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# Basel III E: Synthetic Financing by Prime Brokers<sup>1</sup>

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## **Abstract**

Hedge funds rely on “prime brokerage” units within banks to provide leverage. With the enhanced capital requirements and new liquidity standards introduced by Basel III driving up the cost to banks of engaging in such financing, prime brokers have begun to offer an alternative means of providing hedge fund clients with leveraged exposure to securities. Known as synthetic financing, this alternative requires the prime broker to enter into derivatives contracts with the clients. Under the Basel III framework, the ability of banks to hedge and net such derivative positions results in capital and liquidity costs for synthetic financing that are lower than those for traditional securities financing. This case considers whether synthetic financing should be treated differently than traditional securities financing for capital and liquidity requirement purposes, as well as considering the risks associated with the shift toward synthetic financing.

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<sup>1</sup> This module is one of seven produced by the Yale Program on Financial Stability (YPFS) examining issues related to Basel III. The other modules in this series are:

- *Basel III A: Regulatory History*
- *Basel III B: Basel III Overview*
- *Basel III C: Internal Risk Models*
- *Basel III D: The Swiss Finish to Basel III*
- *Basel III F: Callable Commercial Paper*
- *Basel III G: Shadow Banking and Project Finance*

Cases are available from the Journal of Financial Crises.

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## 1. Introduction

Even the most sophisticated hedge funds rely on banks to provide them with financial services central to the funds' success, and banks seeking to meet the needs of their hedge fund clients face the challenge of developing service offerings that generate an acceptable rate of return for the bank given the regulatory framework. The banking divisions responsible for providing these offerings are known as "prime brokers," and the services involved range from asset custody to trade execution to risk management. Given the nature of the services provided and the sophistication of the client base, the prime brokerage industry is dominated by a handful of leading financial institutions such as Goldman Sachs, Morgan Stanley and J.P. Morgan.

One of the main services that hedge funds want is the ability to use leverage to enhance the returns that they could generate using only their own capital. In its traditional form, prime brokers lend hedge funds cash or securities to use in transactions. For example, a hedge fund with \$10 in hand that borrows \$90 from a prime broker and purchases \$100 in stock can secure exposure to \$100 worth of stock with only \$10 in capital. The prime broker, in turn, records a \$90 asset on its balance sheet tied to the repayment of the loan; an asset that becomes subject to regulations concerning bank capital.

With the enhanced capital requirements and new liquidity standards introduced by Basel III driving up the cost to banks of engaging in such traditional securities financing, prime brokers have begun to offer an alternative means of providing hedge fund clients with leveraged exposure to securities. Known as synthetic financing, this alternative requires the prime broker enter into derivatives contracts with the clients to replicate the desired exposure. Under the Basel III framework, the ability of banks to hedge and net such derivative positions results in capital and liquidity costs that are lower than those for traditional securities financing. Banks have passed along some of these savings in the form of preferential rates for synthetic financing relative to traditional securities financing. A desire to mitigate the impact of Basel III has thus driven a shift from traditional securities financing to synthetic financing.

The remainder of the case is organized as follows: Section 2 provides an overview of the prime brokerage industry. Section 3 describes the traditional securities financing business of prime brokers and explains how the enhanced capital requirements and new liquidity standards introduced by the Basel III framework are increasing the cost to prime brokers of offering traditional securities financing. Section 4 outlines how synthetic financing works and how its treatment under Basel III resulted in a shift toward it by prime brokers. Section 5 concludes with some discussion of the implications of this shift.

### Questions

1. Should synthetic financing be treated differently than traditional securities financing for capital and liquidity requirement purposes?
2. Are there risks associated with the shift toward synthetic financing by prime brokers?

## 2. Prime Brokerage Industry

Central to the success of any hedge fund is the ability to effectively access the global markets. As one industry commentator has put it, "[t]rading securities on the scale and with the

frequency of the most successful hedge funds takes more than a few Bloomberg screens and an online brokerage account” (Spangler 2013). Providing the “more” that is required here are prime brokers, units within banks that offer a range of financial services that support the operations of hedge fund clients. These services can include everything from maintaining custody of a hedge fund’s assets to executing its trades to helping it manage its risk.

Figure 1: 2013 Prime Broker Market Shares

<b>Prime Broker</b>	<b>Clients</b>	<b>Clients as % of all Registered Funds</b>
Goldman Sachs	1,777	20.7
Morgan Stanley	1,346	15.7
J.P. Morgan	1,339	15.6
Credit Suisse	882	10.3
Deutsche Bank	689	8.0
UBS	622	7.3
Citigroup	458	5.3
Bank of America	354	4.1
Barclays	315	3.7
Fidelity Investments	269	3.1

*Source: Hedge Fund Alert (from SEC filings).*

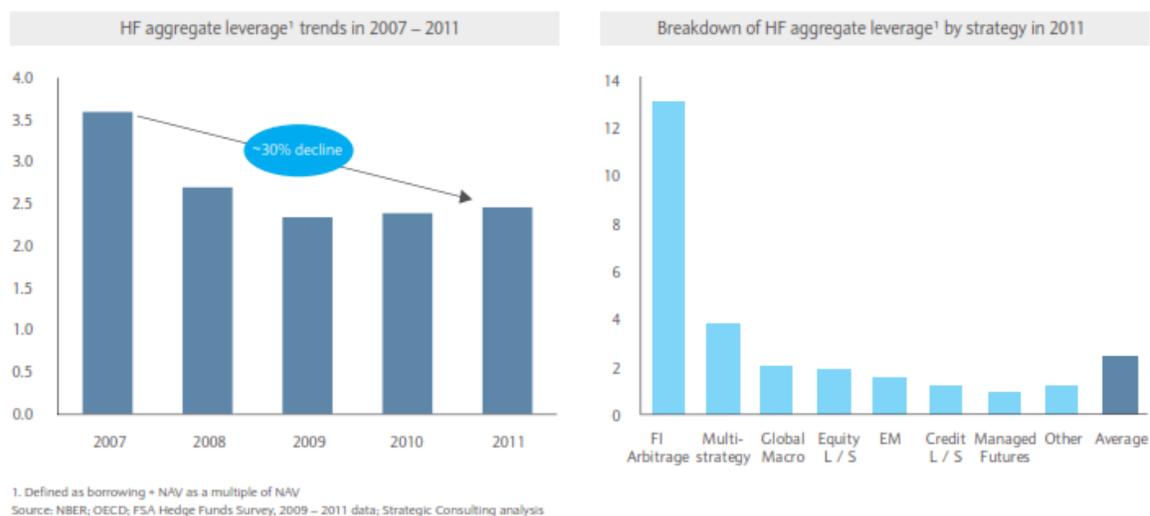
Given the nature of the services involved and the sophistication of the client base, the prime brokerage business has been long dominated by a handful of leading financial institutions. However, the prime brokerage industry has seen some changes in its structure in the wake of the financial crisis of 2007-09. Prior to the collapse of Lehman Brothers and the resulting heightened concern about counterparty risk, hedge funds typically had only one prime broker. In 2009 however, hedge funds with at least \$3 billion in assets had on average 4.8 prime brokers. This diversification created an opening for smaller prime brokers to gain market share at the expense of some of the industry’s largest players. Yet the opening proved short-lived. Lower trading volumes and the potential reduction in counterparty risk fears with the passage of time have resulted in a decline in the average number of prime brokers used to 3.9 in 2010 and 2.9 in 2011 (Krudy 2012). Consequently, the prime brokerage industry today remains highly concentrated among a few top players. (See Figure 1.)

The declining trading volumes that have helped the leading prime brokers avoid the loss of more market share have also put pressure on the profitability of the industry. Robert Lyons, the former Chief Operating Officer at Bear Stearns Global Equities, estimates that total annual revenue for prime brokers has fallen from \$15 billion in 2008 to \$12 billion in 2011 (Krudy 2012). It is against this backdrop of declining revenues that the Basel III framework has added to the difficulties faced by prime brokers, as enhanced capital requirements and new liquidity standards applicable to prime brokers’ traditional securities financing business has resulted in higher costs.

### 3. Traditional Securities Financing

Hedge funds have long sought to enhance their returns by using leverage to gain more market exposure than they would get investing only their own capital. While aggregate hedge fund leverage has declined by approximately 30% since the onset of the financial crisis from about 3.5x total net asset value in 2007 to 2.4x as of 2011, even this lower ratio indicates that for every dollar in client assets, hedge funds are borrowing \$1.40 more. In certain sectors of the hedge fund industry leverage is substantially higher, with aggregate leverage among hedge funds pursuing a fixed income arbitrage strategy topping out at around 13x total net asset value.

Figure 2: Trends in Hedge Fund Leverage



Source: Barclays 2012.

Traditionally, hedge funds have achieved this leverage by borrowing funds from their prime brokers using one of two methods. The predominant method is “securities lending,” which is economically similar to “repo financing”: hedge funds sell securities to their prime brokers while simultaneously agreeing to repurchase the securities at a future date at a slightly higher price. (For a complete discussion of how repo financing works, see the YPFS Case Study Wiggins, et al. 2014C.)

A second option available to hedge funds is margin lending, in which prime brokers provide direct loans to hedge funds secured by the hedge funds’ broader portfolios. (For a complete discussion of repo financing and margin lending as traditional sources of hedge fund leverage, see Barclays 2012.)

Under each method, prime brokers extend their hedge fund clients loans which are recorded on the prime brokers’ balance sheets and are subject to the regulatory framework in which the prime brokers operate. Basel III imposes enhanced capital requirements and new liquidity standards applicable to such loans, significantly increasing the cost to banks of being engaged in this line of business. (For a complete discussion of Basel III’s enhanced

capital requirements and new liquidity standards, see the YPFS Case Study McNamara, et al. 2014B.)

## 4. Synthetic Financing

With the Basel III framework imposing enhanced capital requirements and new liquidity standards that have driven up the cost to banks of traditional securities financing, prime brokers are increasingly shifting to the use of an alternative method to provide their hedge funds clients with the leverage they seek. This method, known as synthetic financing, relies on derivatives such as total return swaps (TRS) to provide leveraged exposure to an underlying asset without actually having to buy such asset. (See Figure 3 for example of how a TRS operates.)

Figure 3: TRS Definition and Example

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**A total return swap (TRS)** is an agreement between two parties that Party A (the “buyer”) will receive from Party B (the “seller”) the amount of any increase in the current price of an underlying asset as of a specified future date (or will pay to Party B the amount of any decrease). In return, Party A pays Party B an agreed upon rate of interest.

**Example:** Party A and Party B enter into a \$100 million S&P 500 total return swap. Over the life of the swap, Party A pays Party B an agreed upon interest rate applied to this \$100 million. If the S&P 500 rises by 10% during the life of the swap, Party A receives \$10 million from Party B. If the S&P 500 decreases by 10% during the life of the swap, Party A pays \$10 million to Party B.

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*Source: Project Editor Notes.*

To illustrate how synthetic financing operates, consider a scenario in which a hedge fund with \$10 in cash wishes to gain exposure to \$100 worth of General Electric stock. Using traditional securities financing, the hedge fund would borrow \$90 from its prime broker and purchase \$100 worth of General Electric stock. The hedge fund would ultimately be responsible for paying back the \$90 to the prime broker plus interest. The prime broker would have no exposure to General Electric stock (except to the extent that the performance of the hedge fund’s investment in General Electric stock affected its ability to repay the loan).

Alternatively, the parties could engage in a synthetic financing transaction in which the hedge fund enters into a TRS with the prime broker pursuant to which the hedge fund posts \$10 in collateral and the prime broker agrees to pay the hedge fund the amount of any increase in the price of \$100 worth of General Electric stock. In return, the hedge fund agrees to pay the prime broker an agreed upon rate of interest over the life of the swap, as well as the amount of any decrease in the price of \$100 worth of General Electric stock.

Having entered into such a TRS, the prime broker would immediately purchase \$100 worth of General Electric stock to hedge its exposure. This having been done, the economics of the

leveraged exposure look identical under traditional securities financing and synthetic financing. (See Figure 4).

Although the economics of the leveraged exposure look identical, the synthetic financing transaction receives different treatment under the Basel III framework. Whereas traditional securities financing results in the creation of an asset on the bank's balance sheet (in the form of the loan to the hedge fund), in the case of a synthetic financing transaction, the asset is the securities position entered into as a hedge to the swap exposure, (the exposure which is an off-balance-sheet item). Pursuant to Basel III's rules, the indebtedness associated with traditional securities financing transactions can be netted only if there is a single counterparty and not across multiple client accounts. Conversely, long and short securities positions entered into to hedge synthetic financing transactions with different clients can be netted. As Figure 5 illustrates, where long and short positions can be paired across multiple client accounts, synthetic financing results in lower balance sheet usage than traditional securities financing.

Figure 4: Traditional Financing vs. Synthetic Financing

Price Movement	Traditional Securities Financing	Synthetic Financing
Value of GE stock increases from \$100 to \$110	<ul style="list-style-type: none"> <li>• Hedge fund sells stock for \$110</li> <li>• Hedge fund repays prime broker \$90 (plus interest)</li> <li>• Hedge fund earns \$10 profit (less interest) on \$10 investment</li> <li>• Prime broker earns agreed upon interest</li> </ul>	<ul style="list-style-type: none"> <li>• Prime broker pays hedge fund \$10 pursuant to TRS (less interest)</li> <li>• Prime broker sells stock for \$110</li> <li>• Hedge fund earns \$10 profit (less interest) on \$10 investment</li> <li>• Prime broker's \$10 loss on TRS cancelled out by \$10 gain on stock</li> <li>• Prime broker earns agreed upon interest</li> </ul>
Value of GE stock decreases from \$100 to \$90	<ul style="list-style-type: none"> <li>• Hedge fund sells stock for \$90</li> <li>• Hedge fund repays prime broker \$90 (plus interest)</li> <li>• Hedge fund loses \$10 (plus interest) on \$10 investment</li> <li>• Prime broker earns agreed upon interest</li> </ul>	<ul style="list-style-type: none"> <li>• Hedge fund pays prime broker \$10 pursuant to TRS (plus interest)</li> <li>• Prime broker sells stock for \$90</li> <li>• Hedge fund loses \$10 (plus interest) on \$10 investment</li> <li>• Prime broker's \$10 profit on TRS cancelled out by \$10 loss on stock</li> <li>• Prime broker earns agreed upon interest</li> </ul>

*Source: Project Editor Notes.*

Figure 5: Balance Sheet Treatment of Traditional Financing vs. Synthetic Financing

	Traditional Securities Financing	Synthetic Financing
Scenario	<ul style="list-style-type: none"> <li>Hedge Fund #1 goes long A with money borrowed from prime broker</li> <li>Hedge Fund #2 goes short A with money borrowed from prime broker</li> </ul>	<ul style="list-style-type: none"> <li>Hedge Fund #1 goes long A via TRS with prime broker</li> <li>Hedge Fund #2 goes short A via TRS with prime broker</li> </ul>
Bank's assets	<ul style="list-style-type: none"> <li>Loan to Hedge Fund #1</li> <li>Loan to Hedge Fund #2</li> </ul>	<ul style="list-style-type: none"> <li>Long position in A to offset off-balance sheet exposure to short A TRS</li> <li>Short position in A to offset off-balance sheet exposure to long A TRS</li> </ul>
Netting treatment	<ul style="list-style-type: none"> <li>No netting – different clients</li> </ul>	<ul style="list-style-type: none"> <li>Net long position in A with short position in A</li> </ul>
Effect on balance sheet usage	<ul style="list-style-type: none"> <li>Balance sheet usage increases by amount of loans to Hedge Fund #1 and Hedge Fund #2</li> </ul>	<ul style="list-style-type: none"> <li>No increase in balance sheet usage</li> </ul>

*Source: Project Editor Notes.*

Figure 6: Calculating Exposure

$$\text{exposure measure} = \text{replacement cost (RC)} + \text{add-on}$$

where

*RC* = the replacement cost of the contract (obtained by marking to market), where the contract has a positive value.

*add-on* = an amount for PFE over the remaining life of the contract calculated by applying an add-on factor to the notional principal amount of the derivative. The add-on factors are included in paragraphs 1 and 3 of the Annex.

*Source: Bank for International Settlements 2014, 4.*

This ability to net the long and short hedging positions associated with TRS transactions leaves the treatment of the off-balance sheet exposure stemming from such transactions as the remaining consideration, and the fact that Basel III does not treat these exposures the same as the assets arising from traditional securities financing has fueled a shift towards synthetic financing. The difference in treatment is perhaps most apparent in the functioning of the Basel III leverage ratio. Intended as a non-risk-based backstop to Basel III's risk-based capital requirements, the leverage ratio requires banks to maintain Tier 1 capital equal to at least 3% of their "total exposure." Total exposure consists of "(a) on-balance sheet exposures; (b) derivative exposures; (c) securities financing transaction (SFT) exposures;

and (d) off-balance sheet (OBS) items” (Bank for International Settlements 2014, 2). While Basel III requires the inclusion of all balance sheet assets (including gross SFT assets with limited netting for transactions with the same counterparty), its treatment of derivative exposures is different. Rather than include the full notional amount of derivative exposure in the leverage ratio exposure measure, Basel III calculates the amount to include as the sum of the replacement cost (RC) of the current exposure (i.e., its mark-to-market value) and an add-on for potential future exposure (PFE) arrived at by multiplying an assumed add-on factor to the notional amount of the derivative.

With add-on factors ranging from 0.0% to 15.0% based on duration and the nature of the underlying asset, as indicated in Figure 7, only a small percentage of a derivatives’ notional value could end up being included in the leverage ratio exposure measure (although given the large notional values often associated with derivatives positions even this could be substantial).

This treatment of derivatives would mean that a bank entering a five-year \$100 million at-the-money TRS with respect to a company’s stock would have \$8 million in exposure for leverage ratio purposes based on \$0 in replacement cost and \$8 million in potential future exposure (\$100 million notional amount multiplied by 8.0% five-year equity add on) (Levine 2013a). If the hedging stock transaction is able to be netted with an offsetting position, this \$8 million exposure would be the only figure included in the leverage ratio calculation. This is far less than the exposure that would result from a traditional securities financing loan to provide a hedge fund with similarly leveraged exposure to \$100 million in stock, which would require that the full amount of the loan be included as an exposure for leverage ratio purposes. For example, if the bank loans the hedge fund \$90 million dollars to buy \$100 million of stock, the full \$90 million would be included in the leverage ratio.

With leveraged exposure provided via derivatives requiring banks to maintain less capital than is required for traditional securities financing, a shift is underway in the prime brokerage industry towards greater use of synthetic financing. According to *Risk* magazine, J.P. Morgan’s international prime brokerage arm saw its synthetic balances more than double in 2012 (Devasabai 2013). Similarly, Barclays has reported double digit growth in its synthetic financing business and describes further growing the business as a “top priority.”

Figure 7: Add-on Factors for Determining Potential Future Exposure

The following add-on factors apply to financial derivatives, based on residual maturity:

	Interest rates	FX and gold	Equities	Precious metals except gold	Other commodities
One year or less	0.0%	1.0%	6.0%	7.0%	10.0%
Over one year to five years	0.5%	5.0%	8.0%	7.0%	12.0%
Over five years	1.5%	7.5%	10.0%	8.0%	15.0%

## Notes:

1. For contracts with multiple exchanges of principal, the factors are to be multiplied by the number of remaining payments in the contract.
2. For contracts that are structured to settle outstanding exposures following specified payment dates and where the terms are reset such that the market value of the contract is zero on these specified dates, the residual maturity would be set equal to the time until the next reset date. In the case of interest rate contracts with remaining maturities of more than one year that meet the above criteria, the add-on is subject to a floor of 0.5%.
3. Forwards, swaps, purchased options and similar derivative contracts not covered by any of the columns in this matrix are to be treated as "other commodities".
4. No potential future credit exposure would be calculated for single currency floating / floating interest rate swaps; the credit exposure on these contracts would be evaluated solely on the basis of their mark-to-market value.

*Source: Bank for International Settlements 2014, 15.*

## 5. Implications

While the leveraged exposure provided via traditional securities financing and via synthetic financing look identical in economic terms, it is possible that a difference in treatment under Basel III is somewhat justified. Traditional securities lending involves the creation of an immediate unilateral credit risk for the bank in the amount of the loan provided. Conversely, the credit risk in the case of a TRS is bilateral and contingent. Depending on the performance of the underlying asset, the bank may end up owing money to its counterparty rather than the other way around.

What's clear, however, is that a difference in treatment does exist, and that this difference is driving a shift in practices in the prime brokerage industry. While the thrust of most post-crisis regulation has been to push activity away from opaque over-the-counter derivatives, here the effect seems to be the opposite. Additionally, because the efficiencies of synthetic financing depend on matching customer longs with customer shorts, prime brokers have an incentive to build up greater exposure to more customers, potentially creating increased interconnectedness risk stemming from the growing amount of exposure that many different customers will have to a single prime broker. (For a discussion of the potential implications of a shift toward synthetic financing, see Levine 2013b.)

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