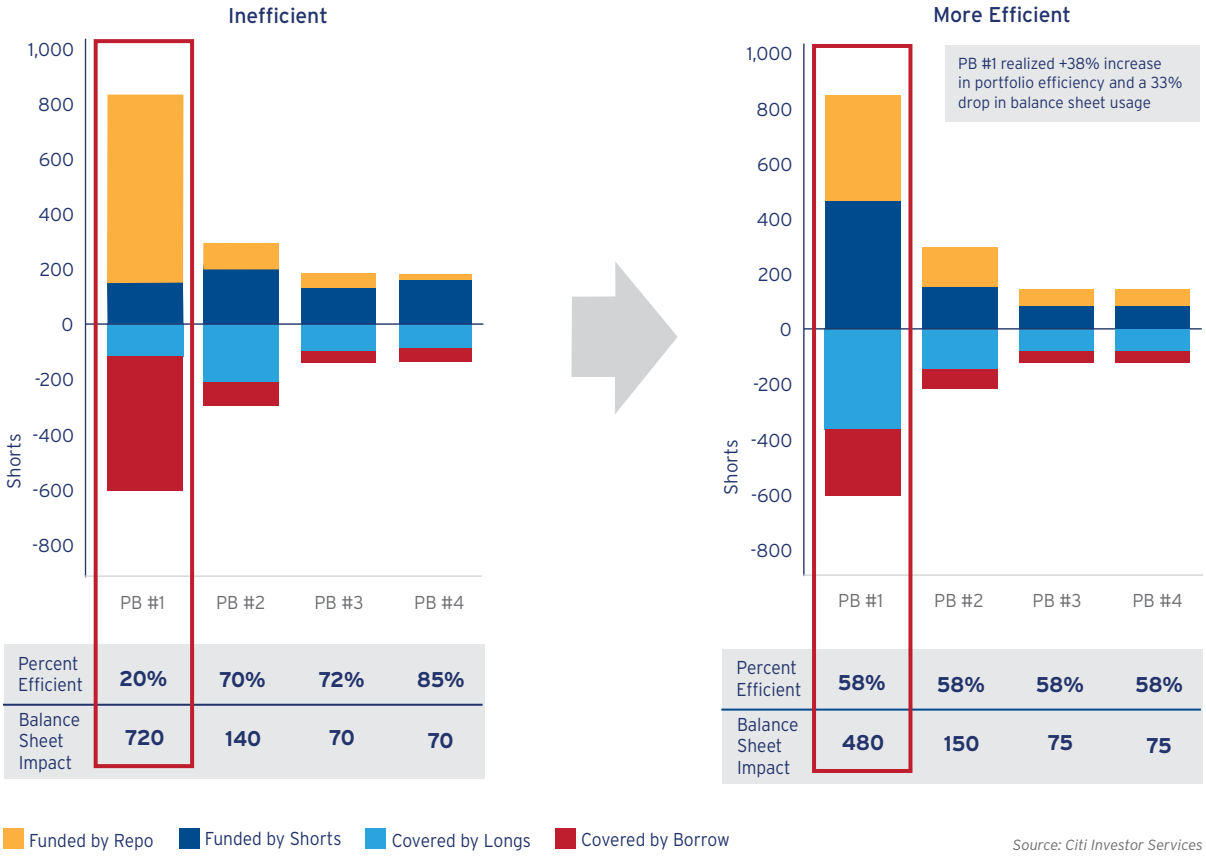
The Likely Concentration of Prime Broker Relationships

In walking through the efficiency example above, one point that should be clear is that the hedge fund needed to make decisions about allocating its portfolio that would favor prime broker #1 and then consider the remainder of its portfolio and other prime brokers in a secondary manner.

While there was no change in the overall size of the debit and short positions placed with prime brokers #2, #3 and #4, there was a reduction in the portion of their portfolio that was efficient and a slight, but still noticeable, uptick in their balance sheet usage.

The result of this analysis was that the ROA on these portfolios fell from 171 basis points to only 160 basis points. This was still higher than the ROA for prime broker #1, but the gap between the hedge fund's main prime and its other counterparts was less extreme.

Chart 39: Portfolio Breakdown from Prime Broker's Viewpoint
1,400 Debit by 1,000 Short



Source: Citi Investor Services

Creating portfolio efficiency with a prime broker is thus likely to become another aspect of the relationship used to reward leading primes. This will not be as exclusive an allotment as wallet share. Each prime broker will have a different position in its overall portfolio that it is looking to offset and thus the hedge fund could conceivably create efficiencies across several counterparts.

However, the hedge fund still has to choose where to direct offsetting debits and shorts, and which firms to contact in what order to understand its outstanding funding needs. This ordering of where to direct its resources is one that is likely to be allocated based on both the strength of the hedge fund's overall relationship and on the ability of the prime broker to engage in this dialog.

" We track not only our balances but the composition of our portfolios that we are giving our prime brokers. And while our banks are saying all the right things in terms of helping us understand what they need to think about in terms of balance sheet usage and the profitability of our portfolio, it's still really just talk at this stage. We are prepared to have much more detailed conversations around how we can affect how profitable of a prime brokerage client we can be"

– $10.0 Billion AUM Hedge Fund

" In this challenging environment, there needs to be a two-way dialogue between the hedge fund and the prime broker. We seek to work closely with our prime brokers to maximize the relationship for both. We had one prime that was very transparent about the pricing model, ROA targets and the necessary composition of the portfolio. We strive to build the right portfolio mix for us and for the prime broker. Our portfolio mix is decided centrally. We think about what we need to do to help our prime brokers achieve their ROA target"

– $5.0 - $10.0 Billion AUM Hedge Fund

> " We used to approach our service provider framework to try and spread out our counterparty relationships as broadly as possible, but today we are much more focused on optimizing across a select group of key counterparties"
>
> *– $10.0 Billion AUM Hedge Fund*

Several hedge funds interviewed for this year's survey noted that they were ready, willing and able to be more efficient but had not been approached by their prime broker to have this discussion. They were therefore choosing to hold off on being more deliberate in creating efficiencies to have an ability to reward those prime brokers that came forward first.

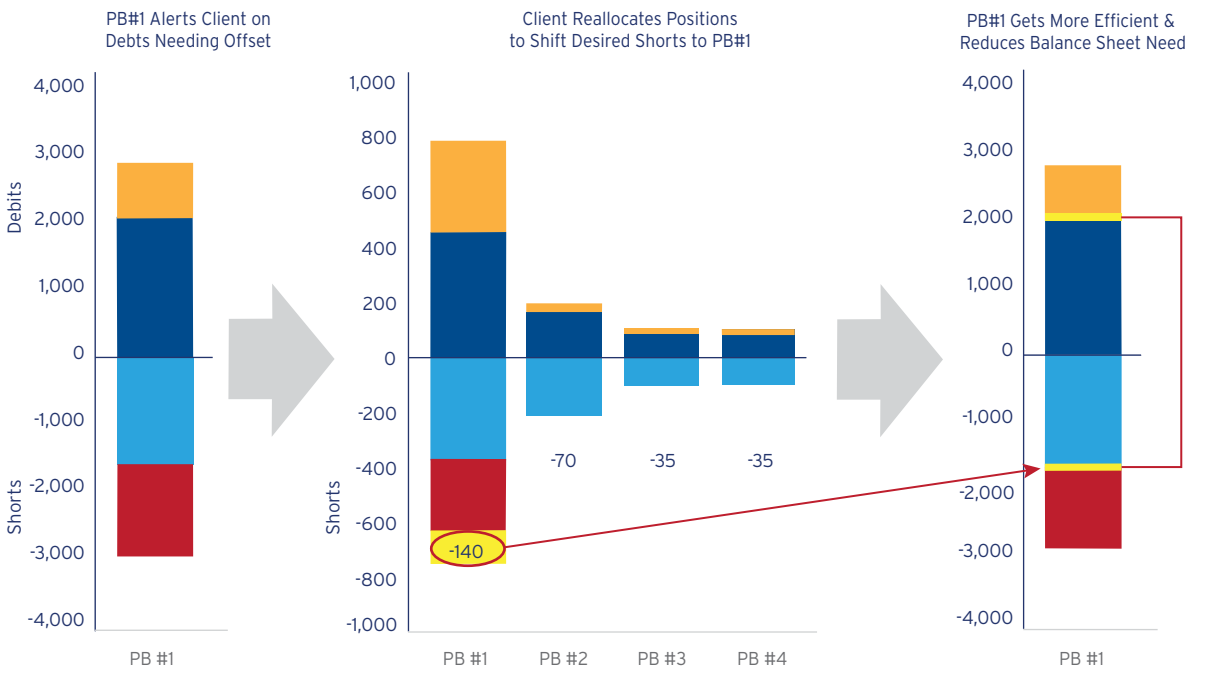
Extending the Relationship to Create Additional Efficiencies

Beyond the more efficient allocation of positions, there are additional opportunities for a hedge fund to work with a favored prime broker to extend the relationship further, if so desired. It could coordinate with its set of prime brokers each day, even if there are no new positions to allocate. If the hedge fund sees an opportunity to provide additional efficiencies, it may choose to reallocate positions and move away from its strict wallet-based allocation methodology.

An example of this type of engagement is provided in Chart 40.

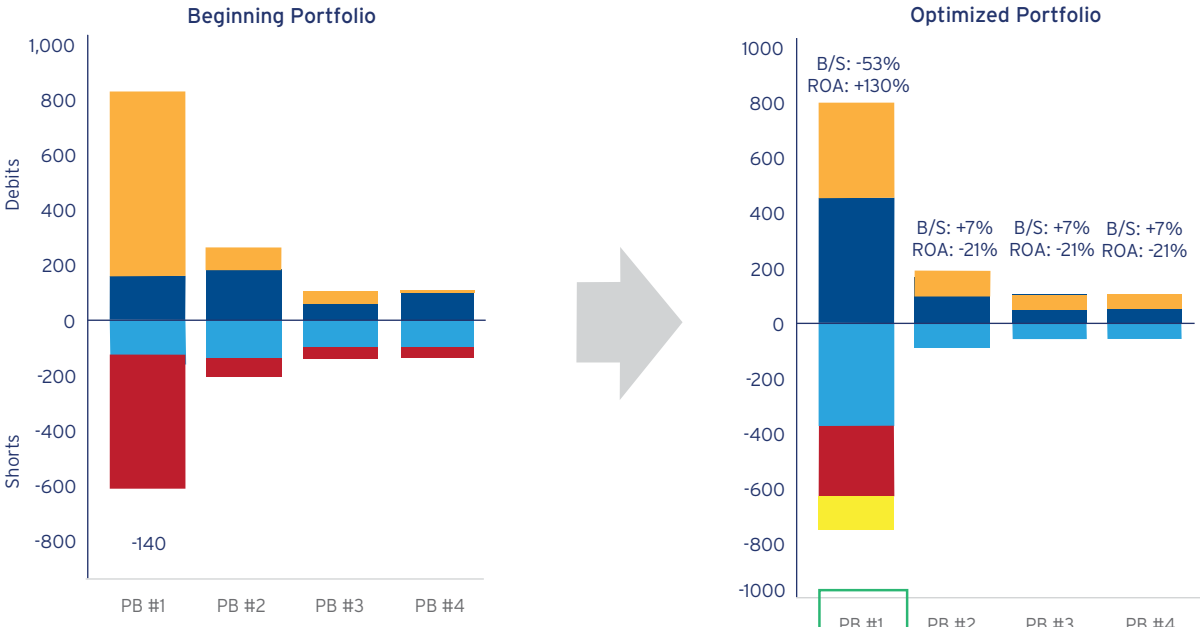
In this example, prime broker #1 has 2,800 debits, of which 2,000 are funded by shorts and 800 require funding by equity repo. The prime broker also has 3,000 short positions, of which 1,500 are covered by longs and 1,500 require coverage by borrow. As a result, the prime broker has an efficient position of

Chart 40: Example of Hedge Fund Reallocating Positions to a Favored Prime Broker
1,400 Debits by 1,000 Shorts Portfolio



Source: Citi Investor Services

Chart 41: Impact of Hedge Fund Client Optimizations
1,400 Debits by 1,000 Shorts Portfolio



	PB #1	PB #2	PB #3	PB #4
Percent Efficient	20%	70%	72%	85%
Balance Sheet Impact	720	140	70	70
Return on Assets*	100 bps	170 bps	170 bps	170 bps

	PB #1	PB #2	PB #3	PB #4
Percent Efficient	62%	68%	68%	68%
Balance Sheet Impact	340	150	75	75
Return on Assets*	230 bps	140 bps	140 bps	140 bps

** Return on Assets figured indicticative based on sample 50 basis point pricing for both debits and shorts*

Funded by Repo | Funded by Shorts | Covered by Longs | Covered by Borrow

Source: Citi Investor Service

3,500 (2,000 debits and 1,500 shorts) out of a total position of 5,800 (2,800 debits by 3,000 shorts). This equates to an efficiency percentage of 60%.

In our example, prime broker #1 alerts the hedge fund that it has debits requiring offset. The hedge fund looks across its set of positions and realizes that it has 70 positions at prime broker #2 that would meet prime broker #1's need and an additional 35 positions each at prime brokers #3 and #4. The hedge fund opts to transfer those positions away from prime brokers #2, #3 and #4 and instead direct those positions to prime broker #1.

The hedge fund's debit position with prime broker #1 is unchanged at 840 debits, but the short position has increased from 600 shorts to 740 shorts as a result of these transfers. Debit positions that are funded by shorts in the hedge fund's account are unchanged and shorts that are covered by long positions have gone up from -360 to -500 based on the transfer of the additional 140 shorts. Thus, the efficient position has increased to 980 positions (480 debits by 500 shorts) and the total position has gone up from 1,440 (840 debits by 600 shorts) to 1,580 (840 debits by 740 shorts). As a result, the hedge fund's efficiency percentage is up to 62%.

> " Given the fact that balance sheets will be constrained, banks will really need to focus on the largest asset managers. It's going to be increasingly important to be a big payer to the street to have good access"
>
> *– $10.0 Billion AUM Hedge Fund*

The balance sheet usage has gone down as well. Now there is a net total of $1.00 debits in the account (840 debits at $1.00 each minus 740 shorts at $1.00 each) and there are still 240 inefficient shorts that require borrow at $1.00 each (-$240). When these shorts are subtracted from the net debit, the balance sheet

utilization figure is only $340 ($100 +$240) versus $480 in the earlier example. The ROA on the account has also gone up to 230 basis points from 150 basis points in the earlier example. Thus, the move by the hedge fund has been beneficial to its metrics with the prime broker.

The increase in the hedge fund's allocation of short positions to prime broker #1 has also been beneficial for prime broker #1. Prime broker #1's debits covered by short position have gone up by +140 positions from +2,000 to +2,140 and the amount of debits to be covered via repo has diminished from +800 to +660. Meanwhile, the prime broker's share of shorts covered by longs has also gone up by 140 positions, from -1,500 to -1,640 positions, and its inefficient shorts have gone down from -1,500 to -1,360 positions. Its efficient position is thus now 3,780 positions (+2,140 debits and -1,640 shorts) and the total position has gone up from 5,800 positions (2,800 debits by 3,000 shorts) to 5,940 positions (2,800 debits by 3,140 shorts. This equates to an efficiency percentage of 64%, up from 60% previously.

Chart 41 shows the final disposition of the portfolio with the more deliberate allocation of longs and shorts discussed in these three examples. To recap, there were three techniques used to create efficiencies: (1) the trade date placement of 280 offsetting long and short positions with prime broker #1; (2) the trade date allocation of an additional 200 offsetting debits and 80 offsetting shorts; and (3) the post-trade date re-allocation of 140 shorts to prime broker #1.

As shown, the result of these three actions has worked to increase the hedge fund's efficiency from 20% to 62%, decrease the hedge fund's utilization of balance sheet from $720 to only $340 (a decline of 53%) and increase the hedge fund's ROA with prime broker #1 by 130%, from 100 basis points to 230 basis points. This was all accomplished with only a modest decrease in the efficiency, increase in balance sheet usage and decrease in ROA for the hedge fund's other three prime brokers.

Section 7: Transforming the Hedge Fund Organization to Capture Optimization Opportunities

Realizing the collateral and financing optimization opportunities discussed in the preceding sections will require hedge funds and other investment managers involved in the alternative space to rethink their organizational construct to create a holistic view of their supply and positions.

This increased focus on "liquidity management" is likely to evolve over time from providing a utility-like function to maximize the use of collateral and efficiencies in financing to an independent P&L that treats collateral as a new asset class to fully capture the potential investment benefits.

Foundational changes in a firm's infrastructure will be required to build better insights. Capturing the right data is a starting point that allows the manager to formulate metrics and scorecards to use as insights to broaden key relationships. Over time, analytics can be added to these platforms to enable the automated selection, direction and substitution of collateral and financing efficiencies.

The Growing Importance of Liquidity Management

In most hedge fund organizations, there are multiple teams involved in the management of the firm's asset and collateral pools.

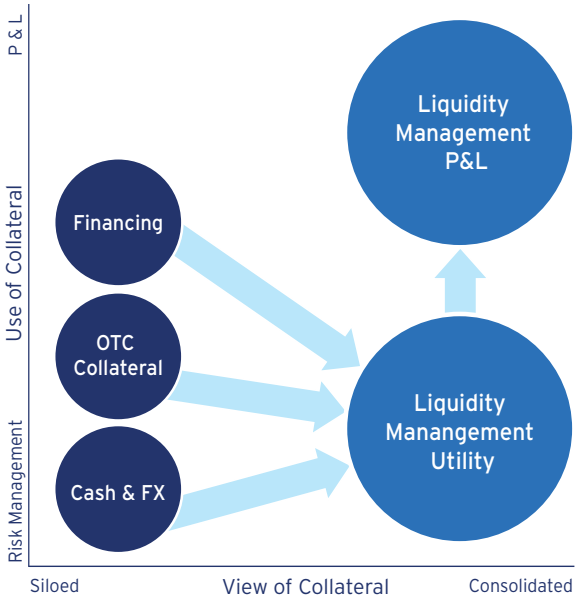
A securities financing team typically oversees the margin financing done by the portfolio manager—focusing on the cash and collateral management related to these positions as part of its daily operational responsibilities and ensuring the firm adheres to short coverage rules. Some firms that are also registered as a broker-dealer additionally employ an individual or team that seeks opportunities to generate additional P&L for the firm by looking to lend its fully paid-for positions. Sometimes these individuals sit with the portfolio managers and in other instances they are a part of the operational team.

Individuals that oversee the firm's repo financing can be a part of this securities financing team or often can sit within the hedge fund's treasury organization. Since the GFC, it has become increasingly common for a hedge fund to draw its full term facility and hold high cash reserves. This gives them the "dry powder" they desire to take advantage of market opportunities when they arise and provide a sense of comfort that the cash is in their control in case of a dealer bankruptcy. The repo financing team will administer this pool of cash, often doing reverse repo to turn that cash into other government securities for high quality liquid assets (HQLA).

A separate group of individuals usually handles the operational activities related to OTC and listed derivatives. These teams monitor the ISDA terms and oversee the initial and variation margin exchanges, resets, rolls, netting and other responsibilities across the firm's set of swap dealers, FCMs and prime brokers. The pool of collateral being used to support OTC and exchange-traded derivatives is typically kept separate from the pool of collateral generated by the firm's equity and bond margin activity.

Finally, there is usually a team or individual responsible for the hedge fund's cash management. This relates not to the active investment of capital to realize opportunities in FX markets, but rather the operational exchanges of cash used to administer settlement, corporate actions or margin in local currencies in areas outside the firm's home market. These firms also work to negate any unintended

Chart 42: Organizational Change



Source: Citi Investor Services

currency exposures related to position holdings and to sweep the firm's excess cash away from its prime brokers at the end of each trading session.

These three teams are represented by the bubbles along the left hand axis of Chart 42.

As noted, some of these functions are clearly designed to help manage the risk of the hedge fund organization and others have an aspect of being able to use the collateral to generate additional P&L. In most organizations, the individuals performing the tasks in these areas are operating within a silo and only looking at their slice of the assets and collateral.

Market leaders have taken a different approach. These organizations have combined all the teams touching the firm's assets and collateral into a single liquidity management unit. This unit has a consolidated view of holdings and is able to look holistically across its entire set of assets to determine the best designation and use of supply. This team is usually an independent unit or a part of the broader treasury organization.

In many of the firms interviewed for this year's report, the liquidity management unit is set up as a utility that portfolio managers rely on to handle their post-trade activities. The powers of that utility vary. Some organizations empower this team to be an active manager of assets, to assess the capital use of individual portfolio managers and assign them their proportionate costs of capital. Other organizations view this solely as an operational team to be more efficient in the placement and use of assets.

What we also see in a handful of cases is the migration of that liquidity management team to focus not only on the efficiency aspects of the collateral and financing assets, but also on the ability to better leverage these assets to enhance the firm's P&L. This includes the use of fully paid-for longs for lending, assessment of cheapest-to-deliver collateral, the ability to engage in collateral upgrade and downgrade trades, to swap collateral postings and to engage in collateral transformation trades.

Organizations that view their liquidity management team as a strategic enabler of extended profits tend to co-locate those teams with their trading units so that they are in the market flow and aware of the positions the firm is building. These organizations think about their trading, financing and collateral management as a complementary set of functions that need to operate in harmony. In this regard, they view collateral as another asset class that the firm "invests in" to generate returns.

Creating a Base-Level Set of Metrics to Gain Insight

Many of the functions related to collateral management and financing are still done manually in the majority of hedge funds today. Beyond a simple file exchange on locates, most firms' systems do not facilitate automated inquiries and pricing comparisons for specials, nor do they handle reporting and time series analysis around key financing data.

Only the largest hedge funds are shadowing margin calculations as few organizations have the ability to model the methodologies used across their network of counterparties. They have not extracted key financing and collateral terms—neither from their prime brokerage and OTC clearing documents or from their ISDA arrangements—to have the required inputs.

While many firms have a portfolio accounting tool, most of these systems do not support a separate collateral ledger and thus few hedge funds are able to track their various pools of cash and collateral in a systematic matter. Most organizations are likely to compile reports from their service providers in Excel to understand their overall position. The majority of instructions around cash and collateral movements is still being exchanged via electronically signed letters of authorization attached to emails, or by various operational resources manually going into the online toolsets being offered by certain prime brokers and custodians.

> "The main driver for us internalizing our repo is EMIR. You get called for initial margin on your derivative trades and you give securities as collateral. You want to give the cheapest to deliver securities to cover this and then repo the rest out for cash. When you take the cash in, you need to find the collateral need that it can cover and then have an efficient way to handle it operationally. This is what we view as optimization"
>
> *– Asset Manager*

> "Collateral is managed at a fund-by-fund level but overseen by a team in central treasury. Their mandate is to optimize funding and tenure, and they are viewed as an investment team. They can impact the P&L, but not really influence trading decisions. Still, some traders may not execute a given trade without first speaking with treasury"
>
> *– $10.0 Billion AUM Hedge Fund*

> "We have taken a pretty strategic approach to how we can realign our financing teams so that we can be more cohesive in the way we face off to the street"
>
> *– Asset Manager*

Getting a base-level view of these data points and creating an ability to instruct and move collateral around effectively are the foundational work items that need to be accomplished to set the stage for optimization. Without these capabilities, there is no ability to gain the required level of insight needed to begin activating the firm's more strategic use of assets or to begin assessing capital and margin charges to individual portfolio managers.

> " The old guard at the established hedge funds will retire with their spreadsheets. There will be some automation on the margins, but it will be the next generation that looks to truly innovate with decision support, optimization, etc."
>
> *– Hedge Fund Technology Vendor*

> " Most hedge funds don't really get collateral management. Most funds under $2B AUM don't have the time or resources to think about it; $5B AUM funds have a treasury function, but it's in Excel, so it's back of the envelope. $10B AUM hedge funds need systems or bodies"
>
> *– Hedge Fund Technology Vendor*

Moving Beyond Metrics to Relationship Management & Optimization

These metrics are also needed to help inform the relationship discussions that are fundamental to effective service provider-hedge fund engagement. The measures feed into the basic scorecards hedge funds are compiling to evaluate their service providers and allow the hedge funds to illustrate the value of their "wallet" across all touch points.

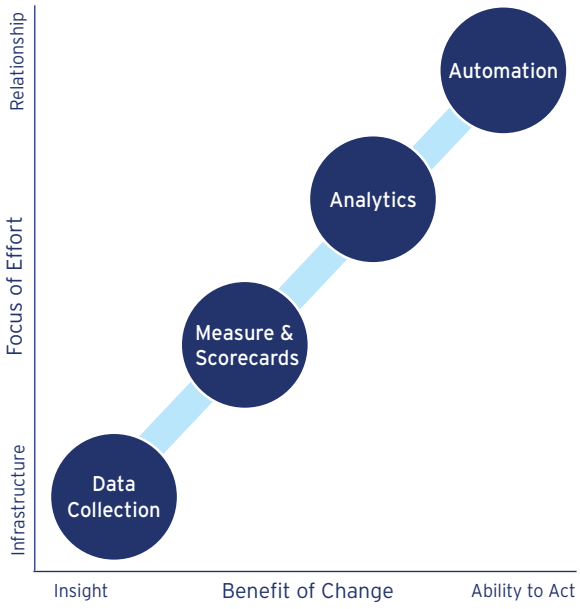
Once the foundation is set, market leaders have been able to create a set of analytics to help inform their relationship goals. From a financing perspective, these analytics can be built to identify position offsets and model the impact of the placement of debits and shorts in terms of efficiencies, balance sheet utilization and ROA.

From a collateral perspective, analytics can be built to offer "what if" analysis around collateral usage and transformations, filters that order collateral by cheapest to deliver and algorithms that suggest potential substitutions and/or collateral upgrade or downgrade trades to help manage the firm's overall inventory most effectively.

Creating the in-house tools to initiate, track, measure and report on such activities is the final stage of enhancement required to automate the pursuit of financing efficiencies and collateral optimizations. Very few organizations are able to perform these functions today, but those that can and that are actively engaging with their counterparties in an effective, relationship-focused manner are finding a positive reception. This is often translating to better access to repo lines and more advantageous margin finance and stock borrow/loan pricing.

This is illustrated in Chart 43.

Chart 43: Platform & Process Evolution



Source: Citi Investor Services

> " We had a system in place since 2009 which looked at each incoming trade and evaluated which one of our prime brokers would give us the best margin treatment"
>
> *– $10.0 Billion AUM Hedge Fund*

Understanding the New Technology Landscape

A new set of technology vendors is emerging with offerings to help hedge funds achieve these enhancements to their data, financing and collateral management platforms. These are, in some instances, firms that have long focused on the hedge fund space and that are extending existing platforms. They are in some instances firms that have provided sell-side platforms and that are realizing a new growth opportunity by adapting their offering to buy-side needs, and in some instances they are brand new purpose-built providers.

Citi's Business Advisory Services team has done an in-depth analysis of these vendors and categorized the types of basic, intermediate and advanced functionality they are creating to support the growth and development of this space. For an overview of this landscape and insight into the platforms created by market leaders, please reach out to your Citi sales contact or to our team at prime.advisory@citi.com.

" We are not yet sophisticated enough to look at wallet spend holistically but we are getting there. We are still at the stage of understanding how much we are paying the street"

– Asset Manager

" If you can get away from loading spreadsheets and get the data into a proper system, you can figure out who the optimal counterparty is for a name"

– Hedge Fund Technology Vendor

Conclusion

The threat of regulatory change has been hanging over the industry for nearly the entire post-GFC period. Hedge funds, investors and sell-side participants alike have been aware of key programs moving forward, but the complexity of the rule-making and controversial nature of changes being suggested has allowed many organizations to view these as back-burner issues. Now the shape of the new regulations is becoming clear and the deadlines for implementation of the new rules are either upon us or soon approaching. This is about to change the strategic imperative driving the strategy of leading hedge fund organizations.

For the past five years, the key driver of change has been the emergence of large institutional investors that are looking to directly allocate capital to hedge fund managers. As discussed in Part I of this year's report, these investors forced significant structural changes in the hedge fund industry so it could survive the post-GFC period. The impact of those changes set the stage for diversification in the way that investors use hedge fund investments in their portfolio, and for the emergence of a multi-tiered industry structure in which different profile managers face off against unique investor sets.

Now the main driver of change will be in response to regulations. In some instances, these regulations are creating opportunities for the hedge fund industry. The exit of proprietary traders from the sell side has allowed for hedge funds and other buy-side firms to pick up new talent and expand their market-making and trading activities into new areas, facing off against their own investors in a new way that is blurring many lines in the industry. It is also strengthening the relationship between hedge funds and their prime brokers, as there is a two-way benefit to be gained by becoming more efficient financing partners. Finally, there is a growing opportunity for hedge funds to help in the effective transformation and provision of high quality liquid assets to support collateralization in the revamped OTC derivative markets.

There are also numerous challenges to be met. Hedge funds are going to face a much more fragmented and difficult collateral management environment that will require them to upgrade their capabilities either through outsourcing or through the deployment of more efficient platforms. They are going to need to be able to more precisely measure the benefits they offer as a counterparty and track their relationship value to their service providers as the allocation of resources from these organizations, particularly around swap trading and financing, are going to be much more limited. This may require them to become more concentrated in choosing which counterparties to work with most closely. Finally, hedge funds are going to have to rethink their use of leverage and determine the trade-off between rising costs and likely returns.

This is now the fifth industry evolution survey that Citi's Business Advisory Services team has produced. Many of the trends we identified have come to fruition and are now seen as standard for the industry. Our goal in these reports is to continue to focus our clients and their clients on what new trends they should be exploring and considering in terms of their own development. As always, we stand ready to support these efforts. For more information, please contact us at prime.advisory@citi.com

NOTES

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