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Financial Services

The Volcker Rule

Considerations for implementation of proprietary trading regulations

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Contents

1. Executive Summary

Implementing the Volcker Rule restrictions on proprietary trading will be one of the most important, and most challenging, rulemaking responsibilities under the Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank). The Volcker Rule distinguishes between prohibited trading and permitted activities – specifically market making, securitization, hedging and underwriting related activities[1]. These activities allow for the effective functioning of US markets and ongoing access to capital, the engine of economic growth. As a result, regulators must be able to meaningfully and effectively distinguish between prohibited proprietary trading and activities permitted under the Volcker Rule, which can vary substantially across asset classes, market practices, and market conditions. This study describes how such permitted activities provide essential liquidity in a representative set of asset classes and markets[2] and illustrates why implementation of the Volcker Rule must be firmly grounded in market realities.

Critical liquidity providers

For most securities, derivatives, and commodities markets, banks and their dealer affiliates subject to the Volcker Rule[3] play a critical role as the central providers of liquidity to other market participants. A poorly constructed or indiscriminately restrictive implementation of proprietary trading restrictions could hamper that liquidity in a wide range of markets, and consequently impede the ability of businesses to access capital and the ability of households to build wealth.

1 Throughout this paper, the term "market making" is used to refer inclusively to all market making and market making related activities conducted by banking entities subject to the Volcker Rule

2 The analysis included in this document is not designed to address all financial markets and all potential consequences of implementation of the proprietary trading restrictions of the Volcker Rule. Instead, the specific markets profiled in this study (Equities, Exchange Traded Funds, US Corporate Bonds, Interest Rate Derivatives, and Natural Gas) provide illustrations of dynamics that are representative of the full range of capital markets activities in which dealers operate

3 Throughout this paper, the term "dealer" is used to refer specifically to US and foreign dealers owned by banking entities subject to the Volcker Rule

The risk of unintended consequences for investors and the US economy is significant. As discussed in Section Two, without the liquidity that dealers provide to US capital markets, there could be substantial negative effects, including:

- Higher funding and debt costs for US companies
- Reduced ability of households to build wealth through participation in liquid, well-functioning securities markets
- Reduced access to credit for small or growing firms with less established credit ratings and histories
- Reduced willingness of investors to provide capital to businesses because of greater difficulties in exiting those investments
- Higher trading costs and consequently lower returns over time for investors, such as pension and mutual funds
- Reduced ability for companies to transfer risks to others more willing and able to bear them via derivatives, with a consequent reduction in overall efficiency of the broad economy

Implementation should also acknowledge the risk that financial activity may migrate to the less regulated "shadow banking" system. Furthermore, the US faces strong competition from overseas capital markets. Given the importance of this activity to the competitiveness, safety, and soundness of the US financial markets and the stated goal of strengthening regulation of the financial system, a rulemaking implementation that pushes these activities outside of the most highly regulated parts of the US financial system would be a particularly undesirable outcome.

Characteristics of permitted activities

To help illustrate the scope of such permitted activities, Sections Three through Seven profile a number of representative markets in which dealers play an active market making role and highlight the implications for Volcker Rule implementation. The profiles illustrate that for market making and market making related activities:

- **Market making necessarily involves a transfer of risk from clients to dealers and the creation of dealer inventory.** Conditions that allow for agency trading – where two market participants can trade directly without the risk-taking commitment of a dealer intermediary – are relatively uncommon. Most markets are too diversified or illiquid to "match" orders in real time. For example, the corporate bond market is highly fragmented based on the credit quality of issuers, the maturity of the instrument, the currency in which the security is issued, and a variety of other factors specific to the instrument. There are roughly 37,000 unique corporate bonds outstanding in the US market alone. To make a market in these securities, dealers must frequently take a principal position in these securities for some period of time. The dealer is then necessarily exposed to changes in the market value of the securities. This long-standing model of principal trading and risk transfer is the norm (domestically and globally) in fixed income and swap markets, and is a major element of liquidity provision even for equities.
- **The level of liquidity and nature of risk varies widely among different markets and products.** Liquidity – the frequency of trading and the overall ability to trade without meaningful market impact (i.e. without affecting the market price) – varies greatly across different asset classes. Corporate bonds are far less liquid than equity shares for any given issuer. However, liquidity can vary widely even within a single asset class – newly issued bonds are more liquid than older bonds, and highly customized interest rate derivatives have a fraction of the trading activity of the most common swaps. Market makers in less liquid and more fragmented products will typically need to hold positions for longer periods of time. The nature of the inventory also varies. Derivatives traded over-the-counter are ongoing contracts that cannot be simply closed out as a securities position can – instead, hedges or offsetting positions are needed to manage the risk on a consolidated basis.

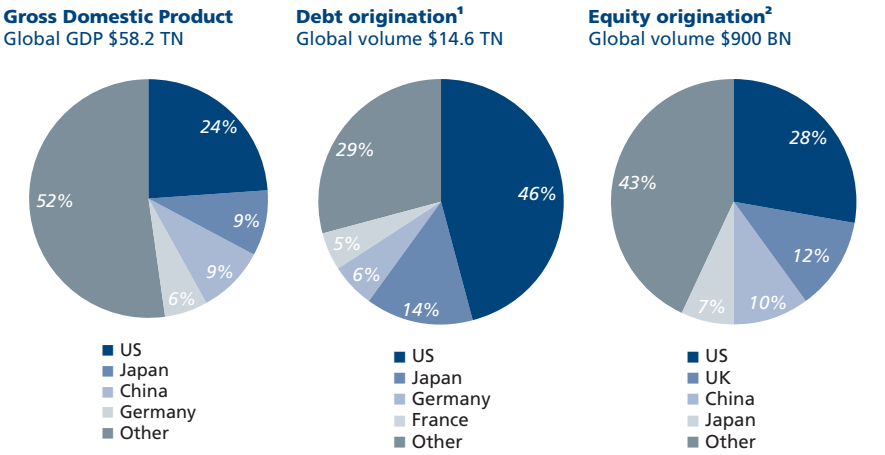
- **Supporting customer trade flows often requires a larger number of additional trades to balance a dealer's overall risk position and to maintain markets.** Dealers manage ongoing risk-taking by hedging, taking offsetting positions, and diversifying positions and exposures. For example, in the corporate bond, interest rate derivative, and natural gas derivative markets, dealers frequently trade with other dealers in order to work down a concentrated position originating with a customer trade. Balancing trades may be in different asset classes, and may each hedge only part of the risk of the original trade. In less liquid markets, dealers must also remain active in trading to understand price dynamics. When underwriting a corporate bond, for instance, a dealer relies on its understanding of supply and demand acquired by actively trading in the secondary market in order to price the new issuance at a market-clearing level.
- **Active risk mitigation often leaves substantial residual risks, such as basis risk.** For example, market makers in corporate bonds end up with a number of long and short positions. These positions offer some risk offsetting benefits, but the offsets are imperfect, leaving a residual "basis" risk to be borne by the dealer. Similarly, a dealer entering into a highly customized interest rate swap with a customer may use other swap trades, future trades, or bond purchases to help offset the risk of the original customer trade. These hedging or balancing trades will typically leave an ongoing basis risk to be internally managed by the dealer.
- **Many markets and products rely on arbitrage trading to function effectively.** Exchange traded funds (ETFs) derive much of their efficiency and effectiveness as retail investment products from the arbitrage relationship between the ETF itself and the underlying assets. In other words, it is essential that the market price of the ETF share itself reflects the value of the underlying assets. Principal trading in both the underlying assets and the ETF is needed to maintain efficient pricing linkage between the two, without which investor confidence in this popular product would be impossible to sustain.

2. Liquidity, Capital Formation, and Economic Growth

The fundamental role of capital formation[4] in the development and growth of modern economies is well established[5]. Markets provide the infrastructure for individuals, firms, and governments to channel excess savings (or capital) to more productive uses through investments in projects that cannot be efficiently financed internally. A market system encourages these investors – seeking higher returns among other investment objectives – to allocate resources to the most productive projects. This mechanism allows firms and governments to access the capital needed to support economic growth. The more efficient the market for resource allocation, the greater potential for economic development and growth.

The US is the leading market for capital formation in the world today. The depth of the US equity and debt markets is unmatched – the US accounted for 28% of global equity capital and 46% of debt capital raised worldwide in 2009. Individuals, businesses, and public institutions raised more than $7 TN in the US last year.

Exhibit 1: US share of global capital markets
US share of GDP and global capital origination volume, 2009

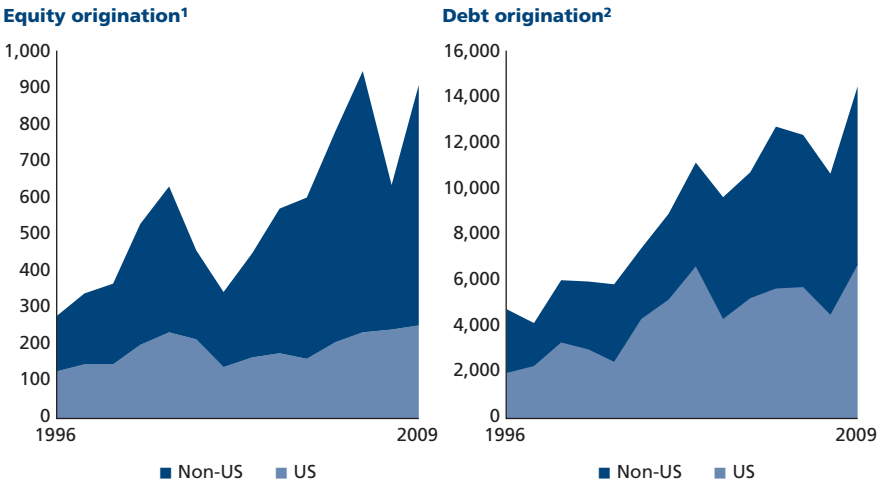


Sources: SIFMA, Dealogic, World Development Indicators, Oliver Wyman analysis
1 Includes all origination of government, agency, local, and corporate debt securities
2 Includes all origination of equity (initial and secondary offerings) and convertible securities

4 Capital formation is defined narrowly throughout this document to include capital or financing raised by individuals, businesses, and public institutions through financial market instruments
5 For a comprehensive review of empirical evidence and theoretical analysis on the subject, see Ross Levine, "Finance and Growth: Theory and Evidence" (2004)

Nevertheless, the US advantage has eroded as financial centers around the world become more competitive and economic growth in other parts of the world outpaces growth in the US. Rapid advances in technology and increasingly open financial sectors are allowing institutions to raise capital in the most efficient venues. Although the US share of capital formation worldwide remains high, it has fallen sharply from its peak in both debt (from 60% in 2003 to 46% in 2009) and equities (from 47% in 2001 to 28% in 2009). The rate of growth in the US capital markets since 2001 has been outpaced more than two to one by competing financial centers – notably London, Singapore, and Hong Kong.

Exhibit 2: US share of global capital markets over time
US share of global origination volume ($BN), 1996-2009



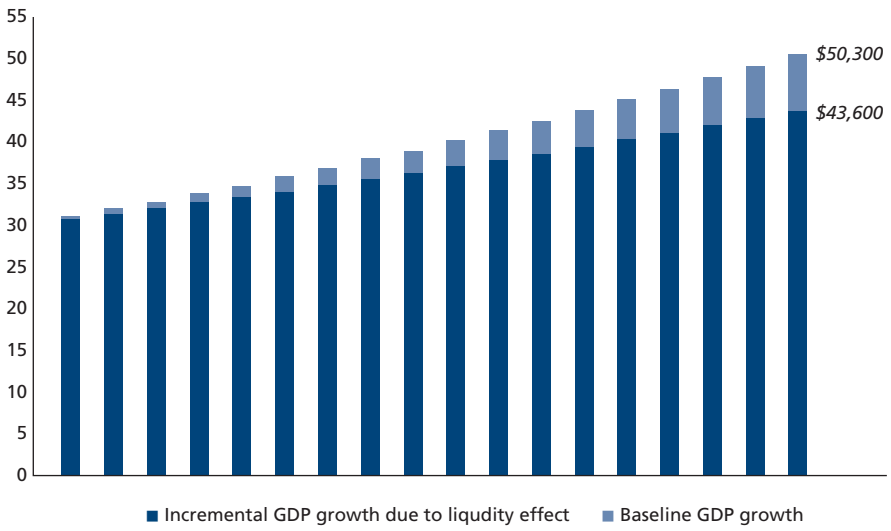
Sources: SIFMA, Dealogic, Oliver Wyman analysis
1 Includes all origination of equity (initial and secondary offerings) and convertible securities
2 Includes all origination of government, agency, local, and corporate debt securities

One of the key drivers of the US edge in capital formation has been superior liquidity across the full range of financial products. This relationship is intuitive. Nearly all businesses require long-term financing. Investors have the capital required for these projects, but may be reluctant to lock up funds in any single investment for long periods of time. Liquid capital markets bridge this gap by allowing investors to (1) participate at a manageable level of risk (shared across a number of different investors) and (2) exit the investment if their investment strategies or objectives change in the future.

There is strong evidence to support the relationship between liquidity, capital formation, and economic growth. A 42-country study by Levine and Zervos (1998) found that stock market liquidity is positively and significantly correlated with future rates of capital formation, productivity, and growth[6]. The analysis controls for banking sector development, education, inflation, and various other drivers of growth. Turnover (the value of stock trading relative to the size of the market) is used as the primary measure of liquidity in this study, though other liquidity metrics produce similar results.

Levine and Zervos found that if a country had boosted its initial stock market liquidity by one standard deviation, real GDP would have been 15% higher by the end of the 18-year sample period (an 80 basis point increase in the annual GDP growth rate). This shift is significant. An economy with per capita GDP of $30,000 in 1976 operating at average levels of market liquidity would have grown to a $43,600 per capita GDP by 1993; with a one standard deviation increase in initial stock market liquidity, per capita GDP would have risen to $50,300 instead[7].

Exhibit 3: Impact of increased stock market liquidity on economic growth
Real GDP/capita (000s) over 18 year period[1-3]



Sources: Levine and Zervos (1998), Oliver Wyman analysis
1 Nation with initial GDP per capita of $30,000 (illustrative)
2 Annual real GDP growth of 2.1% (average observed growth rate for sample set from 1976-93)
3 Incremental growth effect of 0.8% per annum associated with increase in initial stock market liquidity

6 Ross Levine and Sara Zervos, "Stock Markets, Banks, and Economic Growth" (1998)
7 On the question of causation, Levine, Loayza, and Beck (2000) find that the links between financial development and economic growth are not due to simultaneity bias, implying that financial development is not merely a leading indicator, but exhibits a causal relationship with economic growth

Role of market making activity

Market makers play a key role in capital formation by providing liquidity – the option to buy or sell at the market price – for a wide range of assets in nearly all market conditions. True market making generally requires a dealer to assume some level of principal risk on the underlying assets, whose value may rise or fall before the position can be closed.

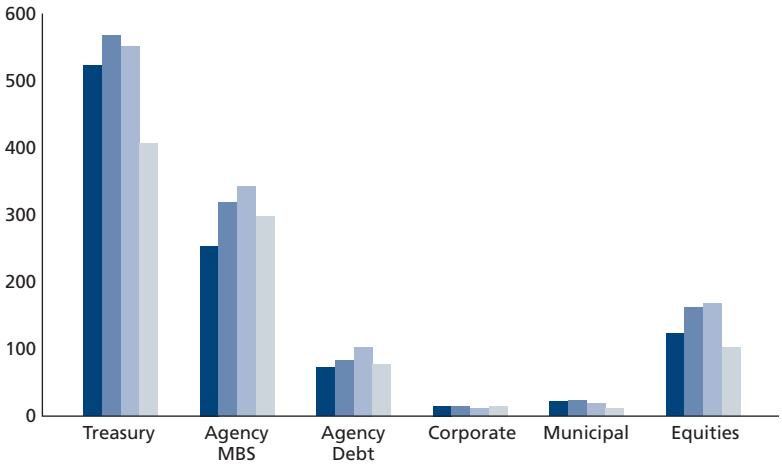
For trades in the vast majority of markets, dealers are required to act as a market-making principal to facilitate trades. A dealer stands ready to buy, sell, or otherwise transact with customers by providing firm or indicative prices in response to customer requests. The market risk is thereby transferred from the customer to the dealer. If the dealer has the particular asset in inventory, the trade is executed and inventory is reduced. If not, the dealer typically hedges or closes out the position by entering into an offsetting trade in the market for all or a portion of the asset purchased. Where the risk transferred to the dealer is large, complex, or unique and in periods when investors are unwilling to participate in the market due to market stress, dealers frequently need to hold these positions for some period of time. This exposes the institution to principal risk – movement in the price of the underlying asset or exposure – and may require a series of balancing trades to hedge or close out the position[8].

Principal trades are practical for the full range of markets, including less liquid assets, markets, or positions where matching buy and sell orders may be difficult to find. This is in contrast to agency trading (in which the dealer would not assume principal risk), which is practical only for relatively small transactions in the most liquid markets where buy and sell orders are readily available.

The level and nature of principal risk that dealers must assume ultimately depends on the liquidity of the products or underlying exposures traded. Liquidity varies widely across different asset classes and even across different securities within the same asset class, demanding substantially higher levels of principal risk taking for some products than others. Relatively illiquid assets (corporate bonds) generally require dealers to hold more risk than liquid assets (government bonds) that can be turned over easily. Exhibit 4 provides a cross-section of turnover, a key measure of liquidity, across several asset classes in the US markets.

8 Institutions are also exposed to related costs and risks, such as the cost of carrying capital against any position held on its books and financing its ownership

Exhibit 4: Spectrum of liquidity across products
Average daily volume ($BN) in US markets, 2006-2009



	Treasury	Agency MBS	Agency Debt	Corporate	Municipal	Equities
Outstanding (2009)[1]	6,850	6,610	2,970	6,530	2,750	18,120
Turnover (2009)[2]	15.0	11.4	6.6	0.7	1.2	1.5

Sources: SIFMA, Oliver Wyman analysis
1 Average value outstanding in $BN
2 Annual trading volume (2009) ÷ average value outstanding (2008-2009)

However, there are no hard and fast rules on the level of principal risk taking (or the size of the trading inventory) required to facilitate customer trades and to manage risk, even within asset classes. A wide range of factors can influence the liquidity of positions in seemingly similar assets, including the size of the position, the length of time that has passed since the security was issued, and general market conditions.

US Treasury securities provide a useful illustration of this point. Approximately 50% of the trading activity in this market occurs in the most recently issued "on-the-run" securities, despite representing just 5% of outstanding assets[9]. A dealer that agrees to assume a large position in on-the-run securities from a customer may be able to exit this exposure relatively quickly with little risk of large shifts in the value of the underlying assets. However, a market maker that takes a comparable position in "off-the-run" securities will need considerably more time to work down this position.

9 Dominique Dupont and Brian Sack, "The Treasury Securities Market: Overview and Recent Developments" (1999)

Implications for Volcker Rule implementation

The Volcker Rule provides regulators with significant latitude in defining the boundaries of proprietary trading (and permitted activities) for regulated banking entities. Providing structure to the concepts conveyed in this rule will be an extraordinarily challenging exercise given the complex nature of principal risk taking and the potential for unintended consequences. Excessive or poorly implemented restrictions on market making may pose a serious threat to the strength of the US capital markets, the safety and soundness of individual institutions, and US financial stability.

- **Strength and competitiveness of the US capital markets** – The strength and competitive positioning of the US capital markets face significant challenges from overseas markets today. A fundamental change in the US regulatory environment that constrains principal risk taking will inevitably reduce liquidity in local markets and may limit access to capital and risk management services for individuals, businesses, and public institutions.
- **Safety and soundness of banking entities** – Traditional consumer and commercial banking activities, such as taking deposits and making loans, require that banks of all sizes manage the interest rate risk inherent in the composition and terms of their balance sheet assets and liabilities. Prudently managing interest rate risk and its potential impact on a bank's capital and earnings is a longstanding supervisory goal. Bank regulators evaluate bank asset-liability management practices because this function is critical to the safety and soundness of US banking entities and the financial system more broadly. Regulators recognize and expressly permit the use of interest rate derivatives in light of their effectiveness as a risk management tool. Many other non-banking entities also use interest rate derivatives to manage core risks embedded in their businesses (for example, insurance firms, mortgage bankers and money managers), but given the vulnerability of banks to interest rate changes, these instruments are essential risk management tools for banking entities.

For decades, dealers have served as intermediaries in interest rate derivatives markets and are instrumental in providing the liquidity needed to allow end-users to manage interest rate risk arising from their traditional banking activities. A restrictive definition of "market making" or trading activity "on behalf of customers" may adversely impact liquidity and the ability of dealers to intermediate interest rate risk transfers from customers to the market. Consequently, the safety and soundness of US banking entities may be negatively affected if dealers, who are today legally permitted to assume and intermediate interest rate risk transfer, become unable to prudently do so as a result of regulations enforcing the Volcker Rule.

- **US financial stability** – Market making is provided predominantly by highly regulated banking entities in the US. One consequence of tighter restrictions on principal risk taking within these institutions is the eventual migration of market making to less regulated financial institutions (e.g. hedge funds). This would merely shift risk into less transparent parts of the market and potentially reduce regulators' ability to identify and manage systemic risks. Alternatively, US-specific restrictions could shift activities offshore, leaving the US exposed to global systemic shocks while limiting US regulators' ability to identify and manage those risks.

3. Equities

The equities or common stock market is the most widely known and broadly discussed US financial market, familiar to many Americans in ways that other capital markets are not. This is due in large part to the unique characteristics which set this market apart from most other asset classes – highly standardized security terms and structures, exceptional liquidity, and active trading by a broad spectrum of different investors.

These unique characteristics of cash equities[10] allow for a relatively high level of trading on an agency basis, where the dealer matches buyer and seller without taking any principal risk to make markets. However, even in this prototypically liquid market, a significant number of trades depend on the willingness and ability of dealers to assume principal risk by "taking the other side" of large trades ("block trades"). The discussion below is focused on the nature of such "block trading" and the critical role of dealers in making markets for these trades.

Block trading

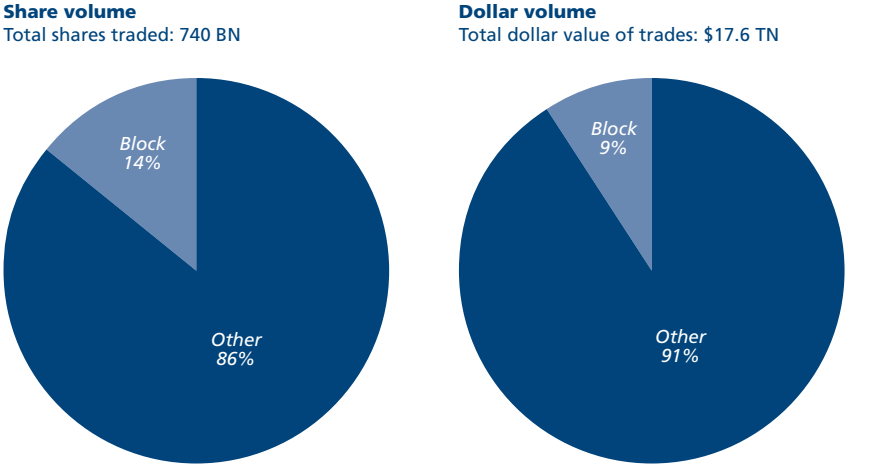
A block trade is the purchase or sale of a significant position in the secondary market for any security. While the theoretical threshold for a block trade is any transaction of sufficient size to impact market prices, most exchanges set practical definitions that apply to all securities traded regardless of the liquidity of the individual position[11]. The data below is based on the definitions of "block" used by the various exchanges, and therefore it understates the amount of liquidity actually being provided by dealers inasmuch as they commit capital to provide liquidity in sizes that are less than those captured by the definition of block.

10 The term "cash equities" is used among capital markets professionals to distinguish traditional equity securities from equity-related derivatives

11 For example, the New York Stock Exchange (NYSE) defines a block trade as any transaction equal to or greater than 10,000 shares traded or $200,000 in value. The London Stock Exchange (LSE) uses an alternative approach based on Normal Market Size (NMS) for a given security. NMS is the minimum number of securities for which a market maker is obliged to quote firm bid and offer prices. NMS for each security is calculated quarterly and is based on 2.5% of the security's average daily turnover in the preceding year. Block trades are defined as a multiple of the NMS (75x for a security with an NMS of 2,000 shares or above 50x for a security with an NMS of 1,000 shares)

Block trading accounts for a significant share of the liquidity in the equities market today. In total, block trades accounted for 14% of shares traded (103 BN) and 9% of traded volume ($1.6 TN) on NYSE in 2009 (see Exhibit 5). Block trades frequently exceed $5 MM in total value – nearly 1000 times the size of the standard trade ($6,400) on NYSE. On average, there were 865 trades of $5 MM+ each day in the final month of trading last year[12].

Exhibit 5: Block trading activity in US equity markets
Share of block trades on NYSE, 2009[1]



Sources: NYSE Euronext statistics, Oliver Wyman analysis
1 Block trades defined as trades of at least 10,000 shares or $200,000 value

Most institutional investors trade in "block size" on a daily basis. These block-size orders may or may not be reflected in the above statistics because institutions give "working orders" to broker-dealers, who break up the orders into smaller sized transactions that are executed throughout the course of the day.

Large block trades can be structured in several ways:

- **Bought deal** – In a bought deal, the dealer buys the shares from the seller before it has built a complete order book for the deal. The dealer will generally resell the shares as soon as possible after they are acquired from the seller. However, large positions may be difficult to "work down" immediately, and the dealer will assume the principal risk associated with fluctuations in the price of the security.

12 NYSE data

- **Non-risk deal** – In a non-risk deal, the dealer acts in an agency role and is paid a commission or an agreed bid-offer spread. The dealer builds a book of orders from potential counterparties and determines a price based on observed demand. This transaction is riskier for the seller, who receives no guarantee as to the final price, but avoids excessive inventory risk for the dealer. These types of trades are rare.
- **Back-stopped deal** – The most common type of block, the back-stopped deal, combines features of a bought deal and a non-risk deal. The dealer builds a preliminary order book from potential counterparties but also guarantees the seller a minimum price. The dealer provides support (i.e. commits capital) if the trade cannot be completed above this guaranteed price[13].

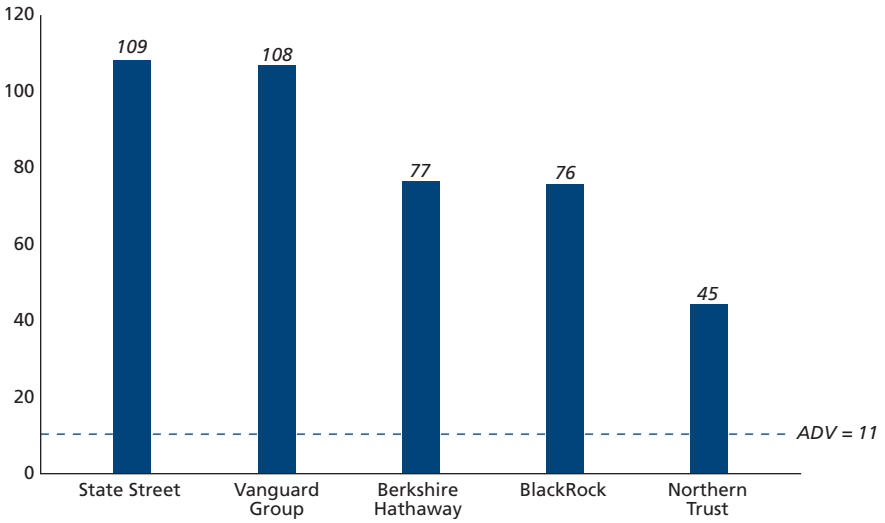
Each of these structures relies heavily on market makers to facilitate the trade. Principal risk taking (or capital commitment) is a critical part of this function for bought and back-stopped deals – some form of price or volume guarantee may be needed to provide investors with a degree of certainty in their immediate execution. This can vary substantially in execution from immediate price or size commitment for the full trade to a standing commitment to work the order through the market (typically intraday) with a minimum price and/or size negotiated ex ante.

In addition to capital commitment, dealers offer the expertise and efficiency gained from participating in large numbers of trades in a variety of securities on a daily basis. This translates into the ability to work down inventories quickly and to find natural pockets of offsetting demand among institutional investors when client needs dictate block trading activity.

Despite the strong liquidity of cash equities as a broad asset class, the structure of the market (with highly concentrated positions in individual securities) requires a significant level of principal risk taking to meet client demands[14]. Institutional ownership in an equity security routinely exceeds average daily trading value (ADV) for the security. Procter & Gamble (PG) provides a useful illustration – at least ten investors, all of which are investment managers for fund complexes, hold more than the average daily trading volume for the security (see Exhibit 6). If any of these investors were to close out one of these positions through traditional execution channels, the market impact would be significant and reduce returns for the funds they advise and the investors in these funds, including individuals and institutional investors such as pension plans.

13 An Introduction to Block Trades, Ashurst (2006)
14 The average daily trading value (ADV) of the US equities market was ~ $100 BN in 2009. The only markets with greater liquidity over this period were US Treasuries and Agency MBS

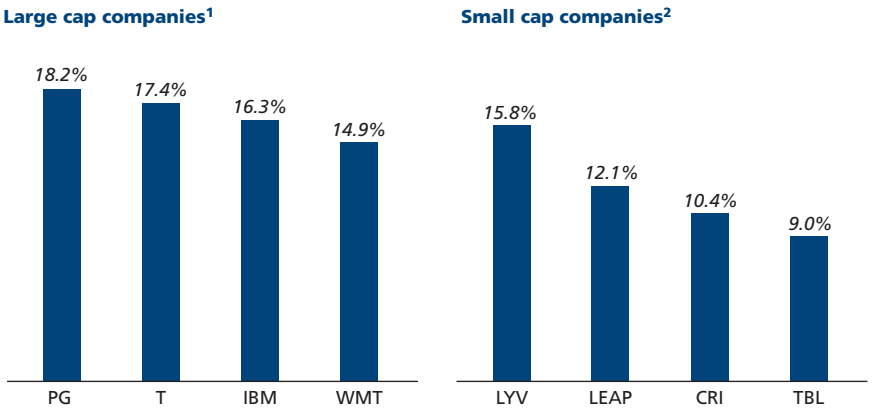
Exhibit 6: Institutional ownership of Procter & Gamble Company
Top five institutional holders, MM shares[1]



Source: Factset
1 As of September 30, 2010

The PG illustration is not purely hypothetical. There were six trades of over 100 MM shares and 10 trades of at least $1 BN on NYSE in 2009. Approximately 15% of shares traded on NYSE and AMEX were block trades. This ratio is relatively constant across large cap (over $10 BN) and small cap (under $2 BN) firms. Across a broad sample of NYSE firms, the share of block trading as a percentage of total shares traded in 2009 ranged from 9-18%.

Exhibit 7: Level of block trading activity
Percentage of share trading represented by block trades, 2009



Source: New York Stock Exchange
1 Sample of companies with >$10 BN market capitalization
2 Sample of companies with <$2 BN market capitalization

Role of market makers

The commitment of capital through principal risk taking has significant implications for liquidity and execution costs for institutional investors. Explicit costs of trade execution, including fees, commissions, etc. are easily quantifiable and highly visible to investors. Implicit costs are far less visible but significant nonetheless:

- **Market impact** – adverse price movement due to need for immediate execution of larger order sizes
- **Timing costs** – higher costs due to changes in share price given delayed execution of order
- **Opportunity cost** – missed gains on changing stock prices due to unexecuted orders

Market impact is by far the most significant implicit cost for institutional investors executing large, block trades. On average, market impact represents 4.78 bps of the 15.70 bps in total execution costs investors pay[15]. Block trading offers substantially reduced market impact for institutional investors, thus preserving capital and protecting investment returns.

Implications for Volcker Rule implementation

Dealers necessarily take on principal risk to serve clients in the equities market. The facilitation of block trades exposes market makers to short-term fluctuations in the value of (often large) blocks of securities which must be held in inventory on behalf of clients – it may take days or weeks to work down these trades, depending on liquidity.

A restrictive implementation of the Volcker Rule, prohibiting trading gains or losses on positions in equities, would effectively ban the facilitation of the most common form of block trades, eliminating a critical source of liquidity and dramatically increasing execution costs for institutional traders. These costs will be borne by the individuals, pension plans, insurance companies, and other investors in the form of reduced returns over time, with knock-on effects on capital formation and economic growth.

15 2010 Elkins / McSherry Transaction Cost Survey, Institutional Investor

The dynamics of cash equities trading provide several important insights for implementation of the Volcker Rule across different asset classes:

- Even in the most liquid markets (with highly standardized instruments, efficient execution platforms, and deep pools of counterparties) client demand will often exceed the short-term liquidity of the market.
- Market makers play a critical role in these moments, providing immediate liquidity for investors by taking on principal risk and working down the trades over time.
- In order to provide liquidity in these moments and effectively work down trades, market makers must be active participants in these securities even in periods when client demand does not require block trades.

Block trading is not a unique feature of the cash equities market; in fact, the level of block trading is substantially higher in less liquid fixed income and derivatives markets.

4. Exchange Traded Funds

An Exchange Traded Fund (ETF) is a pooled investment fund that trades on a securities exchange. An ETF offers investors an ownership interest in a portfolio of stocks, bonds, or other securities. It therefore shares many of the same qualities of a traditional mutual fund, but differs in several important respects that make ETF investment attractive for institutional and retail investors:

- **Pricing** – ETFs are priced continuously and investors can buy and sell ETF shares throughout the day at the current offering price. In contrast to mutual fund shares where all investors receive the same price (the NAV) at the close of trading, investors in ETF shares receive prices established by market supply and demand throughout the trading day.
- **Distribution** – ETFs trade exclusively on exchange so shares can only be purchased through registered dealers; in contrast, mutual funds may be offered directly by an investment fund company.
- **Transaction Costs** – Because ETFs are purchased through a dealer, an ETF investor pays a brokerage commission when buying or selling ETF shares; in addition to any commissions, ETF investors may pay an ongoing management fee but this is typically far lower than comparable mutual funds[16].

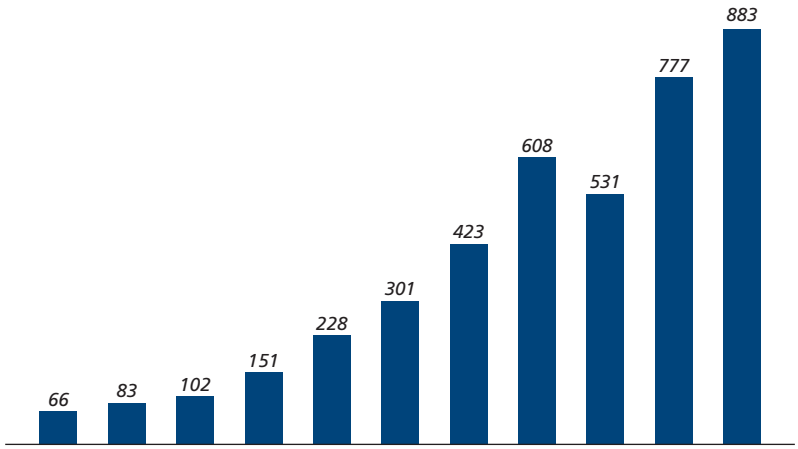
The discussion below focuses on (1) the structure and development of the ETF market, (2) the role of market makers and inventory building in ETF creation, and (3) the role of arbitrage trading required in efficient pricing for retail and other investors.

Development and advantages of ETFs

The first ETF was approved by the Securities and Exchange Commission (SEC) in 1993. The market has been evolving ever since to meet growing demand from institutional and retail investors. There are now more than 900 funds listed in the United States offering investors access to a broad range of strategies and underlying assets. ETFs have been one of the fastest growing asset classes for retail investors since 2000, driving the overall size of the market from just $66 BN in total assets to nearly $900 BN today (see Exhibit 8). ETFs are also one of the most liquid asset classes in the market, contributing 24% ($3.6 TN) of the trading volume on NYSE in 2010.

16 2010 Investment Company Factbook, Investment Company Institute

Exhibit 8: US market for Exchange Traded Funds
Total assets ($BN) and number of funds listed, 2000-2010[1]



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Funds	30	80	102	113	119	152	204	359	629	728	916

Source: Investment Company Institute
1 2010 data current through September 30

The ETF was initially developed to provide institutional investors with direct exposure to specific market sectors for hedging purposes[17]. However, the versatility of these products as an investment vehicle for a broad range of users soon became apparent. The ETF offers several advantages over comparable index tracking or actively managed funds:

- **Product access** – The ETF market offers investors access to liquid positions in a wide range of investment products. These positions would be difficult or prohibitively expensive for investors to construct through individual holdings. The range of ETF products available to investors has grown to meet demand – funds now track broad-based indices, industry sectors, geographies, currencies, and commodities using a variety of investment strategies.
- **Ability to hedge positions** – ETFs allow investors to take long or short positions on the underlying assets; this is a sophisticated strategy that may not be appropriate for all investors, but provides institutional (or large retail) investors with the ability to hedge exposures to specific market sectors.
- **Lower investment cost** – The cost of investment is lower for ETFs than other comparable investment products. The average total expense ratio for equity ETFs in the US is 34 bps versus 93 bps for the average equity index tracking fund and 146 bps for the average active equity fund[18].

17 A Focus on ETFs, The Wall Street Journal (2006)
18 Quarterly Review of the ETF Landscape, BlackRock (Q2 2010)

- **Tax efficiency** – ETFs offer two major tax advantages over mutual funds – actively managed mutual funds generally incur higher capital gains taxes than ETFs due to the frequency of trading activity and creations and redemptions are treated as in-kind transactions rather than outright sales that would result in capital gains.

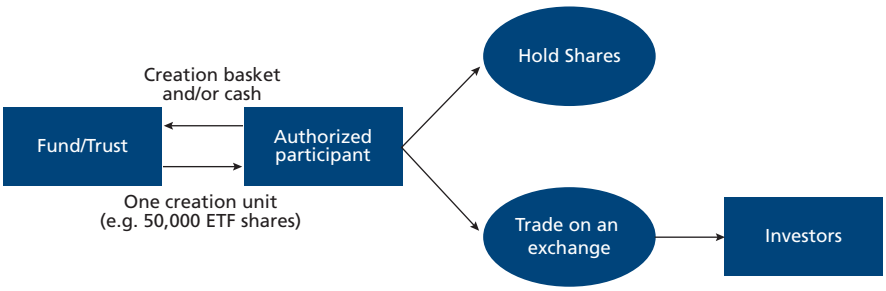
These features have driven strong growth in retail participation. At least 3 million households in the United States hold ETFs in their portfolio today. This falls short of the 60 million households with mutual funds, but ETFs are growing far faster than more traditional mutual funds (109% vs. 1% since 2006) and already make up 6% of invested assets[19].

ETF creation and trading

An ETF is created when a sponsor registers the "investment company" with the SEC or the Commodities Futures Trading Commission (CFTC)[20]. The sponsor defines the investment objective for the fund and then specifies the reference index or underlying assets the fund will track, conventionally known as the "creation basket" for the fund. Sponsors are obligated to publish the size and composition of the creation basket daily.

ETF shares are originated when an authorized participant – usually a designated dealer active in the market for the underlying assets – deposits a creation basket in a trust linked to the fund. The ETF issues a "creation unit" to the authorized participant in exchange for the underlying assets specified in the creation basket. By definition, creation units are very large blocks of shares ranging from 25,000 to 200,000 shares. The dealer will take these shares into inventory and gradually sell the position into the market to meet investor demand[21].

Exhibit 9: ETF creation process



19 2010 Investment Company Factbook, Investment Company Institute
20 Funds that invest directly in equity shares, fixed income bonds, or commodities are regulated by the SEC; funds that invest in commodities futures contracts are regulated by the CFTC
21 The share creation process also works in reverse. A creation unit can be liquidated when an authorized participant deposits or redeems a creation unit with the ETF. The authorized participant will receive the underlying securities in exchange

The pricing of ETF shares is driven by supply and demand, not necessarily the net asset value (NAV) of the reference index or underlying assets. ETFs are obligated to publish the indicative intraday value (IIV) of the reference index or underlying securities on a periodic basis during the trading day, generating "arbitrage" opportunities for investors if the price of ETF shares and IIV diverge. Any investor can take advantage of these "arbitrage" opportunities, but only authorized participants can create or redeem shares at the end of the trading day to address any lasting disconnect between the two prices.

Implications for Volcker Rule implementation

Dealers play a critical role in the ETF market at origination and through the life of the fund. As authorized participants, dealers source the underlying assets required to create ETF shares and hold an inventory of the newly created shares; they also trade actively in the market to ensure ETF share pricing remains close to the value of the underlying assets. These activities require dealers to assume some level of principal risk in the following ways:

- **Building inventory** – Authorized participants source the underlying assets required to create ETF shares and subsequently take delivery of the newly created shares. The size of the creation unit requires dealers to build sizeable inventories of underlying assets (and take delivery of inventories of ETF shares). The process exposes the dealer to inevitable fluctuations in the value of the underlying securities or the ETF shares.
- **Actively trading large positions** – Authorized participants also trade actively in the market to ensure ETF pricing remains close to the value of underlying securities. This may take the form of smaller transactions with counterparties on an exchange or larger trades facilitated on behalf of clients.

The scope of restrictions on "proprietary trading" in the ETF market will need to be considered carefully given the special nature of "market making" activity for ETFs and the significance of the market itself – a $900 BN asset class and a critical, low cost investment vehicle for retail investors that depends on dealers for liquidity.

5. US Corporate Bonds

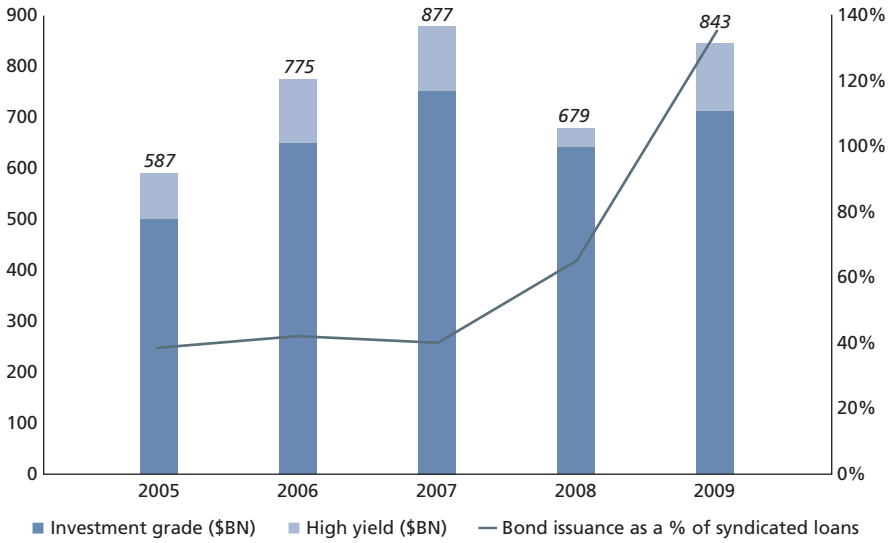
The corporate debt market is one of the primary channels for capital formation in the United States today. Corporate bonds provide an attractive means of financing capital investment and operations for a wide range of issuers, from public utilities to multi-national corporations.

Below, our discussion is focused on (1) an overview of the US corporate bond market, illustrating its fragmentation and consequent illiquidity; (2) the underwriting process by which dealers help companies raise new funds in the corporate bond market; (3) the secondary trading market and its dependence on the active intermediation of dealers who take principal risk and hold inventories as a result; and (4) the connections between the corporate bond market and the market for credit derivatives.

Overview of the US corporate bond market

The US corporate bond market has evolved rapidly over the past several decades to meet the growing demand for capital market financing – $7 TN in corporate debt securities are outstanding today with more capital raised through the corporate bond market ($850 BN) than any other channel in 2009.

Exhibit 10: US corporate bond underwriting
Investment grade and high yield issuance[1], 2005-2009



Sources: SIFMA, Dealogic, Oliver Wyman analysis
1 Includes "self issuance" by financial institutions

The importance of the US corporate bond market has grown in the wake of the financial crisis. Until 2007, bank lending contributed 70% or more of the debt financing raised by corporations in the United States[22]. However, the balance of financing activity shifted toward the bond markets as banks tightened lending standards during the crisis. Bond market investors moved far more quickly than lenders to fill the gap as the economy began to recover in 2009. The majority of banks did not begin easing lending standards and reducing spreads on corporate loans until the first quarter of 2010[23].

Corporate bonds are flexible but complex securities. Beyond the interest rate risk associated with any fixed income instrument, corporate bond investors (unlike investors holding government-backed debt) bear meaningful credit or default risk. The market is also generally segmented into three broad classifications – investment grade, high yield, and distressed – with investment grade issuers having the lowest perceived credit risk. Issuers with higher ratings generally pay a lower coupon (interest rate on the bonds); high yield issuers (non-investment grade) pay a higher coupon to compensate investors for additional credit risk. Each segment of the market has distinctive liquidity and trading characteristics, with high yield bonds (often from smaller companies) trading less frequently and in smaller sizes.

Corporate bonds offer issuers and investors enormous flexibility in their terms. Corporate bonds may be secured (collateralized) by specific assets or unsecured, represent senior or subordinated claims on the issuer's cash flows, offer fixed or floating rates, may convert to equity under pre-defined circumstances, may be paid off in advance of maturity (callable), etc. Furthermore, a single issuer typically has a number of bond issuances outstanding in the market at any one time, with different maturities, seniority of claims, and coupon rates.

The net effect of this flexibility in credit quality, term structure, and pricing is a highly fragmented market with a large number of securities relative to total debt outstanding. There were roughly 37,000 corporate bond securities with a total market value of $7 TN outstanding at the end of 2009. By contrast, there were only 5,000 equity listings with a total market value of $15 TN[24]. This fragmentation means that trading activity and overall liquidity at the level of an individual bond is quite low. As with Treasuries, liquidity varies considerably even among bonds from the same issuer, with the most recently issued bond typically being the most actively traded.

22 Source: Dealogic
23 Senior Loan Officer Opinion Survey, Federal Reserve (October 2010)
24 Sources: Fixed Investment Securities Database (FISD), World Federation of Exchanges

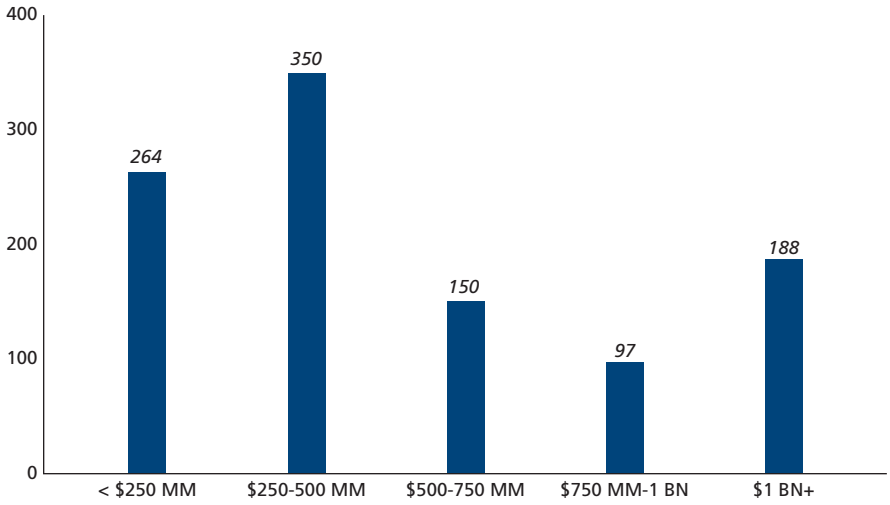
Underwriting

Corporate bond underwritings generally occur without the need for dealers to directly assume principal risk. A syndicate desk solicits indications of interest in a pre-underwriting phase to set the terms of the deal based on investor demand. In most cases, the deal is fully subscribed – investors commit to buy all available bonds at the offer price. However, dealers stand ready to support deals in three important ways, all of which involve principal risk taking:

- **Liquidity provision** – Dealers often purchase other securities held by investors in the secondary market, providing liquidity (or cash) these investors will need to participate in new offerings.
- **Price discovery** – Dealers must be active participants in the secondary market for corporate bonds in order to effectively and efficiently price new offerings and ensure that deals reflect investor demand.
- **Direct support** – Dealers also frequently step in to support deal pricing when investor demand falls short of expectations. The "syndicate desk" fills the demand gap by purchasing available securities and holding the position. By assuming this risk, the dealer can ensure that an issuer gets the expected pricing (coupon) on the issuance.

The scale of US corporate bond underwriting underscores the need for principal risk taking to support liquidity and capital formation. In 2009, there were nearly 200 deals of $1 BN or more brought to market in the United States (see Exhibit 11). A substantial capital commitment is required to (1) support deals of this size during periods of market stress and (2) generate sufficient liquidity in the secondary market for investors to participate. Even providing modest support for the deal (on the order of 10% of the issue volume) would result in a substantial spike in trading inventory.

Exhibit 11: US corporate bond underwriting[1]
Number of deals by total debt issued, 2009



Sources: Dealogic, Oliver Wyman analysis
1 Includes "self issuance" by financial institutions

Secondary trading

The secondary market for corporate bonds is dominated by over-the-counter (OTC) trading where dealers act as principals. Most investors work through one or more dealers who make markets in the specific bonds they wish to buy or sell. A number of efforts to launch exchange-based trading have been attempted over the years, but liquidity in corporate bonds is generally limited (see discussion below) and "agency" trading models have not been successful in illiquid or even liquid markets.

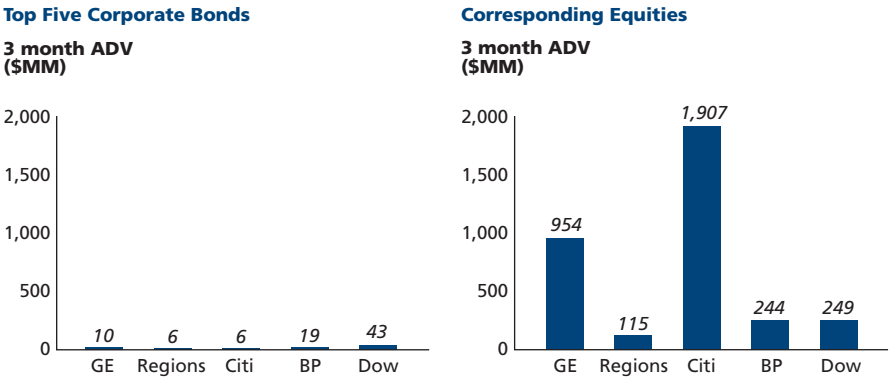
NYSE Bonds platform

In April 2007, NYSE launched NYSE Bonds, an exchange allowing trades in 6,000 debt securities, mostly corporate debt of issuers already listing equities on the exchange. Replacing the Automated Bond System, this platform maintains and matches orders on a strict price and time priority basis and reports quotations and trade prices on an absolute real-time basis. Bonds can be traded through this electronic platform at all hours of the day. The exchange has since struggled to attract significant trade volume in corporate bonds. In November 2010, there were 178 total trades on NYSE Bonds[1]. By contrast, TRACE corporate bond database, which documents OTC trades, reported 189 trades over a single day for a single security[2]. Only 10 of the 20 trading days in November 2010 saw any trading activity on NYSE Bonds; the limited activity was attributed to three issuers, representing seven unique securities.

1. NYSE Bonds daily bond activity, November 1-November 30, 2010
2. TRACE, November 30, 2010

As noted above, liquidity in the corporate bond market is generally limited. In 2009, average daily trading volume (ADV) for corporate debt was $17 BN – by contrast, daily trading volumes in Treasuries and equities were over $400 BN and $100 BN respectively. At the security level, this disparity is even greater. Exhibit 12 compares the three month average daily trading volume for the five most actively traded investment grade securities and the equity shares associated with these institutions.

Exhibit 12: Average daily volume comparison
Five most active investment grade bonds and corresponding equity shares



Sources: TRACE, Thomson Reuters Datastream

Trading volume is limited by several key factors, including:

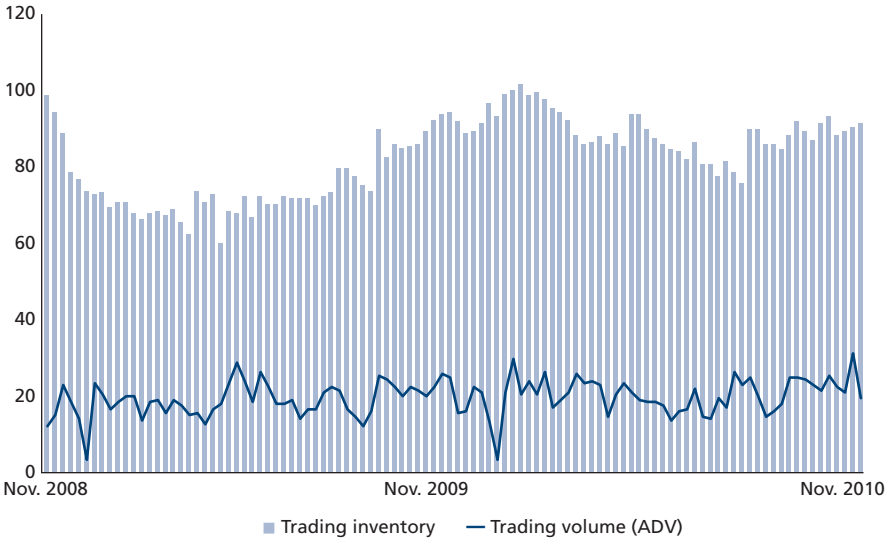
- **Fungibility** – In contrast to equity shares, corporate bonds (even for the same issuer) cannot be readily substituted for one another. A company with outstanding debt may have dozens of bonds in the market with varying maturities, yields, and other unique characteristics that make it difficult to exchange one security for another. IBM for example, has 26 bonds outstanding today with coupons ranging from 1% to 8.375% (six bonds mature in 2011, four were issued in non-USD currencies, and three offer floating interest rates).
- **Buy and hold investors** – Many types of US corporate bond investors, especially insurance companies and pension funds, acquire securities for stable cash flows generated by coupon payments (or other unique characteristics). They are unlikely to turn over the investment on a frequent basis. This implies that investors who are looking to buy or sell positions may have difficulty finding a natural counterparty to a trade at a given point in time.

The liquidity constraints of the corporate bond market effectively require dealers to build sizeable inventories. Typically, dealers earn only a fraction of the bid-offer spread in the secondary market for corporate bonds. Competition among market makers and the price risk associated with illiquid positions make it difficult (if not impossible)

to realize the full bid-offer spread on a trade-by-trade basis. Positions frequently need to be held in trading books for some period of time before liquidity materializes and the position can be closed. This position taking is essential to provide liquidity to the market.

When a customer wishes to sell a bond, the dealer takes the bond into inventory, where it will be held until it can be re-sold on reasonable economic terms. When a customer wishes to buy a specific bond, a dealer either has the bond in inventory or needs to borrow the bond from another investor in order to deliver it to the original customer. Given the fragmentation of the corporate bond market, dealers frequently need to borrow bonds in this manner. Such borrowing creates a "short" position in the bond. As with the long (bought) inventory positions, the dealer will subsequently try to close out the short position by buying the bond and delivering it back to the original owner. Such long and short inventory positions can last hours, days, weeks, or longer; dealers may be left holding particularly illiquid positions for significant periods of time. (High yield bonds, for example, are generally less liquid and so remain in inventory for longer than investment grade bonds). As a result, dealers typically build inventories well in excess of the daily trading volume in the market.

Exhibit 13: Trading inventories for US corporate securities
Primary dealer inventory and daily trading volume ($BN), past two years[1-3]



Source: Federal Reserve Bank of New York

1. Inventory net of long and short positions; volume represents average daily transaction value
2. US corporate securities includes corporate bonds, non-agency MBS, etc. with maturities >1 year
3. Inventories prior to 2008 were generally higher due to significant levels of private label MBS, mortgage related assets warehoused for securitization, etc. held on trading books

The mix of long and short positions generally creates an overall dealer inventory whose net size is significantly smaller than its gross long and short positions; the gross size of a large dealer's corporate bond inventory may be 2-10 times the net size[25]. Although long and short positions may offset each other in aggregate, the instruments on each side will generally be different, leaving a substantial amount of risk due to mismatches in offsetting positions in the dealer's portfolio. This "basis risk" must be actively managed as part of an overall portfolio-level risk management approach. The risk of individual positions cannot be meaningfully assessed or understood without the context of the other positions in the inventory. Below, we discuss how this portfolio approach to managing inventory risk relies on credit derivatives.

Credit default swaps

Credit derivatives represent a distinct but complementary asset class from corporate bonds. Credit derivatives (or more specifically, credit default swaps) isolate default risk from other forms of risk inherent in corporate bonds, such as interest rate risk. The standardization of the contract has driven rapid growth in the market, and trading volumes for CDS now exceed trading volumes for corporate bonds themselves. This is not unlike the volume of many agricultural derivatives, which exceeds the physical supply of the underlying commodity.

However, it is impossible to separate credit derivatives from the broader credit trading market. Dealers manage all forms of credit trading as a single, consolidated business in a manner that reflects the complementary nature of CDS as an asset class:

- **Liquidity** – The CDS contract provides the investor with an option to trade on a reduced set of risk dimensions relative to corporate bonds or loans. As a result, the CDS contract is a far more liquid (and substitutable) instrument that can be readily traded by investors looking to take a position in the market.
- **Risk management** – The CDS contract also provides investors (and dealers) with an effective instrument for hedging the credit risk of a corporate bond or loan. The knowledge that credit risk can be effectively (and efficiently) hedged plays a key role in supporting credit provision in the primary market.

25 Estimate based on market interviews

CDS offer an alternative channel for serving client needs in the credit trading market. Much like corporate bonds, making markets in these instruments requires dealers to assume some level of principal risk (and such position taking may in fact reduce the net credit exposure of the institution).

Implications for Volcker Rule implementation

Dealers play a critical role in the US corporate bond market – including underwriting in the primary market, trade execution in the secondary market, and structuring credit derivatives to allow investors to hedge exposures and accept more tailored risks. All of these activities require dealers to take principal risk. An overly restrictive implementation of the Volcker Rule that restricts principal risk taking in the corporate bond markets will place significant constraints on market liquidity and may have broader effects on key players:

- Investor demand for corporate bonds will be constrained if a ready market for the securities does not exist (or cannot be facilitated by dealers). Unless bank lending can fill this demand gap, capital formation is likely to be curtailed.
- Dealers owned by banking entities likely would be unable (or unwilling, except for the most creditworthy issuers whose bonds are highly likely to have strong investor demand) to play a key role in the underwriting process to price, provide liquidity for, and directly support deals, making it more difficult for issuers to raise capital and generally increasing the cost of financing.
- Pension funds and insurance companies (as the key investors in the corporate bond market) will have reduced access to corporate debt securities used today.

6. Interest Rate Derivatives

The rapid development and integration of capital markets over the past 30 years has driven a sharp rise in the use of sophisticated financial instruments, most notably interest rate derivatives (IRD). Since the market's inception in 1980, the notional value of outstanding IRD contracts has climbed to $450 TN – roughly 75% of outstanding derivatives contracts worldwide. While notional values can be useful indicators of business activity, it is important to recognize that these figures are only loosely correlated to levels of risk and cannot be easily compared to the principal amount of other financial instruments such as equities or bonds (see discussion below). Over 75% of large non-financial corporations report using interest rate derivatives, reflecting the wide acceptance of this financial instrument as a highly effective risk management tool.

IRD are flexible instruments that serve a wide variety of end user needs. Dealers have been instrumental in bringing these products to market and ensuring access for a broad spectrum of market participants. The discussion below will focus (1) on the nature of the most commonly used form of IRD – the interest rate swap, (2) the wide variety of end user needs served by these instruments, and (3) the critical role of dealers in making the market for these products.

Interest rate swaps

An interest rate swap is effectively a risk transfer agreement. Two counterparties agree to exchange interest payments (or receipts) on a common principal amount. The most common form of interest rate swap exchanges variable-rate for fixed-rate payments in the same currency, though the terms of these agreements are flexible and vary considerably depending on the needs of the counterparties.

Interest rate swaps differ from traditional securities in several fundamental ways:

- **Bilateral contracts** – An interest rate swap is a bilateral contract between two counterparties with some mutual interest. Each party stands to gain from the agreement, most often by locking in attractive financing terms or reducing exposure to interest rate volatility.
- **Zero sum economics** – The economic value of an interest rate swap at origin is typically zero. Any changes in the future value of the contract (driven by movements in the agreed reference interest rate) will benefit one party and result in a loss for the other. This means that swaps do not in aggregate directly change the total value of assets in the market.
- **Flexible terms and structure** – Although there is a constantly evolving standardization of process, including electronic confirmation, ISDA documentation, collateral agreements and clearing, interest rate swaps provide for considerable flexibility and can be customized to meet the specific objectives of each counterparty, particularly where one party is seeking to transfer a specific set of risks arising from its capital structure or core banking activities. Agreements frequently vary by notional value, expiration, collateral, frequency of valuation, etc.

The flexible nature of the interest rate swap has allowed the market to respond to a broad range of end user needs. This has fueled growth of nearly 25% per annum over the past decade, with $350 TN in notional contracts outstanding today.

Exhibit 14: Global interest rate swaps market
Value outstanding ($TN), 2000-2010[1]

Source: BIS semiannual derivatives statistics, June 2010
1. 2010 data current through June

Notional vs. gross market values

Interest rate swaps data is often reported in "notional amounts", where notional refers to the hypothetical underlying quantity based upon which interest payments are calculated. These notional amounts are never exchanged, thus they overstate the size of the market and the level of activity and are not useful as measures of market risk. In most swap transactions, cash flow obligations are a small percentage of notional amounts, and so are levels of risk. However, notional amounts are useful in derivatives reporting as they are easily quantifiable, consistently calculated across all institutions, and do not change over the life of the agreement.

In contrast, "gross market value" or the total value that could be received or paid if the transaction was unwound on the reporting date, is a more meaningful market risk indicator. In 2010, gross market value was 5% of notional value[1]. However, even gross market value overstates market risk because it does not account for offsetting positions or the value of collateral that is required for many derivatives transactions. For example, a dealer entering into a swap contract may hedge the position through another contract in the inter-dealer market. A positive gain in one contract and the offsetting loss in the other are merely summed in absolute terms to compute gross market value.

Notional amounts are also quite distinct from "open interest" figures typically used in exchange-traded futures and options markets. Open interest represents the total number of contracts that have not yet been settled or liquidated. Such contracts tend to expire over relatively short time frames, meaning that open interest is akin to a snapshot view of market activity. Notional totals for OTC derivatives markets, however, include all prior trades that have not expired (less specific unwinding trades). OTC contracts tend to be longer-lasting, and are not liquidated by offsetting trades. Notional figures therefore represent more of a cumulative historical view of total trading activity.

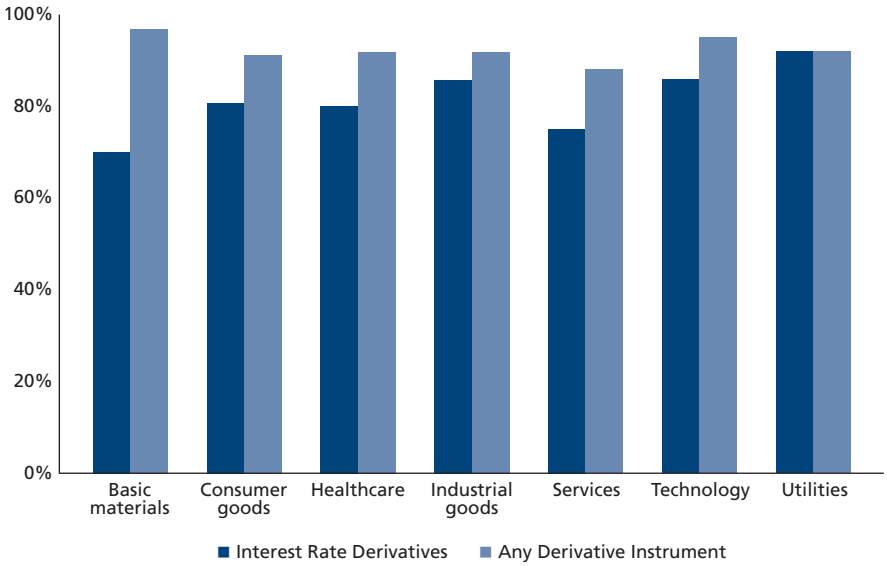
1. BIS semiannual derivatives statistics, June 2010

End users of interest rate swaps

Interest rate swaps are fundamental tools in managing interest rate risk. A broad range of entities are affected by changes in interest rates, including corporations, municipalities, banks, insurers, pension funds, and asset managers. Such groups are natural end users of interest rate swaps, which allow the transfer of these risks in very precise ways. Any institution with significant assets or liabilities sensitive to interest rate fluctuations is likely to be an end user of interest rate swaps.

The interest rate swaps market initially emerged to serve the needs of **corporations** facing significantly higher financing costs in the fixed rate markets. The interest rate swap allowed these institutions to raise debt in the floating rate markets and simultaneously create a synthetic fixed rate stream of payments (more in line with the risk appetite of the firm) at lower cost than issuing directly in the fixed rate markets. Over time, the number of large corporations using interest rate swaps for such transactions has increased. According to the latest survey of derivatives usage among the top corporates worldwide, 81% of non-financial corporations in the Fortune 500 reported using interest rate swaps[26].

Exhibit 15: Level of derivatives usage by non-financial corporations
Global Fortune 500 by sector (% using derivatives)



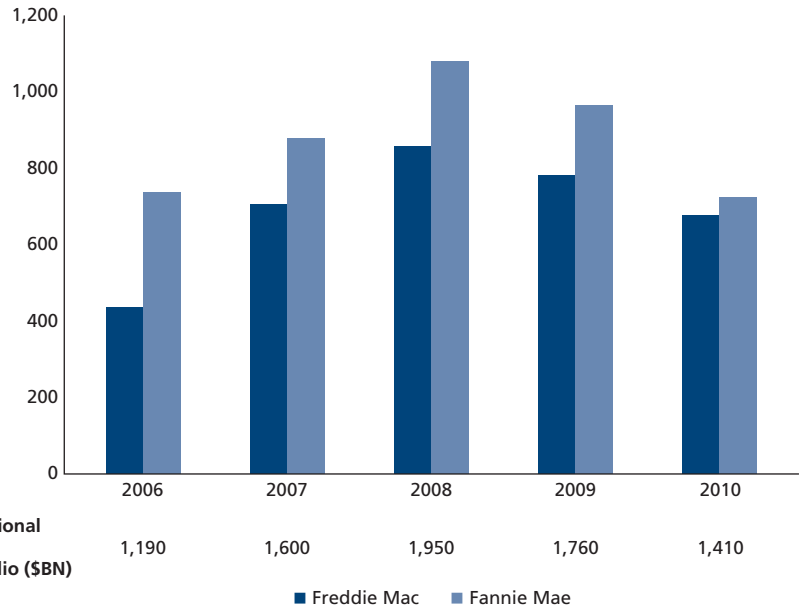
Source: ISDA Derivatives Usage Survey 2009

Financial institutions are the heaviest users of interest rate swaps (94%) today. These firms rely on interest rate swaps to manage a complex set of risks that arise from a variety of core banking, investment, and insurance activities. **Insurers** and **investment managers** rely on interest rate swaps to manage the duration gap between cash inflows from assets and cash outflows from liabilities. The difference in the sensitivities of assets and liabilities to changes in interest rates can result in significant liquidity issues for these institutions.

26 ISDA Derivatives Usage Survey 2009

Banks and **Government Sponsored Entities (GSEs)** rely on interest rate swaps to hedge broader exposures to interest rate volatility within lending or mortgage portfolios. These exposures arise due to interest rate mismatches between assets (e.g. commercial and consumer loans) and liabilities (e.g. deposits). Regulators require banks to manage their interest rate risk to ensure the safety and soundness of these institutions, by protecting earnings and capital. The scale of these hedging transactions (and the value they provide) is enormous. Fannie Mae and Freddie Mac hold mortgage portfolios that collectively exceed $1.5 TN. The GSEs actively hedge the interest rate risk on nearly the entire portfolio through interest rate swaps, holding more than $1.4 TN in notional value as of September 2010.

Exhibit 16: Level of interest rate derivatives usage by GSEs
Swaps and swaptions holdings of Fannie Mae and Freddie Mac ($BN)
2006-2010[1]



Source: Company filings
1. 2010 data current through September 30

Rising interest rates expose banks and GSEs with predominantly fixed rate mortgage assets to significant interest rate risk, as the funding liabilities supporting the assets do not have the same maturity profile. In addition, assets such as mortgages create very complex interest rate risks, because of product features such as borrowers' ability to prepay mortgages without penalty. This asset-liability mismatch can be a substantial source of risk. For example, in the 1980s, Savings & Loan (S&L) mortgage portfolios lost up to 25% of their value due to rising interest rates[27]. Today, these complex risks are actively managed through the extensive use of interest rate swaps and more complex interest rate derivatives, provided by dealers. It is useful to note that modern interest rate risk management using derivatives has helped to limit losses due to interest rate movements among major financial institutions, even during the recent crisis.

For both banks and other financial firms, reduced liquidity for interest rate derivatives caused by a restrictive implementation of the Volcker Rule could directly impair these institutions' ability to prudently and actively manage interest rate risk.

Market structure

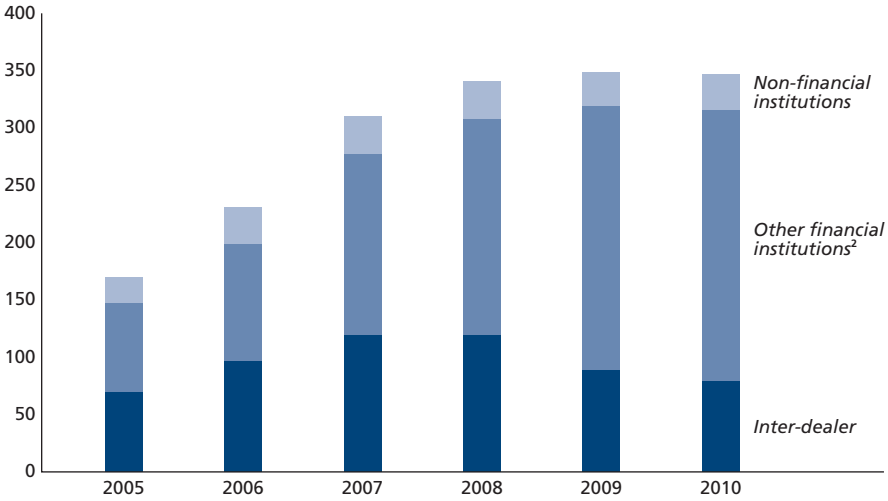
Dealers play a critical role as market makers in the interest rate swap market. The bespoke nature of interest rate swaps makes it difficult and impractical for dealers to simultaneously identify two institutions with exactly offsetting interest rate hedging needs. Despite this lack of perfect offsets, the principal model ensures that the interest rate swap market remains highly liquid in terms of low execution costs and ability to trade without price impact.

A customer seeking to enter into an interest rate swap negotiates terms and executes the swap with a specific dealer. The swap then constitutes a legally binding contract between the customer and dealer, which persists throughout the agreed life of the swap. A swap dealer therefore ends up holding a large number of ongoing, active contracts. This swap "inventory" is of a fundamentally different nature than an inventory of securities, as the dealer is solely obligated to uphold swaps contracts and cannot trade out of the obligations like a position in a security, without counterparty consent.

27 Dwight Jaffee, The Interest Rate Risk of Fannie and Freddie, Journal of Financial Services Research (2003)

The dealer must instead manage the risk presented by the ongoing swap by entering into other transactions that offset the original interest rate swap's risk. These offsetting transactions may be swaps with other customers, swaps with other dealers, trades in related futures contracts, or the purchase or sale of bonds. Inter-dealer transactions are a substantial part of the overall swaps market (23% of notional in 2010) and are integral in allowing dealers to manage swap positions.

Exhibit 17: Counterparties to interest rate swaps
Notional amounts outstanding by counterparty ($TN), 2005-2010[1]



Source: BIS semiannual derivatives statistics, June 2010
1. 2010 data current through June
2. Includes GSEs, investment managers, and insurers

By regulation, principle, and practice, dealers must be able to understand their composite interest rate risk exposure across all relevant swaps, bonds, futures, and funding[28]. A given interest rate swap between a dealer and customer is not managed as a separable unit of risk, but rather as a contribution to a comprehensive set of exposures to relevant interest rate yield curves. Although a dealer will actively manage the overall risk profile, there are frequently many imperfect risk offsets within the overall portfolio, leaving significant basis risks to be held and managed on an ongoing basis. Examples of basis risks include:

- Being long 1-month USD LIBOR[29] but short 3-month USD LIBOR – these rates usually move in close alignment, but the precise spread between them may change over time
- A swap with a customer is agreed to last for 51 weeks, while the hedging position lasts for 52 weeks

28 The nature of funding sources, such as deposits and repurchase agreements, contributes to overall interest rate risk
29 The London Interbank Offered Rate (or LIBOR) is a daily reference rate based on the interest rates at which banks borrow unsecured funds from other banks in the London wholesale money market.

- One swap referencing 3-month USD LIBOR rates, and an offsetting swap referencing 3-month USD Treasury bill rates

Beyond basis risk, dealers also retain a residual risk of the failure of counterparties to perform on their obligations under the agreed swaps. This implicit extension of credit to counterparties is a major source of the value dealers provide to customers. Otherwise, even those customers who could manage risks through exchange-traded derivatives would be subject to margin calls and unpredictable cash requirements. Most corporate users of interest rate swaps are not able or willing to take on these complexities of direct participation in exchange trading of interest rate instruments.

Dealers manage this counterparty credit risk in a number of ways, including:

- **Netting** – Netting allows users to offset amounts due at termination of individual contracts with the same counterparty and manage only the final, "net" position. Since OTC derivatives are generally not tradable, users can best alter positions or terminate contracts by taking an offsetting contract with the same counterparty to adjust the overall net position to desired levels. Thus, netting gives end users incentives to deal with one counterparty instead of many, in order to reduce collateral requirements and credit exposures. The institutions most suited to being counterparties to multiple transactions are dealers, due to their access to large amounts of capital, their natural exposure to interest rate and other risks, and experience and efficiency in working with such products. The market has consequently become dealer-driven.
- **Collateral** – The use of collateral in interest rate swap agreements has enabled the expansion of the swaps market to a larger set of end users, including corporates. By holding collateral, dealers ensure that the threat of default from one counterparty does not affect other transactions and create wider implications for the market.

Implications for Volcker Rule implementation

Market making in derivative contracts is inherently distinct from market making in securities. Derivatives contracts are customized to meet client needs and can remain in place over extended periods of time. They are not discrete securities, which are generally more fungible and actively traded. Clients' needs are specific to their own situation and are unlikely to be hedged perfectly with offsetting trades, leaving dealers with significant ongoing residual risk positions – including, for example, basis risk and counterparty credit risk.

The interest rate swaps market provides a useful illustration of the unique risks (and the trading activities required to manage these risks) inherent in the derivatives markets:

- Interest rate swaps are typically customized products that remain in the portfolio of dealers for an extended period of time. The nature of these contracts exposes dealers to basis risk that may not exist in other, more standardized markets where positions can be closed or completely offset. However, dealers are well positioned to manage this risk and provide a valuable service to clients by taking on these difficult-to-hedge exposures.
- The size and structure of interest rate swaps vary considerably. It may be difficult (if not impossible) to find perfectly offsetting trades in the market, so any given trade may trigger a number of hedging transactions across multiple instruments to effectively offset the risk.
- The risks contributed by individual swaps contribute to an overall risk position that dealers manage holistically, often across multiple asset classes. Risks arising from interest rate swaps, corporate bonds, and related futures contracts all contribute to a firm's sensitivity to changes in interest rates. It is both more efficient and more effective to manage this risk on a portfolio basis. Trade by trade hedging is prohibitively expensive and often impractical for these exposures.

Taking risk in the context of market making is an appropriate and important service that dealers provide. An overly restrictive interpretation of the Volcker Rule restrictions on position taking in the interest rate swaps (and related derivatives) market would hamper the risk management capabilities of most corporations and financial firms, leaving a wide variety of US institutions more exposed to risk.

7. Natural Gas

Over the past several decades, commodities trading and risk management have become an increasingly important set of activities for producers, consumers, and investors. New sources of demand from rapidly industrializing nations and economic instability have driven significant price volatility in the market. This volatility has real implications for the costs of production (and ultimately consumption) across a broad range of products and services in every market.

Financial institutions play a critical role in helping producers, consumers, and investors manage commodity price risk. This function occurs directly via risk management (or hedging) and indirectly via liquidity provision in the derivative markets. The discussion below is focused on the role of dealers in one of the most important segments of the commodities market today – natural gas. Natural gas is only one of many commodities markets where the analysis that follows applies. The structure of the natural gas market is such that it is necessary for dealers to take and retain significant risk positions in order for them to be able to provide producers, end users, and investors with products that effectively mitigate or hedge risk exposures to natural gas and related commodities.

While "market making related" trading in commodities-related instruments is permitted by the Volcker Rule, a narrow interpretation of the definition of market making could have a profound impact on the ability of end users to hedge risk in the underlying assets.

Natural gas markets

Natural gas is a critical resource for the US economy. The US produces more natural gas than any comparable source of energy – outpacing other fossil fuels, nuclear power, and renewables. The US was the world's largest producer of natural gas in 2009. The vast majority (95%) of this production is consumed domestically[30].

30 Total natural gas production in the United States totalled 593.4 BN cubic meters (bcm). 30.3 bcm (5%) were exported via pipeline or liquefied natural gas (LNG). Source: BP Statistical Review of World Energy (2010)

Natural gas already accounts for nearly 25% of total energy consumption in the United States, trailing only petroleum[31]. However, it is likely to become an even more important resource for US households and businesses as industries shift toward cleaner-burning fuel sources – natural gas is a far cleaner source of energy than oil or coal. Significant environmental initiatives such as emissions cap and trade in California will only reinforce this trend.

Natural gas is used for a variety of household, commercial, and industrial applications. A major source of electric power generation, natural gas is also used extensively in manufacturing as a feedstock for a range of refined petrochemical products such as plastics, fertilizers, and fabrics. Household and commercial penetration is somewhat lower but continues to expand rapidly.

Exhibit 18: Consumption of natural gas
End users by sector, 2009

End Users	Consumption (bcf)	Share of Total
Electric power plants	6,888	33%
Industrial	6,090	29%
Residential	4,739	23%
Commercial	3,095	15%
Transportation	32	< 1%
Total	**20,843**	**100%**

Source: US Energy Information Administration, 2009

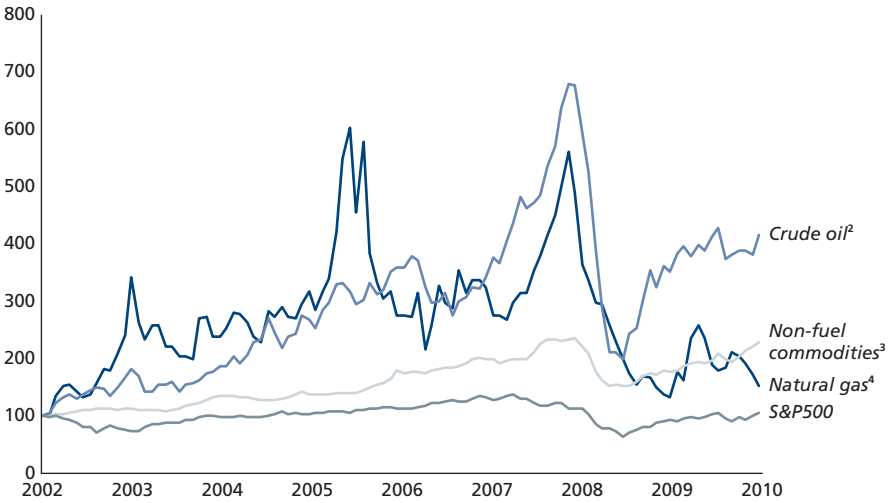
Similar to other commodities, the spot price (the market price for next day physical delivery) of natural gas is driven by supply and demand in local markets. Natural gas is priced and traded at various 'trading hubs' throughout the country, located at the interconnection of major pipeline systems. There are over 30 trading hubs in the US, each with its own localized pricing dynamic.

Based on the fact that a significant number of interstate and intrastate pipeline systems converge at the Henry Hub delivery point on the Sabine Pipeline in Louisiana, that location has evolved as the reference point for the industry in pricing both delivered natural gas, and futures and derivatives contracts tied to the price of natural gas. The incremental transportation cost of moving natural gas over interstate and intrastate pipeline systems creates what is referred to in the market as "basis differential" and forms the basis for pricing differentials between localized markets. In 2009, the average spot price for natural gas at trading hubs ranged from $3.13 to $4.89 per MM British Thermal Units (MMBTu) vs. a benchmark price of $3.92 at Henry Hub. Daily, weekly, and monthly pricing variances exceed this range considerably.

31 US Energy Information Administration Monthly Energy Review, November 2010

The natural gas market is particularly sensitive to short-term supply and demand shifts due to the inelasticity of the market. In the short term, consumers are limited in their ability to substitute energy sources, and producers require significant lead time to expand pipeline capacity. Limited responsiveness by consumers and producers alike means that natural gas prices are highly reflective of demand spikes/troughs or supply disruptions.

Exhibit 19: Volatility of natural gas spot prices
Indexed average monthly prices for selected benchmarks, 2002-2010[1]



Source: International Monetary Fund
1. 2010 data current through October, Jan 2002=100
2. WTI crude index
3. IMF non-fuel commodities index, includes industrial metals, food, beverage, etc.
4. Henry Hub spot prices

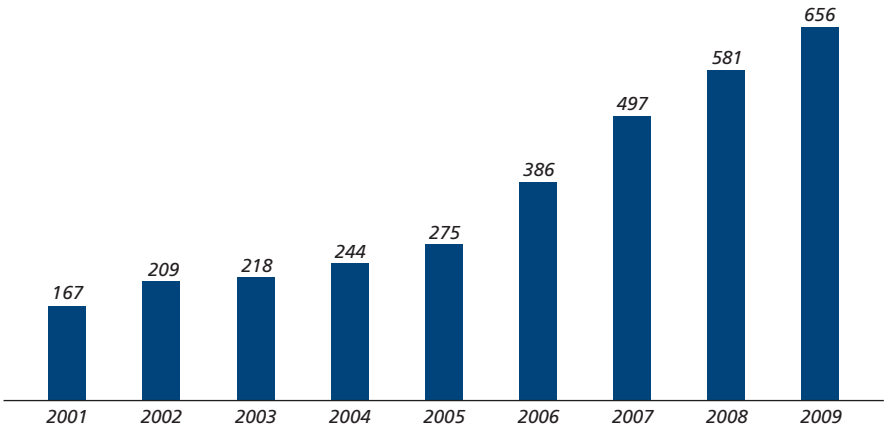
Price volatility in the spot market can have significant consequences for end users. Stable input pricing is essential for setting product pricing, financing new projects, and ensuring the economics of the business are sustainable in the commercial sector; it is equally important for consumers who rely on natural gas for the home. A robust derivatives market has developed to allow end users (and other market participants) to hedge this volatility.

The derivatives market consists mainly of medium- to long-term futures, options, and related financial contracts traded on-exchange or over-the-counter (OTC). The notional value of outstanding natural gas derivative contracts is estimated to be 10 to 12 times greater than that of physical contracts[32]. Data on trading volumes (both physical and derivative) is limited, but the largest exchanges report the total number of contracts traded and cleared through their platforms. Over the past decade, the total volume of energy contracts has grown nearly

32 NaturalGas.org

20% per annum; and natural gas contracts represent three of the top 10 energy contracts traded today (see Exhibits 20 and 21).

Exhibit 20: Energy derivatives growth
Contracts traded or cleared (MM), 2001-2009



Source: Futures Industry Association

Exhibit 21: Top 10 energy derivatives growth
Contracts traded or cleared (MM), 2009

Contract, Exchange	Volume
Light, sweet crude oil futures, CME	137.4
Brent crude oil futures, ICE	74.1
Natural gas futures, CME	48.0
Fuel oil futures, SHFE	46.4
WTI crude oil futures, ICE	45.8
Crude oil futures, MCX	40.9
Gas oil futures, ICE	36.0
Crude oil options on futures, CME	28.6
Henry Hub natural gas swap futures, CME	25.7
European style natural gas options, CME	25.3

Source: Futures Industry Association

The derivatives market is instrumental in serving the risk management needs of producers and consumers whose core competencies generally do not extend to trading. Producers are able to use derivatives to lock in a certain price and guarantee the revenue stream that they will receive from a stock of natural gas. Likewise, end users can use derivatives to fix pricing for natural gas inputs. Given the high price volatility associated with natural gas, derivatives are a critical tool available to end-users and other market participants as a mechanism to manage the risks and uncertainty inherent in their businesses.

Supporting investment in natural gas production

Recent advances in drilling technology have made shale gas accessible and represents an important advance towards North American energy self-sufficiency. This provides a significant benefit to the US economy that is only now being recognized. The development of these resources was made possible in no small part by the revenue streams that US natural gas producers earned as a result of active hedging programs. US producers earned approximately $13 BN in increased revenue in 2009 due to hedges entered into during 2008. This extra revenue allowed producers to continue the development of shale resources despite a very low price environment and a highly constrained credit environment during this period.

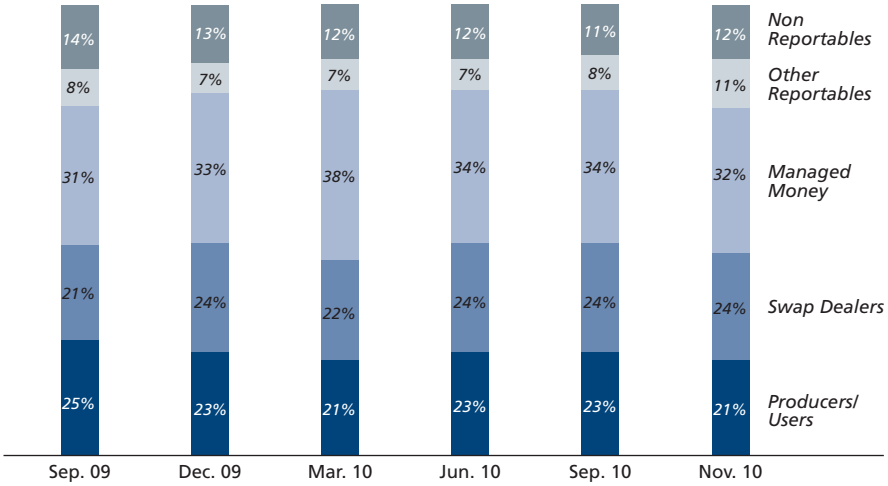
However, there are fundamental differences between exchange-traded and OTC derivatives transactions. The risk of an exchange trade is managed via a central counterparty with daily margin calls for all market participants[33]. In a volatile pricing environment, it may be impossible for corporate end users to manage these margin calls. By contrast, the risk of an OTC trade is managed on a bilateral basis and involves an implicit extension of credit from the dealers or their affiliates. Collateral calls (that require end users to post collateral with their dealer) are generally less frequent than margin calls for exchange-traded derivatives. As a result, dealers and their affiliates play a crucial role in facilitating the risk management capabilities of end-users and other market participants.

Role of market makers

Financial institutions are major participants in the natural gas derivatives markets today. During the final week of trading in 2009, nearly 25% of the open interest in NYMEX Henry Hub Natural Gas futures and option contracts were held by "swap dealers" – the majority of which are affiliated with financial institutions. The level of participation has been relatively constant over time (see Exhibit 22).

33 End users typically access the market via Futures Commission Merchants (FCM) who facilitates trades on behalf of the client; however, the client remains responsible for posting margin based on the position of the trade.

Exhibit 22: Swap dealer participation over time in natural gas derivatives
Percent of NYMEX open interest in futures and options, Sep 2009 – 2010[1]



Source: US Commodities Futures Trading Commission (CFTC)

1 2010 data current through November. CFTC data began segregating swap dealers in September 2009

Affiliates of dealers (or swap dealers) hold positions in the natural gas market to serve the needs of customers, provide liquidity to the market, or hedge the exposures generated by trading activity. Natural gas and related commodities markets exhibit particular characteristics which make it necessary for dealers (or swap dealers) to trade in large volumes and retain risk positions in various instruments in order to realize these objectives. These market characteristics include:

- **Asymmetric market demand** – Producers and consumers of natural gas often have asymmetric financing/funding needs that do not perfectly offset one another. A natural gas producer with significant investment costs may wish to lock in cash flows over a period of several years, while an end user may prefer to eliminate variable price risk by entering into a derivative contract with a dealer that is willing to swap the fixed priced of natural gas against the floating price, allowing the end user to obtain certainty in an otherwise highly volatile seasonal market. Market makers provide a critical bridge as a willing intermediary to the market in taking the other side of otherwise illiquid client trades. Dealers and their affiliates are able to manage a portfolio of derivative instruments across multiple commodity types and maturity dates. This aggregation mutes the impact of market volatility for the dealer while allowing them to provide crucial liquidity to the market.

- **Concentrated volumes** – Natural gas derivative contracts trade in concentrated volumes (or blocks) to meet the supply and/or risk management needs of major industrial end users. It is generally impossible for dealers or their affiliates to match buy and sell orders of this size in real time. Instead, market makers commit capital to take the other side of these trades and assume the principal risk – this risk is offset by existing positions within their portfolio or managed down through a series of trades, often in a different instrument.
- **Fragmented liquidity** – The total number of natural gas derivative contracts has proliferated over the past several years to cover a wide breadth of different exposures. The Chicago Mercantile Exchange clears over 200 natural gas futures and option contracts today, and many more bespoke contracts are crafted to meet specific needs. Market makers manage this fragmented liquidity for clients by taking the other side of trades (even highly illiquid trades) and managing the risk with more liquid, albeit imperfectly matched instruments.
- **Basis risk** – The structure of the natural gas market is highly fragmented. A power producer taking delivery of natural gas at a regional hub may still hold considerable exposure if the only available contract for hedging price risk is the Henry Hub futures contract. Market makers will accept this (and other forms) of basis risk and manage the position across a portfolio of offsetting positions.

The trading activity of dealers (or swap dealers) facilitates their ability to provide important risk management products that provide tangible benefits to producers, consumers and the economy generally, including:

- **Risk management to support financing** – Investment banking and project finance groups frequently serve clients planning to either build or acquire natural gas fired power plants. To secure financing, the prospective plant owner must demonstrate a stable income stream; however, income from the power plant is based on the fluctuating spread between the price for natural gas and the revenues received from power generation.

A dealer's commodities desk can provide a solution by structuring and executing the following arrangement: the dealer enters into a swap transaction with the power plant, whereby the plant owner pays a floating price and the dealer pays a fixed price on the spread between natural gas and power prices. This transaction stabilizes the power plant's margin, thereby creating the fixed cash flow needed to support the client's debt obligation. The dealer assumes the risk based on the spread between the fixed price sale of natural gas and the fixed price purchase of power.

In order to manage these price risks, the dealer will hedge its long-term power purchase and long-term natural gas sale exposure under the swap by (1) selling fixed-price power to a wholesale reseller or a municipal utility to offset its purchase of the long term power, and (2) buying NYMEX Henry Hub natural gas futures contracts to hedge the fixed price of the natural gas swap. If natural gas prices should subsequently rise, the loss the dealer incurs on the obligation of the swap position will be offset by the increase in value of its long futures position.

The dealer therefore plays a key role in the natural gas trading market by providing risk management services in a volatile price environment, allowing:

- Long-term infrastructure financing – The client is able to enter into a long-term swap transaction to secure a fixed income stream and finance the construction or acquisition of the power plant.
- Lower energy costs – Without the ability to maintain a constant presence in both sides of the market, natural gas transactions similar to the one described above would not occur, thereby reducing energy market liquidity. This in turn will increase hedging costs and/or market risks incurred by developers of new power plants, by other clients with hedging needs, and by energy producers, and, ultimately, increase energy costs incurred by US households and businesses.

- **Liquidity provision** – In 2009, a major dealer agreed to acquire a large, complex energy position of NYMEX Henry Hub natural gas options and ICE Henry Hub natural gas futures contracts from a futures commission merchant ("FCM"). The FCM had assumed the position from a client unable to post adequate margin on the position due to financial difficulties. At the time, price volatility of natural gas was high and market liquidity was low, making it difficult to value the position. However, the dealer's active presence in the futures and options markets allowed the commodities desk to accurately value the portfolio and reasonably price a liquidity premium appropriate to the risk transfer in a timely manner.

  After assuming the open positions (numbering in the thousands), the dealer managed them within its existing portfolio and proceeded to liquidate some positions over time, while keeping others open to serve as hedges of existing transactions and anticipated new transactions. By doing so, the dealer enabled the FCM, NYMEX, and the market as a whole to avoid the significant disruption of an immediate forced liquidation of the open positions.

Implications for Volcker Rule implementation

Managing commodities pricing risk is a complex endeavor that requires substantial experience, sophisticated risk management technology, and real-time market knowledge derived from active, daily trading. The majority of end users lack the scale to build this trading infrastructure in-house and therefore rely on dealers or their affiliates to provide liquidity and help manage the price risk inherent in their business.

Affiliates of dealers fill this role in a variety of ways, all of which require some level of principal risk taking and position building. An overly restrictive interpretation of the Volcker Rule restrictions on proprietary trading could have serious consequences for the natural gas markets:

- Greater exposure to overall price volatility for all market participants
- Greater exposure to basis risk (imperfect hedges) for end users
- Reduced credit for critical infrastructure projects
- Increased hedging costs

These lessons apply in equal measure to a broad range of commodities markets.

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