

Effective Regulation: Part 4

Turning Good Ideas Into Good Outcomes

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Global Markets
Institute

No idea is so good that it can't be misapplied

Efficient and safe financial markets are essential to global prosperity. The goal of regulation should be not only to make the financial system safer, but also to improve its ability to perform its two critical functions: allocating capital to where it will best be utilized, and providing individuals with the opportunity to participate in markets in an equitable fashion.

Many good ideas aimed at reducing systemic risk and improving fairness for all market participants are now under consideration. But good ideas do not necessarily guarantee good outcomes. Execution and application matter. Securitization is an excellent example of how a good idea, when applied badly, can go terribly awry. In response to earlier banking crises, securitization was embraced as a means to reduce risk at individual banks. It worked – local banking problems became fewer and more easily managed. But when securitization was applied to low-quality assets and improperly used by banks to exploit gaps in regulatory oversight, it helped to create the current crisis.

Actions taken in one area can have profound and sometimes adverse effects on another – in ways that are not always obvious beforehand. This is often referred to as the “law of unintended consequences”. As we consider changes to the regulatory system, it is important to understand how these changes may have impacts beyond what is intended.

In this piece, the fourth in a series on effective financial market regulation, we aim to help better focus the debate on financial reform beyond individual issues and to look instead at how the whole system can be altered to reduce systemic risk and improve overall economic performance. We concentrate on a few key topics: the role of market-makers in resolving mismatched markets; the importance of full participation in the price-discovery process; and the most effective role for clearing houses. In looking at each, we consider how the whole financial system can be strengthened without inadvertently sowing the seeds of the next crisis or significantly diminishing market efficiency.

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Introduction: the complex financial eco-system

Consider the honey bee.

Perhaps an odd start to a paper on financial-market regulation, but it is an appropriate one. Financial systems, like complex eco-systems, are interconnected in ways that can be opaque to the casual observer – and sometimes to the informed observer as well. Reforms to financial regulation are undoubtedly necessary, and we support them wholeheartedly. But they should take into account the necessarily complex nature of the global financial system if they are to make it both safer and more efficient.

Efforts to address a single flaw in isolation have often had unexpected and unwanted consequences as they ripple throughout the entire financial system. By singling out individual behaviors, current efforts to reform flaws in today's system run the same risk of causing detrimental unintended consequences. That is not to say that significant improvements are undesirable or impossible. It is only to argue that as much effort should be dedicated to understanding financial interconnectedness as is dedicated to reviewing individual practices.

Ultimately, reform should not only make the system safer, but also improve its ability to perform its two critical roles: to allocate capital to areas where it will be utilized best; and to provide individuals with the opportunity to participate in markets in an equitable fashion.

If we set out to cleanse the financial system of every practice that does not immediately appear "useful" or "good", or that could be subject to abuse, we may find that we have accidentally destroyed the ability of markets to provide essential services. Eco-systems require many parts. Although most of us would prefer not to deal with them, the world would be worse off without bees, bats or fungi. *Similarly, the role played by each part of the financial system must be considered in a broader context if reforms are to improve the functioning of the system as a whole.*

Understanding the role played by each part of the market requires an appreciation for how markets really work, and how different pieces interconnect. In our view, the core driver of complexity in financial markets is that markets tend not to be naturally balanced between buyers and sellers. Different market participants have different interests, needs, time horizons and liquidity requirements. Market makers and similar entities create balance in markets by bridging the gaps between what investors want to supply, and what companies, individuals and governments want to use.

Filling the gap between the capital that investors want to supply and the capital that companies and others need is the core function of modern markets. The success of innovations such as the repackaging of risk into derivatives and the increasingly complex nature of market-making have allowed capital to be raised in larger quantities for more companies, and to be allocated more efficiently than in the past. This has, in turn, fuelled economic growth and the ensuing benefits of such growth – job creation, innovation and greater tax revenues.

That is not to say that complexity in and of itself is positive. The recent past is filled with examples of complexity getting the better of markets and of individual firms – in many cases because complexity appeared to be an attractive end unto itself. On the other hand, complexity that is the byproduct of markets serving the needs of their users and the economy should not be eradicated just because complexity sometimes fails. Simple is not always best.

Our goal in this paper is to help better focus the debate on financial reform beyond individual issues and to look instead at how the whole system can be altered to reduce systemic risk and improve overall economic performance. This is likely to become a question of how to take some of the very good ideas that will drive the reform

process – such as the standardization of financial products and the increased use of clearing houses – and better understand how and when they will be clear positives for the system, and when the opposite might well be true. Crises like the one we have recently experienced tend to drive their own momentum for change, but there is no idea that is so good it cannot be misapplied.

The most recent example of this is securitization. In response to earlier crises, financial markets and regulators embraced securitization as a powerful means of mitigating risk at individual banks. And it worked up to a point – local banking problems became fewer and more easily managed. But this good idea turned bad when it was applied to low-quality assets like sub-prime mortgages. It turned worse when it was used by financial firms to reduce the capital they held against low-quality loan portfolios or to hide risk in affiliates. Ultimately, securitization helped create the current crisis.¹

As legislators, regulators and market participants alike implement various reforms, the goal must be to increase systemic stability, rather than to inadvertently sow the seeds of tomorrow's crisis.

In the next section of this paper, we summarize the key conclusions of our analysis, and then follow with a more detailed look at several major market reforms currently being considered.

Financial reforms: some key conclusions

Form should be allowed to follow function

Standardization of financial products solves many problems, and in the high-volume parts of the markets, standardization is a true positive. But, as we will discuss, the high-volume parts of the markets are not the only economically important parts.

Non-standardized products that trade over-the-counter (OTC) are critically important to financial markets. They allow companies to raise capital at lower costs, to manage risk more effectively and to engage in transactions that improve their structural efficiency. These non-standard transactions are often the kinds of transactions that drive the largest economic benefits – including job creation, investments in physical assets and the development of new technologies.

The high-volume parts of the markets – in addition to performing their most critical function of setting prices – are in fact what allow these low-volume, high value-added transactions to occur. As we will show, this is because market makers must execute many high-volume transactions to hedge the risks associated with a single non-standardized one.

Thus, as we seek to standardize more financial products, we must take care that we do not accidentally inhibit the ability of markets to create economic value. Markets should continue to offer a broad array of products that can be used by capital providers and capital consumers. Market makers must be able to manage the risks that ensue from these products. The connections between custom and standardized parts of the markets need to be understood and maintained, rather than hindered or eliminated. For example, hedge exemptions can be critical to allowing market makers to offset risk from providing corporate clients with specific risk-management services that are impractical for corporations to manage for themselves. Incentives to use standard products are highly

¹ We discussed the role of securitization in fueling the current financial crisis in the first paper in our *Effective Regulation* series: *Avoiding Another Meltdown*, March 2009.

appropriate, but prohibitions on non-standard products can seriously interfere with the ability of the market to help corporations raise capital and manage risk.

Restrictions on participation are almost certain to hurt the functioning of markets

Many commentators argue that price volatility benefits only traders, while hurting the rest of the economy. While it is true that the price-discovery process in financial markets can be very messy, price discovery is undoubtedly one of the most important functions of markets.

Price discovery yields good prices, which benefit everyone. This is because weak companies with inflated stock prices or an inappropriately low cost of debt waste valuable capital. Allocating capital instead to strong companies will help them fund expansion, and that expansion can, in turn, fuel economic growth. This is the key to long-term prosperity, a point we will demonstrate in detail later in this paper by looking at a few case studies involving oil companies.

Short sellers and the buyers of credit default swaps (CDS) have come under particular criticism over the past year, with some observers arguing that they generate little economic benefit. Yet they bring valuable information to markets: contrarian views in the case of short sellers, and more accurate pricing information in the case of CDS buyers. As a result, they give market participants greater faith in prices and increase their willingness to provide funding. As we show later in this paper, companies with CDS are able to raise debt capital at lower rates because CDS allow buyers to more easily manage their risk. This lowers funding costs for the companies and improves their ability to invest.

Full participation is essential to an efficient price-discovery process. This is true even, and sometimes especially, when we don't like or agree with all of the answers markets provide.

Liquidity should be a key goal of regulation, and transparency should be seen as a tool to create liquidity, not a goal in itself

It is important to understand the interplay of liquidity and transparency. Liquidity is the key attribute of well-functioning markets, ones that reduce systemic risk and serve the real economy. Transparency is a key attribute of liquid markets, as investors will not supply significant capital if they cannot understand the true value of an entity.

However, it is important to distinguish between price transparency and transactional transparency. Price transparency allows investors to know the price at which a security has been sold or bought. This, in turn, allows investors to accurately assess the value of their investments. This kind of transparency makes investors more willing to commit capital, aids liquidity and promotes systemic soundness.

An alternative notion of transparency – transactional transparency that allows all participants to see all trades on a real-time basis – can actually *inhibit* liquidity. This is because participants who invest large pools of money – such as pension funds and the mutual funds through which small investors allocate most of their capital – can be severely disadvantaged if all of their transactions are visible in real time. Having their positions visible to everyone else forces them to act much more defensively in their trading. This, in turn, significantly reduces the liquidity available to other large investors and corporations.

While real-time reporting may seem like a simple positive, in the world of real markets, there are substantial trade-offs to consider. Many of the positive innovations in trading platforms over the last decade have allowed large investors to provide liquidity without having their orders broadly seen until *after* their transactions are completed (this is called “non-displayed liquidity”). These innovations have essentially transferred liquidity from hard-to-access slips of paper sitting on the trading desks of large mutual and pension funds, to easier-to-access electronic systems. Greater liquidity has, in turn, lowered trading costs by reducing bid-ask spreads, and has allowed companies to execute larger capital

raisings and risk-management transactions. If liquidity provided by large investors goes from being non-displayed to virtually non-existent, everyone loses.

Although clearing houses may be the most effective way to reduce systemic risk in derivatives markets, they are not appropriate for every market or every user

Clearing houses are really only effective when applied to highly liquid, high-volume markets, and only for major participants. This issue is quite simple: well-capitalized clearing houses that clear high trading volume and accurately priced products can massively reduce counter-party risk – but they do this at the cost of concentrating that risk at the clearing house itself.

In high-volume markets operating through tightly regulated clearing houses with stringent membership requirements, this trade-off is very positive. Yet in lower-volume products with less liquidity and weaker members, the reduction in counter-party risk is naturally much smaller – and the risk accumulated at the clearing house is much greater. In these cases, *clearing houses can actually increase and concentrate systemic risk*. Thus, we believe that low-volume products should remain outside of the clearing process, though not outside of the position and trade reporting processes.

For regulators and other participants, there is another important lesson from securitization to be drawn. Altering a system to implicitly or explicitly promote a particular market structure or product – such as securitization or clearing houses – increases the risk that this structure or product will be used in ways that are unintended or inappropriate. If regulators and investors rely too much on this explicit or implicit promotion, they may overlook signs of strains in the market.

Although securitization was originally intended to be applied to high-quality loans, the rules in fact incentivized institutions to relax their lending standards further and further, ultimately as far as subprime mortgages. Unfortunately, securitization itself could not transform poor loans into good ones. Similarly, clearing houses cannot make poorly capitalized counterparties or illiquid assets safer. We do not want the clearing houses of tomorrow to create similar systemic problems as securitization has.

In the next few sections of this report, we will discuss various markets in which regulatory reforms are being considered, and how these key conclusions apply to them.

Mismatched markets: why simple is not always better

Here we discuss markets that are naturally imbalanced, with a particular emphasis on commodities markets. We explain why this imbalance leads to complexity, and how market makers, passive index investors and other more complex financial products have emerged to meet the needs of different market users, resolving this mismatch problem.

Illustrating the mismatch: a study of commodities markets

Commodities markets provide an excellent example of inherently complex markets that are naturally imbalanced. They also demonstrate the economic value that can be generated by resolving this imbalance. There are three very different natural users of these markets, each with different needs and demands (see Exhibit 1).

Exhibit 1: Three very different natural users of commodities markets create a mismatch problem

	Commodities producers	Commodities consumers	Financial participants
Examples	<ul style="list-style-type: none"> * Oil companies * Mining companies * Natural gas suppliers 	<ul style="list-style-type: none"> * Individual consumers (car owner or homeowner) * Companies that consume commodities (airlines or utility companies) 	<ul style="list-style-type: none"> * Selectively buy and sell futures in the underlying physical commodities
Use of commodities markets	<ul style="list-style-type: none"> * Sell 1 to 5-year oil on a daily average basis * Want the option to sell puts at below current market prices 	<ul style="list-style-type: none"> * Individual consumers do not typically hedge their exposure * Utility and airline companies often hedge their exposure, typically over a shorter time frame than producers * Want the option to buy calls at above market prices 	<ul style="list-style-type: none"> * Trade 1 to 3 month futures contracts and December expiry options * Prefer to have the option to buy or sell calls or puts, but for a narrow time frame at specific prices * Tend to be active as long as markets are moving, but especially when prices are rising

Source: Goldman Sachs Research.

The first major participant group in the commodities market is **commodity producers** – such as oil companies, mining companies and natural gas suppliers – which tend to tap into commodities markets in order to hedge the risks associated with long-term investment projects. These projects can include anything from drilling in a new oil field to excavating a new mine, and they generally take anywhere from three to seven years to complete. As such, commodity producers prefer to be able to manage their balance sheet risk over a timeframe of 18 months to 3 years, or longer. They typically do so by selling 1- to 5-year oil on a daily average basis, and they prefer to have the option to buy puts at below current market prices as well. Because they tend to be at greatest risk when commodities prices are low and falling, this is also when they tend to be most active in the markets.

There are two primary types of **commodity consumers**. The first is the individual consumer – such as a person who drives a car, a homeowner who uses heating oil, or a person who purchases gold or pork. The second is companies that consume commodities – such as an airline that relies on jet fuel to fly its planes, a utility that supplies electricity, or a bread-maker that bakes with wheat. The individual consumer has less financial exposure to commodity prices and therefore little desire to hedge his or her risk. The average driver, for example, does not typically hedge his or her exposure to increases in gasoline prices. Utility and airline companies, on the other hand, tend to have significant financial risk associated with changes in commodity prices. They therefore do often hedge their exposure, typically over a shorter time frame than producers (measured in months or up to a year). They also want the option to buy calls at above market prices. Because of the nature of their risk, they tend to be active when commodity prices are high and rising.

Commodities markets are not only comprised of producers and consumers, but also of **financial participants**. Unlike producers or consumers, these participants generally do not produce or consume the underlying physical commodities. Instead, they selectively buy and sell in futures markets based on their view of forward fundamentals. They therefore bring to the markets insights into the fundamental outlook. They care most about the liquidity of these markets and the direction of prices. They tend to trade 1- to 3-month futures contracts and December expiry options. They also prefer to have the option to buy or sell calls or puts, but usually for narrow time frames and at specific prices (e.g., \$100 oil). They tend to be active as long as markets are moving, but especially when prices are rising.

This is because most investors tend to have an affinity towards buying (this is true not only in commodities markets).

There is clearly an imbalance across the needs and demands of these three natural participants in commodities markets. In essence, the hedging needs of commodity producers are far greater than the demands of commodity consumers, and each market participant prefers to hedge or invest over a different timeframe, using different instruments.

The market itself has created one solution to this mismatch problem: the introduction of **long-only passive index investors** into commodities markets through the creation of the S&P GSCI™ Index in the early 1990s. Index investors are typically long-term investors with diversified portfolios of equities and bonds, such as pension funds and endowments. Commodity futures investments are attractive because they offer an equity-like rate of return, but one that is not correlated with equity and bond returns, and that therefore offers a good source of portfolio diversification. Like active investors, passive index investors do not produce or consume the underlying physical commodities. Instead, they provide a relatively stable supply of long-term passive capital and bear commodity price risk on behalf of producers and consumers, thereby lessening the mismatch problem.

Market-makers, which are typically broker-dealers, also play an important role in resolving this mismatch problem. This is because they enable buyers and sellers to implement their trades by taking on risk. They quote both a bid and an ask price for an asset at which they will transact on behalf of their clients, and in the process they assume price and basis risk (basis risk is the difference between the position market makers hold for clients and the hedges they can purchase in the market). They can hold a position for a matter of milliseconds or for much longer periods of time. Because they often hold basis positions for some time, risk management is a key ingredient to their success. The ability to transact in volume in standardized contracts and to build complex risk books is central to their ability to offer the complex hedge products that companies need.

To illustrate how this works in practice, let's consider a company that would like to hedge its risk in order to maintain an oil development program. A typical hedge would be for 4,000 barrels a day of production that would, over the three years of the program, provide a floor on the average price of oil that is 20% below current prices. Such a program, in isolation, would require a market maker to experience swings in the value of its hedge of about \$5 million on one out of every 20 days. If the same hedge were implemented inside of a typical dealer book, this number would be reduced to swings of about \$1 million on one out of every 20 days, while \$5 million swings would only occur on one out of every 63 days.

This drop in volatility is due to the ability of the dealer to offset risk within a complex trading book. This is a typical, yet somewhat counterintuitive aspect of portfolio theory – **complex hedge books are actually less volatile and safer to run than simple ones**. If the company had tried to execute the hedge without using a market maker, it would have been exposed to much greater volatility. This is why companies use dealers to run hedges for them and why companies frequently use custom instruments.

The benefits of well-functioning commodities markets

The benefits of well-functioning commodities markets are significant. For producers and consumers, the ability to hedge the risks associated with their day-to-day operations or long-term investment projects can lead to everything from higher returns to lower capital costs. It can also lead to stronger growth, particularly if it encourages companies to undertake high-return investment projects. In particular, hedging allows companies to adjust the size and the timing of the capital they need to borrow or raise. It reduces the size of required equity reserves, allowing more resources to be shifted to profit-making

opportunities. And it allows companies to avoid project disruptions and undesirable asset sales. The net impact of this can be considerable.

For example, we estimate that if an oil company investing in a \$100 million project properly hedges its oil-price risk, it can increase its production by approximately 20% over a 10-year period, beyond what it could produce without using a hedge. Appendix A provides greater detail.

But, as we have discussed, standardized contracts traded on exchanges are not particularly effective for corporate hedging. Market makers need to bridge the gap between market participants by taking on multi-year basis positions and complex options exposures, and by dynamically hedging the resulting risk.

This leads to complex trading books and significant trading volumes to support the necessary risk management. Regulating the exchange part of the market in isolation without taking into account the very valuable functions performed by the OTC market could easily destroy significant economic value.

Instead, we would argue that the different parts of the market need to be regulated with a focus on reporting standards and data warehousing, so that all transactions are reported to a central data warehouse. This would allow these markets to serve their economic function, while still allowing regulators to detect and eradicate misbehavior. Regulators cannot do this, however, without extended authority to examine combined positions across markets, as well as the authority to unwind inappropriate positions.

We would also note that due to the large and concentrated one-way exposures of some of the key participants in these markets – such as utilities (buyers) or oil companies (sellers) – public reporting of positions should be aggregated with a delay. Otherwise, such institutions will be penalized: market participants will know not only what they have already bought or sold, but will also have a reasonable assessment of what these institutions will need to buy or sell in the future. This transparency would allow speculative traders to buy or sell in front of them, with little risk, and this would disadvantage everyone else.

Illustrating the mismatch: examples in other markets

Mismatches between investors and companies are not confined to commodities markets. They permeate financial markets and the broad pattern is consistent across markets. Most investors have strong preferences for highly standardized and highly liquid investments. But companies and some investors who have specific business requirements often find standardized contracts to be ineffective for raising capital or managing risk. The mismatch can be due to differing time horizons, as in the case of the commodities markets, or it can be due to differing size transactions. Let's consider this in practice with a few simple examples.

First, consider a company ("Seller") that wishes to sell a subsidiary that doesn't fit its long-term strategy. The best offer price Seller gets for this subsidiary is from a company ("Buyer"), which sees the subsidiary as key to its own long-term strategy. But Buyer is only willing to purchase the subsidiary in exchange for shares of its stock, which cannot be sold by Seller for 1-3 years. If the Seller were able to sell these shares immediately, Buyer's share price could be depressed by a flood of excess supply. But, as a result of this lock-up, Seller is subject to volatility in Buyer's share price over this period of time.

Selling the subsidiary to Buyer is the best option for both companies – as well as for their shareholders – but Seller may be hesitant to do so if it cannot manage the risks associated with this transaction. A customized zero cost collar matched to the size and need of the specific circumstances, supplied and hedged by a broker-dealer or other market-maker, allows Seller to limit the balance-sheet impact of volatility in Buyer's share price. It does

this by creating both a floor and a ceiling, so that the Seller is exposed to fluctuations in the share price of Buyer within this range, but not above or below this range.

Second, consider a US-based company that wants to borrow in the long-term Euro debt markets to finance its operations in Europe. Yet the company finds that its cost of borrowing in the short-term US Dollar debt market is cheaper (the interest rate is lower). Or a European company finds it can borrow more cheaply in Dollars but only wants to have Euro-denominated debt.

One solution is to raise money in Dollars, but to also overlay that debt with a custom foreign-exchange swap, again done through a broker-dealer or other market-maker, that exchanges Dollar risk for Euro risk and allows the interest rate to float. This gives the company the lower financing costs, which in turn allow it to expand more quickly, and gives investors the (Dollar-denominated) long-term debt instruments they are willing to buy.

Third, consider a content provider (e.g., a sports team, TV production company or news channel) that wishes to sign long-term contracts with various media outlets in order to expand its business. But the content provider is concerned that the media companies with which it seeks to do business will not be able to fund these long-term contracts and thus is nervous about its ability to finance its own expansion. Again, there is a mismatch problem between what the content provider wishes to do, and the risks that it is able to take.

The content provider is able to resolve this problem by purchasing credit default swaps (CDS) on a basket of companies, designed by a broker to meet its specific needs, providing credit protection in the event that the media companies fail and thus are unable to live up to their contractual obligations. Such CDS allow the company to ensure potential debt investors of its own cash flow. This kind of demand is common on the part of small companies seeking trade credit from larger ones, but it cannot be satisfied by standard products.

Bridging the gap between sellers and buyers requires well-capitalized market makers that can dispose of the risks accumulated with these transactions over time and in an orderly fashion, with a minimal impact on prices. Market makers can do this by offering custom derivatives to the company, and then offsetting that risk with standardized ones. The key to doing this effectively is two-fold. First, liquid standardized products need to exist. Second, a market-maker needs to be able to run a large diversified book of custom derivatives so that its own risk management systems can take advantage of the offsets that are implicit in diversified portfolios.

While this type of complexity has come under fire recently, it is important to understand that the real problems in the recent crisis came from highly concentrated risks that were taken *without* any real risk management. There were very few failures involving market making around complex derivatives, despite incredible market volatility and some notable failures in liquidity. Moreover, none of these market failures created systemic problems. As we have discussed in previous papers,² the complexity that created problems in the recent crisis arose mostly from firms using complexity to *hide* risk, not to manage it.

Sellers create buyers: the value of full participation

The value of full participation in markets should not be underestimated. Allowing investors – such as buyers of CDS or equity short-sellers – to express negative views actually makes markets work better. Investors with negative views give prices more credibility, thereby increasing the amount of capital investors are willing to provide and helping good

² See *Avoiding Another Meltdown*, March 2009 and *Improving Transparency*, June 2009.

companies grow. They also prevent weak companies from wasting limited capital. Jobs and prosperity come from good companies using capital well, not from suppressing contrarian views.

Credit default swaps can lower corporate funding costs

The CDS market has been blamed for many of the problems that arose during the credit crisis. While there is certainly room for improvement in regulation of this market, it is important to understand the role it plays before concluding which regulatory reforms are appropriate.

A buyer of CDS is essentially purchasing insurance against the loss of principal in the event that an issuer goes into bankruptcy or a particular bond goes into default. The seller is essentially offering this insurance by agreeing to pay the buyer in such an event. In exchange for the insurance, the buyer pays premiums to the seller over a period of time.

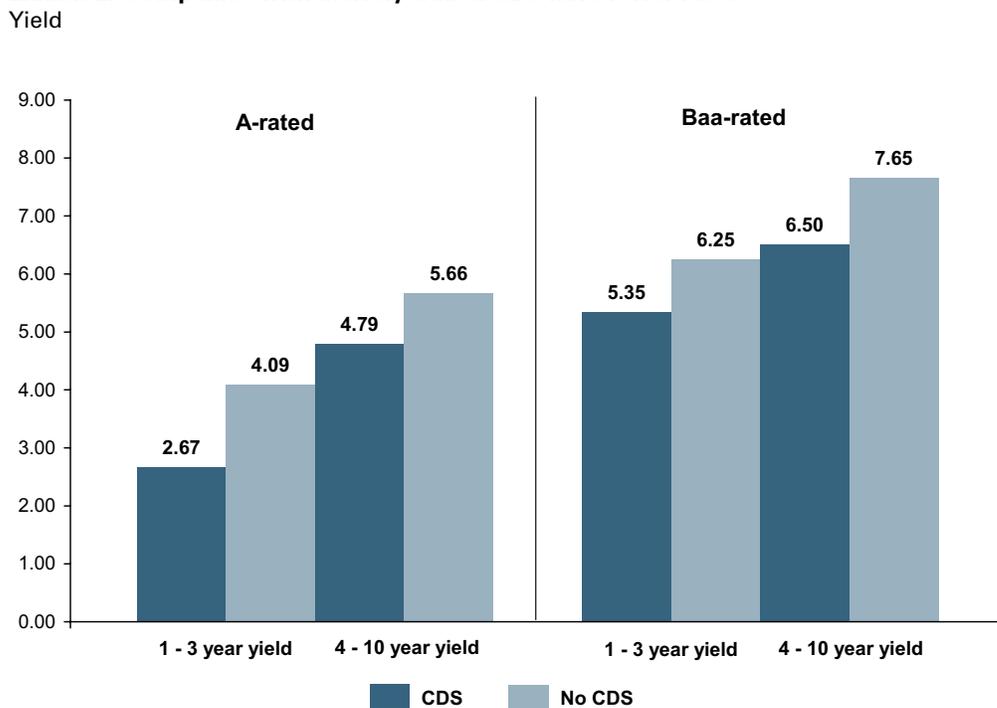
Like the commodities market, the CDS market solves another mismatch problem, this one involving liquidity. Investors want the ability to adjust their portfolios with few transaction costs, but debt markets tend to be very fragmented and therefore illiquid. For example, the 30 stocks included in the Dow Jones Industrial Average have about 20,000 total outstanding bonds (excluding subsidiaries, the total is 10,000; excluding financials, the figure is 1400-1500). For each of these same 30 companies, about three-quarters of the CDS trading volume is concentrated in a single five-year CDS contract.

Thus CDS markets provide a far more standardized and deeper market in which investors can hedge their risk and express a view on a company's underlying credit. When trading is consolidated in a fewer number of instruments, the market price of those instruments more accurately reflects the broader market view of that asset, and does so with less "noise" than would be associated with the trading of each individual security. The CDS market also creates a deeper and more liquid market for managing risk in individual bonds. This liquidity provides investors with more comfort in their positions and in their ability to manage risk, which makes them more willing to supply capital.

A simple comparison suggests that firms with actively traded CDS enjoy rates that are roughly 100 basis points below equivalent-rated companies without CDS (see Exhibit 2). We note that this figure probably overstates the impact of having CDS on corporate debt costs, as the companies with CDS may have more naturally liquid markets in their bonds, which would also reduce their rates.

However, we find similar improvements in debt financing costs when we look at the discount for new issues (a premium that companies need to offer investors when they issue debt to attract the necessary level of new investment). Specifically, the "new issue discount" for firms with actively traded CDS is about half the size of the discount required from firms without actively traded CDS (a reduction from 40 basis points to about 20 basis points). This is true even after controlling for other measures of available liquidity (see Appendix B.) As we show in Exhibit 3, this type of reduction in debt costs can have a significant impact on business investment and result in significant benefits for consumers.

Exhibit 2: Companies with actively traded CDS have lower rates



Note that this analysis excludes captive financing companies of industrial companies.

Source: Goldman Sachs Research.

Exhibit 3: Impact of CDS on the US telecommunications industry

As we discussed earlier, we estimate that the actively traded CDS market lowers the cost of capital by roughly 100 basis points. In the absence of the CDS market, an additional 100 basis point cost of debt would translate into an incremental annual interest expense for the sector as a whole of about \$2.2bn.

Launching a new telecommunications network in an average US city costs about \$100mn-\$180mn. If the cost of debt increased but the industry maintained its target rate of return on capital, then the industry would have to forgo about 15 build-outs per year. Losing these projects means that job creation, tax revenue and efficiency gains would also be lost.

The incremental \$2.2bn in annual industry-wide interest expense can also be thought of as equivalent to building out wireless networks for 62mn people, or about 20% of the US population. Over the course of five years, this incremental interest expense would be equivalent to the cost of a nationwide wireless network build-out.

Source: Goldman Sachs Research estimates.

The existence of actively traded CDS also affects a company’s access to other important kinds of financial capital, including hedges, trade finance and short-term credit facilities. The providers of this capital will need to manage their own risk exposures, and CDS offer an efficient way of doing so. This ability to manage risk makes suppliers of capital likely to provide more capital, and at a lower cost, than would have been possible without CDS.

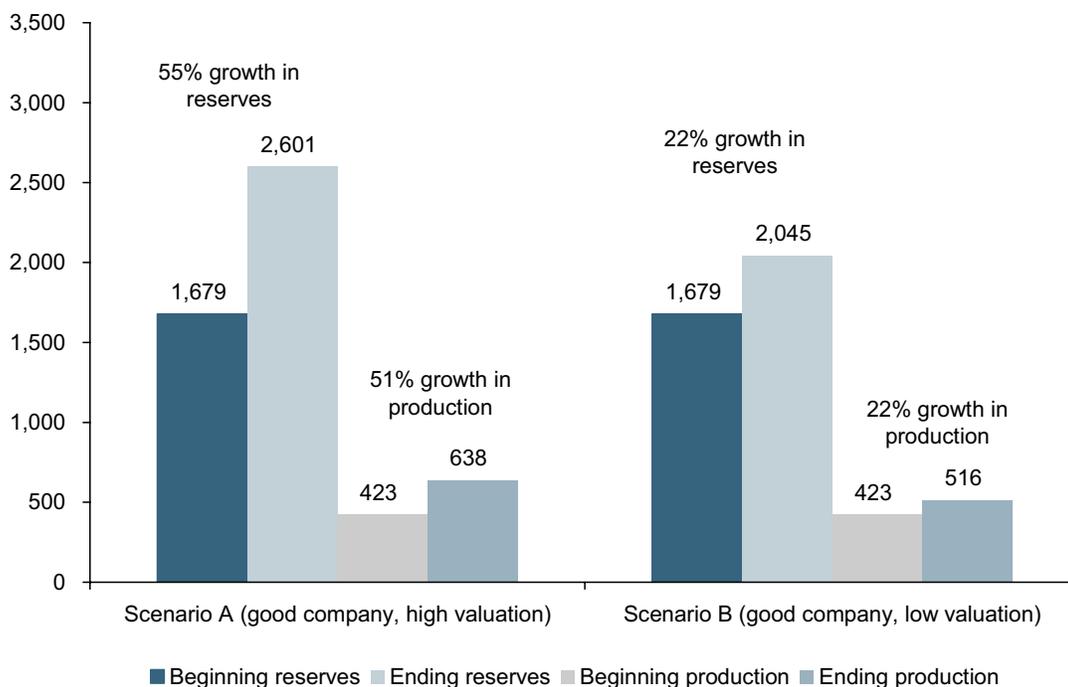
Short sellers aid the price discovery process

Short sellers have often been blamed for destroying market value and, at the extreme, for fuelling a spiral of selling that can destroy markets. But they provide critical information and liquidity to equity markets, and thus make the price-discovery process more accurate.

Without the ability to sell short, an investor can only express a negative view by selling his or her stake and walking away from the market. This means that markets that do not allow short selling are upwardly biased. This may be good for investors in the short term, but it is unsustainable in the long run, as the housing market crash has shown us all too clearly. Moreover, it wastes resources by allowing weak companies to use capital that could have generated more jobs and greater growth if it had been used elsewhere. Good capital allocation is the key to long-term prosperity.

By considering an oil-producing company that wants to expand its production while maintaining current levels of reserves, we can see how society at large – as well as shareholders – can benefit from healthy equity markets. If we hold the willingness to dilute current shareholders to 5% and value the company at 6X debt-adjusted cash flow, the company will be able to invest nearly \$75 billion over 10 years, expanding production by 50% (this is explained in detail in Appendix C). If the firm had instead been valued at 3X debt-adjusted cash flow, it would have been able to finance less investment (just \$55 billion) and it would only have been able to increase production by 20%. See Exhibit 4.

Exhibit 4: A lower valuation means that even a well-run oil company can produce far less oil
mn BOE and MBOE/day



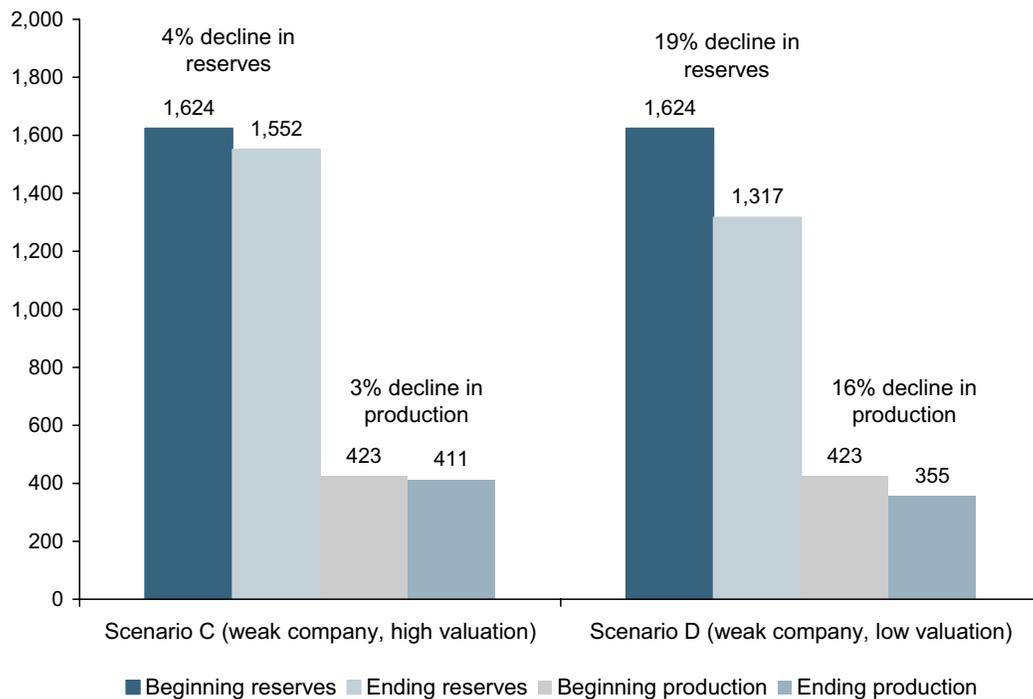
Source: Goldman Sachs Research estimates.

The value of high prices for good companies is relatively intuitive. The more subtle problem is how this can backfire for society (and for shareholders) when information or market participation is restricted, and negative information on less-worthy companies is not reflected in their share price. If, for example, we examine an identically structured oil

company with poorer reserves (and thus poorer long-term prospects), we can see how society can lose from equity prices that are too high.

If the company with poor prospects is also valued at a multiple of 6X, it will invest \$55 billion in total, but production will fall by 3%. If the company had been valued more correctly at a multiple of 3X, in recognition of the poor quality of its reserves, it would only have been able to invest \$43 billion. Production would have fallen by an even larger 16% (see Exhibit 5). But the capital that was not invested would have been available to other companies that could have invested it at higher rates of return. Either the first company could have produced more oil, or another company could have produced another resource that is valuable to society at large. In practice, the gains in efficiency could be even larger because the lower multiple would probably have led the weaker company to be acquired by a stronger one, so that even more of the investment dollars would have been redirected toward more valuable activities.

Exhibit 5: A weak oil company with a high valuation wastes valuable capital
 mn BOE and MBOE/day



Source: Goldman Sachs Research estimates.

Improved market structures: “dark pools” and clearing

Market structures have evolved to meet the differing needs of their users, and are likely to continue to evolve. Here we discuss this evolution in the equities market, where inaptly named “dark pools” of liquidity, or alternative trading platforms, have emerged to meet the demands of participants executing large transactions. These platforms improve liquidity – and in turn reduce trading costs – but there is scope to strengthen their regulation. This is particularly true with respect to improving the regulatory definitions and obligations of market makers operating in these new platforms, which would improve perceptions of fairness. We will also discuss evolution in derivatives market structures by focusing on the role of clearing houses.

Alternative trading platforms and their effect on liquidity

The equity markets provide perhaps the best example of a highly evolved complex ecosystem, where care must be taken to preserve the benefits that have evolved from competition and innovation. Unlike the commodities market, equity markets tend to be highly standardized. Yet they too face a mismatch problem – not in structure but in size. Buyers will buy and sellers will sell in different sized lots, with market makers bridging the difference between the two.

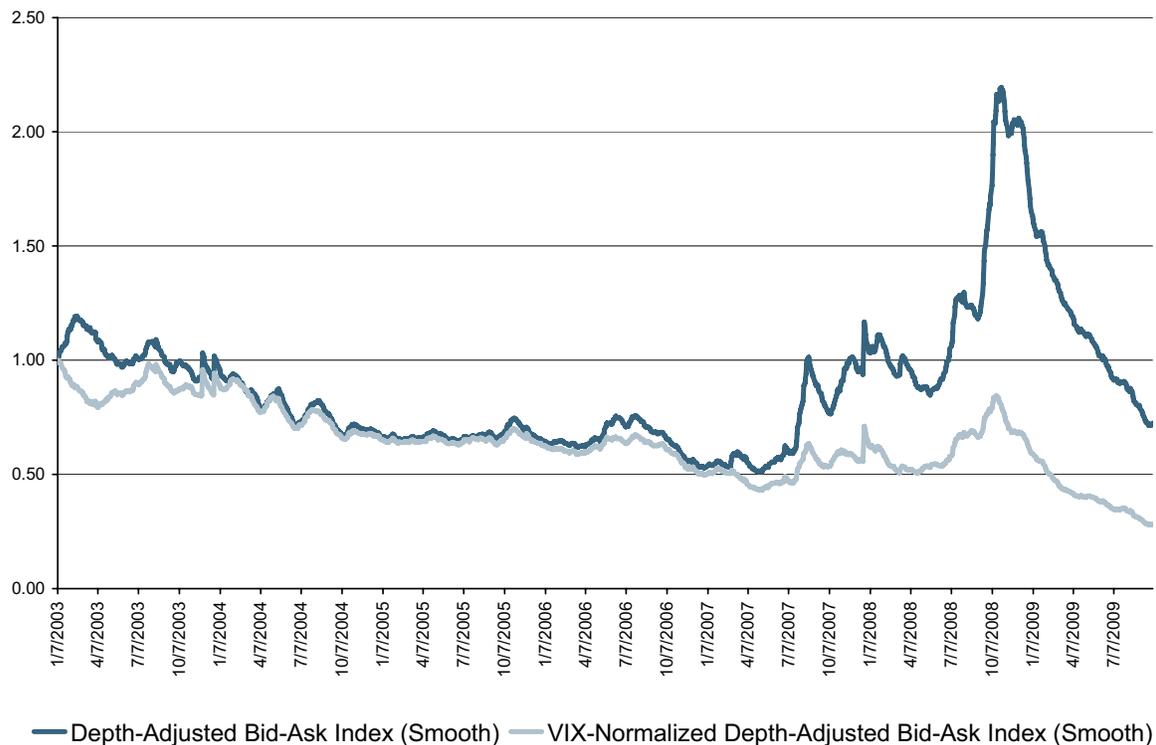
Crucially, liquidity is what helps to solve this mismatch problem. Market makers that see large volumes are best positioned to match differing size transactions. In traditional exchange trading, bids and offers are public, and this transparency helps buyers and sellers to achieve the best price.

For some market participants, however, the openness and transparency of the equity market actually mean they are unlikely to achieve the best price. The risk, particularly for large transactions such as those undertaken by pension funds or large mutual funds (where most small investors have most of their equity exposure), is that other market participants will use this transparency to undercut the intended transactions. For example, an investor may see that another market participant wants to sell a large block of shares. That investor may sell his or her own shares immediately in order to push down the share price – to the detriment of the initial seller. As in commodities markets, the risk is that market participants who wish to avoid displaying their intentions may withhold liquidity from the market, which ultimately hurts all parties.

Alternative trading platforms – so-called “dark pools” of liquidity – have evolved to address this problem. They work by separating liquidity from information about the transaction – the participants, lot sizes and transaction prices. Through the process of “non-displayed liquidity”, information does become available to both regulators and the public market – but not until the transaction is complete.

The evolution of alternative trading platforms is relatively complex, but they began to emerge in earnest in 1999, when the Securities and Exchange Commission introduced regulations formalizing the structure of electronic communication networks. Subsequent regulations have paved the way for alternative trading systems and specialized exchanges to offer special order types and facilities. High-speed computer trading systems now compete with traditional exchanges for order flow, and allow large investors to use non-displayed liquidity.

This increased competition has improved market efficiency (see Exhibit 6). Over the last five or so years, volatility and market-depth adjusted bid-ask spreads have decreased. The bid-ask spread represents the difference between the price at which a seller is willing to sell an asset, and the price at which a buyer is willing to buy that asset – or how closely demand and supply are matched. It is an important transaction cost, so a narrowing in this spread is a clear positive for investors.

Exhibit 6: Market efficiency has improved as volatility and depth-adjusted bid-ask spreads have declined

Source: Goldman Sachs Research.

This is not surprising. Invisible liquidity, or an unexpressed willingness to sell above the market or buy below it, has always existed. Alternative trading platforms have simply allowed that liquidity to be brought to market efficiently, by removing the negative consequences to the investor of supplying that liquidity.

Our view is that “dark pools” have added light and liquidity to the market, not removed them. Formal exchanges, which naturally wish to expand their own businesses, would like to see these volumes moved onto traditional exchanges. Yet we see the most likely outcome of eliminating “dark pools” as a loss of liquidity, or a move of that liquidity back to the pads of paper on trading desks from where it came, which would result in a less efficient market.

Enhancing comfort with innovation

While the gains from innovation have been great, understanding of these activities has lagged. Further, many practices – some good, some bad – have been confused with each other. There is a broad perception that regulation has not kept pace with market innovation. In our view the core of that perception is that the technologies that enable the use of these platforms (and the competitive response of exchanges to allow things like co-located computer systems) have allowed more market participants to offer services that are equivalent to market-making – but that are not necessarily regulated as such. Like specialists and floor brokers, these computer systems enjoy certain advantages from seeing orders sooner and being able to respond more quickly to those orders than other market participants. But because they are not all regulated as market-makers, the potential – and the perception – has been created that they may in some way be taking advantage of

those privileges without meeting the implicit obligations of a true market maker. Updating the rules around market-making, and more clearly defining the role of market-makers, would help alleviate these concerns without hurting the ability of market makers to serve their clients well and improve market efficiency.

Clearing houses: where they do and don't reduce systemic risk

Clearing houses are widely considered to be a means to reduce the systemic risks posed by derivatives markets. They can in fact dramatically reduce systemic risk by reducing counter-party risk, increasing liquidity and aiding price discovery. But if used for the wrong products, or if membership is expanded too widely, they can actually increase systemic risk.

It is important to understand that clearing houses do not make risks simply disappear. This is a commonly held misconception. When high-volume, standardized trades are netted, counter-party risk is fundamentally reduced. For example, if the same derivative is traded one thousand times and netted, only two positions ultimately exist – that of the final buyer and that of the final seller. The economic risks associated with the 999 other transactions in the same derivative net, but the counter-party credit risk of those final two positions still exists. This residual risk represents the domino that can create systemic risk. This is because the clearing house now guarantees the final counter-party link. In doing so, it accumulates a large share of the now much smaller pool of counter-party risk, and the clearing house itself becomes a new hot spot of systemic risk.

The reduction in systemic risk more than offsets the greater concentration of risk in markets where clearing houses are well-capitalized, well-managed and well-supervised, and their members are sound. But clearing houses have strong economic incentives to have as many members and products as possible. Unfortunately, these incentives could lead clearing houses to expand into poorly priced and illiquid products and to lower membership standards. This could create real dangers for individual clearing houses and for the system as a whole – much as the extension of securitization to subprime mortgages ultimately disrupted many other markets.

Moreover, the risk reduction from clearing standardized dealer positions is large, while the risk reduction from clearing everything else is fairly small. For example, we took a snapshot of risk at Goldman Sachs to see what would happen to counter-party risk if clearing houses had been applied to standard versus non-standard instruments and dealer versus non-dealer exposures. Normalizing exposures to the dealer's gross notional exposure of 100, Exhibit 7 shows both the relative size of different categories and approximately what risk reduction would be achieved in each category by clearing houses.

As we show, netting provides a bigger reduction in risk for dealer counter-parties clearing standard products. The total reduction in risk for non-dealer counterparties trading standard and non-standard products is very small. Netting dealer counter-parties yields 16X the risk reduction achieved from netting non-dealer counter-parties. Similarly, even between dealers, the biggest gains come from netting standard products – at about 6X the risk reduction. It should also be noted that the risk reduction as a percentage from netting standard products would in practice probably be larger than what is suggested by these numbers, as the availability of clearing would likely shift some non-standard contracts into a standard form.

Exhibit 7: Counter-party risk is reduced by clearing standard, dealer-traded instruments

	<u>Netted product notional</u>	<u>Gross notional</u>	<u>% change</u>
<u>Dealers</u>	54	100	-46%
Non-standard	7	13	-50%
Standard	48	87	-45%
<u>Non-dealers</u>	48	51	-6%
Non-standard	1	2	-38%
Standard	47	50	-5%

The counterparty risk matrix shown above is normalized to the dealer's gross notional exposure (shown above as 100). This means that the other numbers in the matrix are relative to this number. For example, 54 (for the dealer netted product notional) is 54% of the dealer gross notional exposure.

See Appendix D for greater detail.

Source: Goldman Sachs Research.

Thus, in our view clearing houses are best applied clearing standardized, high-volume parts of the market, primarily dealer positions. Attempts to force customized, low-volume products through clearing houses – or to over-expand clearing-house membership – could easily be the driver of tomorrow's crisis.

The vast bulk of the counter-party risk that will arise will come from high-volume products traded between major market participants. And this is precisely where clearing houses do aid in improving systemic safety and soundness. It is simply important to remember that these are not the only transactions that take place, nor are they the most economically important ones. In fact, the low-volume, specialized instruments – such as those we mentioned earlier – often add a disproportionate share of economic value. This is because they enable companies to fund and manage their investments more effectively than is possible with standardized products.

As we discussed in the hedging examples we outlined earlier, customized transactions are often supported by many high-volume trades between multiple participants across multiple markets. Regulation of these markets must therefore make high-volume trading possible, efficient and systemically safe. But it must also allow for the high-value added custom transactions to take place. As such, the low-volume parts of markets need better reporting of activity and increased oversight, to prevent them from being used to circumvent the rules created for the high-volume part of markets. We therefore suggest the use of data warehouses and position reporting to regulators as key reforms, but not attempts to limit the use of such economically important products.

Conclusions

While reform is undoubtedly necessary, it is also difficult. As we have outlined in this paper, many good ideas being are being discussed as part of the reform process. But it is important to allow the needs of companies and investors to be met, and not to become over-reliant on simple solutions that might well turn out to be less effective than hoped. The more extensive the restrictions, the more quickly markets will find ways to work around them that will weaken the system. In contrast, reforms that strengthen the functioning and safety of markets will cause weaker practices to wither. Finding the right balance will not be easy, but it is essential. As we have shown, the interconnections between markets make it necessary to view each change not in isolation, but in terms of its potential impact on the system as a whole.

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Appendix A

We estimate the impact of hedging on a medium-sized oil company's ability to produce incremental oil. We do so by assuming that this company is investing in a \$100 million oil production project over a period of ten years. As Exhibit 8 shows, under the first scenario, we assume that the company does not hedge its exposure to fluctuations in oil price changes and is able to produce 4.3 million barrels of oil over the ten-year time period, earning a return on equity (ROE) of 10.1%. Under the second scenario, we assume that the company does hedge its exposure. In doing so, it is able to limit revenue downside and generate higher cash from operations. The incremental cash can be reinvested into the project, expanding it to about \$120 million in total capital invested, 20% more than under the original scenario. This results in a higher ROE of 14.5% and incremental oil production of 17%-18% (or 5 million total barrels of oil over the 10 years) compared to the un-hedged program.

Exhibit 8: Impact of a hedging program on a \$100 million oil investment project

Key Assumptions	
Total project investment (\$mn)	\$102
WTI Oil price (\$/bbl)	\$75
F&D cost (\$/bbl)	\$24
Scenario 1: Unhedged project	
% of production hedged	0%
% debt financed	0%
% equity financed	100%
Hedge price	\$75
Interest rate	5%
Total production (mm bbls)	4.3
ROE	10.1%
Scenario 2: Hedged project	
% of production hedged	60%
% debt financed	60%
% equity financed	40%
Hedge price	\$75
Interest rate	5%
ROE	14.5%
Total investment assuming reinvestment	\$120
Total production (mm bbls)	5.0

Source: Goldman Sachs Research.

Appendix B

Academic research on the costs of raising capital in the corporate bond market is surprisingly scarce. Most research on new issue costs focuses on the equity market, presumably because data on equity markets are more readily available. A notable exception is a 2007 study titled "Underpricing in the Corporate Bond Market", which looks at the determinants of new-issue concessions for corporate bonds. This concession is the difference between the offer price of a bond and the underwriter's best estimate of where a bond will trade in the secondary market. For example, if a new bond issue is expected to trade at 99.40 in the secondary market, then offering it to investors at a price of 99.00 would imply a new-issue concession of 40 basis points.

Research finds that underpricing patterns for corporate bonds are similar to those found for equity. It also draws a similar set of conclusions. Namely, that the evidence is consistent with the view that underpricing incents investors to participate in the book-building process, during which they must reveal information about their "demand curve" for the bond. In this way, underpricing is best understood as part of a process that compensates investors for providing information and liquidity to the bond market.

To the extent that liquid CDS markets improve both the transparency of prices and liquidity for the underlying bond market, they ought to reduce the size of the required underpricing discount or "new issue concession" offered to investors in new bond issues. We have run several regressions to test this proposition on bonds issued from 2005 to 2007. Using first-day returns as a (noisy) proxy for new issue concessions, and a "CDS dummy" variable to indicate the existence of a liquid CDS market, we estimate a model of new issue concessions as a function of this CDS dummy plus a large number of control variables including credit rating, sector dummies, maturity, IPO dummy, public/private equity dummy, issue size, firm size, number of equity analysts covering the firm, various credit-related metrics, and monthly time dummies.

Our regression evidence indicates that having actively traded CDS cuts this discount by nearly half. Whereas the new issue concessions averaged 40 basis points over this period, the existence of actively traded CDS reduced this by nearly 20 basis points. Though preliminary, this result is consistent with the view that actively traded CDS markets help companies reduce the cost of accessing the corporate bond market.

Appendix C

We examine the impact of market valuations on two medium-sized oil companies: one with good-quality reserves and one with poorer-quality reserves. We conduct our analysis assuming four different scenarios. Scenario A assumes that the strong oil company with high quality reserves is valued at its historical average multiple, in this case 6X debt-adjusted free cash flow. Under scenario B, the market values the same strong oil company at a lower multiple (in this case 3X). Under the third scenario – scenario C – the weak oil company with lower quality reserves receives a market valuation of 6X and under our fourth scenario – scenario D – the same weak oil company is given a lower market valuation of 3X. The key assumptions and results of our analysis are shown in Exhibits 9-10.

We conclude that the strong oil company is able to use capital efficiently to drive greater oil production. This company is still able to expand its reserves and production even under a lower market valuation, although at a much lower rate. In Scenarios C and D, capital is wasted on a weak oil company.

Exhibit 9: Key assumptions used in analysis of market valuation on a strong and a weak oil company

mn BOE and MBOE/d

Key assumptions	
Oil price	\$65
Natural gas price	\$5.00
Production growth	5%
F&D inflation/year	3%
Reinvestment rate	150%
Maximum shareholder dilution	5%

Source: Goldman Sachs Research.

Exhibit 10: Impact of market valuation on the output of a strong and a weak oil company

mn BOE and MBOE/d

	Reserves (mn BOE)			Production (MBOE/d)		
	Beginning	Ending	% change	Beginning	Ending	% change
Scenario A (good company, 6X multiple)	1679	2601	55%	423	638	51%
Scenario B (good company, 3X multiple)	1679	2045	22%	423	516	22%
Scenario C (weak company, 6X multiple)	1624	1552	-4%	423	411	-3%
Scenario D (weak company, 3X multiple)	1624	1317	-19%	423	355	-16%

Source: Goldman Sachs Research.

Appendix D

In our analysis of the risk reduction offered by clearing houses, we define dealers as Goldman Sachs's counter-parties with a Collateral Support Agreement (CSA) where we post collateral. The exception here is the US Government (which does have a CSA but which we do not categorize as a dealer). We categorize non-dealers as everyone else. The products we include in the dealer/non-dealer and standard/non-standard categories are shown in Exhibit 11.

Exhibit 11: Categorization of dealer/non-dealer and standard/non-standard products

Dealer		Non-dealer	
Standard	Non-standard	Standard	Non-standard
CT Swap	CT Structure	CT Swap	CT Structure
CT European Swaption	CT Swap Notional MTM	Option	CT CapFloor
CT FRA	CT Swap Master	CD Standard CDS	CT Formula Strip CapFloor
CD Index Tranche	CT Formula Strip CapFloor	CT European Swaption	CT Swap Cxl Berm
CD Vanilla CDS	CT Formula Strip	CD Vanilla CDS	CT Formula Strip
Equity Swap	CT Asset Swap	Equity Swap	CT Swap Master
CD Index Product	One Touch Binary Option	CD Index Product	Mortgage CE Collateral Put
Equity Option	CT Structure Replicator	Mortgage Default Swap	Mortgage Synthetic CDO
Option	CD Synthetic CDO Tranche	Commodities Basis Swap	CD Fixed Stream
Mortgage Default Swap	CT Swap Cxl Berm	Equity CFD	Mortgage Collateral Put
Forward	CD SCT Vanilla CDS	Equity Option	Mortgage Collat Basis Swap
CD Standard CDS	Equity Swap Term	CD Index Tranche	CD Synthetic CDO Tranche
Commodities Basis Swap	Mortgage Index Product	Cash Settled Forward	CT CcTrigger
Cash Settled Forward	CT CapFloor	Forward	Non Delivery Option
Equity CFD	Mortgage Synthetic CDO	Equity Variance Swap	CT Swap Cxl Euro Foss

CT stands for compound tradable (represents a wide class of similar products like swaps).

FRA stands for forward rate agreement (a 1-period version of a swap).

CFD stands for contract for difference.

CT Swap Notional MTM is a mark to market swap (a cross currency swap where the notional of one leg resets each period according to the FX rate).

CD stands for credit derivatives.

CXL Berm is a Bermudan cancelable swap.

CXL Euro Foss is a European cancelable swap.

Source: Goldman Sachs Research.



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