The use of derivatives has mushroomed in the past 20 years. Businesses and governments routinely enter into derivatives contracts in connection with price exposures that they experience in their ongoing operations. They “hedge” price risk. How should businesses and governments—who already use derivatives so much—evaluate the use of derivatives in their enterprises? This article provides a set of principles for this evaluation.

The core function of derivatives is to synthetically alter price consequences to a business or government. Most often, a business elects to contract for the currently expected market price consequence on a future date in lieu of experiencing the consequence of the actual price on that date. The hedger decides that the certainty of today’s forward price is better than the uncertainty of future prices that may move in the hedger’s favor, may move against the hedger or may simply stay the same.

Businesses and governments that employ derivatives to hedge price risk in their enterprises are exempted from many of the requirements of the Dodd-Frank Wall Street Reform and Consumer Protection Act as “end users.” For example, they are not required to transact over exchanges or swap execution facilities and can execute transactions using direct negotiations with a bank or other financial institutions. In addition, end users are exempt from the requirement that their derivatives be submitted to regulated clearinghouses so that credit risk can be managed. The evaluation principles discussed herein assume that the derivatives are executed directly and are not cleared.

I argue that the use of derivatives by businesses and governments is far more widespread than is objectively explainable based on obvious criteria. This article will also describe factors apart from objective criteria that encourage the use of derivatives.

The conclusion drawn is that the use of derivatives for reasons that run counter to sound objective financial criteria generates costly inefficiencies in the economy.

**Key Characteristics of Derivatives**

The value to a counterparty of a derivative on any given day during its life involves two central properties of the contract. The first is the expected financial value of the performance in the future by the other party to the contract. The second is the likelihood that the required performance by the other party will not occur and that the expected financial value will not be realized (giving rise to credit exposures between the counterparties, as described below).
The values of these properties can be, and typically are, measured independently, but they must be evaluated in concert. Measurement of these values and how they interact, even for a simply structured derivative, is a complex task.

Time is a critical factor in the valuation of a derivative. One party to a derivative contract is obligated to make a payment based on a reference price that is determined on a set date in the future. For example, the contractual obligation might be to pay the price on a set quantity of crude oil (e.g., 100 barrels) delivered at a particular place (e.g., Cushing, OK) at a set time (e.g., the next succeeding June 1). This is the floating price leg of the derivative. The other party typically is required to make a fixed payment, based on the current expected (or “forward”) price at inception of the contract.

Since derivatives are executory contracts, their realized value is totally dependent of performance by the counterparty. Similarly, their accrued value can evaporate if the expected performance by the counterparty vanishes as the result of a bankruptcy or similar event. It is as if the party that has accrued value had loaned the amount of that accrual to its counterparty and the counterparty then went bust. For all reasonable purposes, credit has been extended to the counterparty.

*Margining and Demands on Cash Liquidity*

As described above, the changing accrued value of a derivative generates credit exposures during the term of its existence. These credit exposures are not capped. An exposure’s size is measured by the movement of the referenced forward price during the life of the derivative. This price movement has no limit.

To protect against losses, banks generally require that credit exposures be fully or partially collateralized by their counterparties. This is referred to as “margining.” If a derivative’s credit exposures are fully collateralized, the bank will require that the full amount of credit exposure as of the prior day’s close of business be on deposit in an account that secures the bank. If the forward price moves in the bank’s favor, the amount of margin required to be on deposit the next day increases. If the forward price moves in favor of the counterparty, margin collateral can be withdrawn.

Since the amount of credit extended under a derivative is uncapped and unpredictable, margin can pose severe cash liquidity risk to the counterparty. In a volatile price environment, the challenge can be greater as prices move by relatively large amounts over short periods of time. In the real world, the threat posed by the need to access cash immediately is the most dangerous aspect of derivatives.

Generally, banks allow counterparties to accumulate credit exposure up to a cap before they must make a deposit of margin collateral. These are typically referred to as “margin thresholds.” Banks treat margin thresholds like revolving loans, decrementing credit capacity to lend to the derivative counterparty on an unsecured basis.
Banks also require “credit triggers,” provisions that require full margin collateralization, regardless of thresholds, if the credit of the derivative counterparty deteriorates. The most common trigger is a downgrade by a credit rating agency. The implementation of a credit trigger is the extreme form of the dreaded “margin call.” One need only recall the credit default derivative margin call made on American International Group (AIG) in 2008 that precipitated its bailout in the amount of $185 billion. A margin call can be catastrophic.

A credit rating downgrade trigger means that the business or government must come up with cash at precisely the time that cash is most difficult to secure. This amplifies the cash liquidity risk posed by margining generally. The company might be pushed into a default for lack of cash, which triggers cross defaults to other financing arrangements, even though default caused by its underlying business is remote. Historically, this is the way derivatives have bankrupted businesses and governments.

An inescapable feature of derivatives—even if they are perfectly designed to offset some price risk that is absolutely going to be realized in the future—is that if the business or government cannot meet a call for margin, either because a credit threshold has been exceeded or a credit trigger has been tripped, it will likely go bankrupt. The derivatives terms will be breached and all other financial arrangements that have cross default provisions will be breached as well.

These risks are poorly understood and almost never valued when businesses and governments decide between derivative hedging and the use of simpler alternatives. Moreover, these risks are not considered in the academic literature that analyzes the use of derivatives. If a call for margin is unfunded, it is often the case that other contracts of the business or government will default because of cross-default provisions. This potential for cataclysmic insolvency of a company or government, even though its underlying financial condition may be relatively stable has not been modeled and perhaps may be impossible to model.

The un-margined derivatives credit exposures that are widespread in the economy are a form of “Ponzi financing described by economist Hyman Minsky. He states that “Ponzi” financing can not be currently repaid or even repaid from identifiable future revenues, which creates high levels of instability in the economy. Of course, not every un-margined exposure is impossible to fund with identifiable revenue. They are not precisely what Minsky described—though Minsky may have addressed them if he had the opportunity to think about them.

The problem is that many un-funded margin obligations have the potential to become “Ponzi” financing. One reason is that exposure under derivatives have no actual cap, as prices are generally uncapped. Also, a derivative is a demand obligation. The counterparty is incented to make a demand before insolvency because, once cash is deposited, the counterparty enjoys super priority over other creditors in respect to the
collateral under bankruptcy law. In cases such as AIG, a margin calls cannot be funded by current cash flow. The only way to avoid default is to find financing that replaces the financing under the derivatives that has suddenly become unavailable. This is reminiscent of subprime mortgage loans that were at the center of the financial crisis. As for AIG, the replacement financing came from the U.S. taxpayers.

Finally, credit exposures in derivatives run both ways. Banks protect themselves with margins, thresholds and credit triggers. However, if a business or government transacts a derivative with a bank, the credit exposure is equally likely to involve an extension of credit to the bank. This extension of credit is almost never priced into the transaction by the business or government and they rarely benefit from margining, threshold and trigger provisions. The vast majority of derivatives are held by only four banks, so the ability of businesses and governments to negotiate favorable terms is negligible, even if they understand the risks involved. It is as if the market has concluded that no risk of bank default need be considered. The derivative counterparties of Lehman Brothers Holdings might find that conclusion particularly unpersuasive.

The Decision to Hedge with a Derivative

Financial market participants can put money into stocks bonds or derivatives seeking to profit from price moves by having superior information than other market participants. This is speculation. In contrast, businesses and governments use derivatives to offset a market price exposure that it experiences in its operations or in its capital structure. Unlike speculation, the value of hedging is not derived from market price moves. The value is in the offset between the actual price exposure and the synthetic price exposure under the derivative.

Derivatives do not eliminate risk. They are contracts that exchange one set of future consequences from a price change for another, assuming the other party performs. Picture a business whose profit and loss during a period in the future depends on price movements of a commodity or security. In order to avoid the consequences of an adverse price move, the business could establish a reserve from borrowings or earnings. Alternatively, it could enter into a derivative that (assuming performance by the counterparty) fixes the consequence of this price exposure at the current price level.

The distinctions between these alternatives—cash reserves and derivatives—should drive the decision between these two methods of managing the risk of price movement.\(^3\) The use of derivatives is often characterized as a “risk reduction” device. Instead, it is a contract that is one of a number of devices to alter the consequences to an enterprise of an exposure to price changes. Price volatility is eliminated (assuming performance by the counterparty) as both the risk and reward of price change are passed to the counterparty. The possible cost of using a cash reserve is the capital to fund it, net of the earnings on the reserve deposits. The possible cost of a derivative is
the company pays the value of a beneficial price move if it occurs. That value, plus a fee, is transferred to a bank that is its counterparty. If a reserve is used, the risk is that an adverse price move has consequences beyond the reserve. If a derivative is used, the basic embedded risk is that the counterparty fails to perform, but derivatives include many other risks as well.

The enterprise price risk that is hedged by a derivative occurs sometime in the future, presumably when the payments are required under the contract. However, the other basic property, two-way credit risk extension, comes into play from the inception of the derivative contract. A company either funds margin collateral during the term of the derivative contract or it receives an extension of credit from the counterparty, which is almost always a bank. In turn, the company also extends credit to the bank.

The company or business could set aside funds as reserves. It could save the amount it would have been putting up in margin or in the embedded extension of credit under the derivative contract if no ongoing margining is required. At the time the enterprise price risk is experienced, the company or government would be equally protected from a price shock, assuming that the derivative counterparty performs its obligations and the reserve is prudently sized and maintained. However, if it uses a reserve fund it would benefit from a favorable price movement. If it uses a derivative it would not experience a negative price shift.

Superficially, the cost of borrowing money to fund a reserve and the cost of credit extended under a derivative should be the same. As discussed above, a derivative involves an extension of credit, with many of the characteristics of a loan to fund a reserve. A bank has finite capacity to extend credit to any company or government. When it makes a loan, the bank decrements available credit capacity to keep track of how much exposure to the borrower has been taken on. Similarly, when the bank enters into a derivative, the embedded credit exposure is decremented from credit capacity. Both consume finite credit capacity, limiting what the business or government can borrow for other purposes. As well, the bank that deploys the credit under the derivative will charge an amount at least equal to the profit it would receive by issuing a loan.

The question is whether the costs and benefits are accurately reflected in the pricing of the derivative contract and the consequences to the two parties.

Since the alternative approach to managing a price exposure is to establish a reserve, derivatives can be described as a substitute for funding a reserve. The cost of funding a reserve is the cost of capital to the business or the government (net of earnings on the reserve). In this sense, a hedging derivative is a substitute for capital. In practice, the use of derivatives by businesses and governments is closely related to capital funding.
Derivatives use is closely related to capital funding in several other ways. Indeed, derivatives are often used directly in conjunction with capital raising. For instance, interest rate derivatives can allow a business or government that wants to borrow at a fixed rate to fund its capital requirements by accessing floating interest rate markets. More broadly, derivatives are used to hedge in order to lower the cost of capital. Credit rating agencies, in particular, encourage the use of price hedges. After all, credit ratings are based on probability of default rather than prospects for profit. This may be at least a part of the reason that some studies have observed a positive correlation between the share prices of companies and the propensity to use derivatives to hedge.4

If the underlying social purpose of the financial markets is the efficient intermediation between capital sources and capital uses, the best way to evaluate the use of derivatives is to observe their efficiency in that task. To the extent the use of derivatives rather than capital reserves increases that efficiency, derivatives provide a social value. To the extent their use decreases it, they impose a social cost.

There is an important difference between the use of derivatives and capital reserves, however. The cost of borrowing under a loan is straightforward. Lenders charge interest over time. Contractually, principal and interest are distinguished from one another so that the basic costs, at least, are transparent.

The compensation charged by a counterparty, typically a bank, for entering into a derivative is very different. The first problem is that there is no certainty that the bank will incur a direct cost of entering into the transaction. As discussed above, at inception market-priced derivatives have no intrinsic financial value to either party. Value—and its mirror image, credit exposure—accrues over time as forward price expectations change. Banks must evaluate the credit exposures either using statistical probabilities based on prior price movements or adjust calculated exposures over time. The pricing of derivatives is so complex that customers almost never understand how much a bank charges them. The profit margin for the bank is baked into the pricing of a derivative.

This constitutes a massive distortion of the credit markets. In an efficient market, the same credit is priced similarly regardless of how it is deployed. Derivatives are commonly used to reconcile differences between the needs of the sources and uses of capital investment. This is an alternative to the commercial bank intermediation model in which banks loan from deposit funds and other sources and their capital absorbs the differences between sources and uses of capital. In both cases, the users of capital “rent” the balance sheets of the banks to access sources of capital investment. Large differences between the rent charged for derivatives and the rent charged in the commercial banking intermediation model for the “use” of the bank balance sheet constitute an extraction of value from the capital intermediation process in excess of the value provided.
Only the banks that overcharge are aware that the overcharging occurs. In order to examine pricing, one must compare the original pricing with the market at inception of the transaction, and data is difficult to find. However, there are rare glimpses into the practice. One was a package of London Interbank Offered Rate (LIBOR) derivatives entered into by the Denver Public Schools as part of a complex financing of its unfunded pension fund liability. LIBOR derivatives are extremely liquid, and are near commodities. Andrew Kalotay, the founder of Andrew Kalotay Associates that provides quantitative analysis of fixed income products, was asked to look into that financing after it collapsed in the wake of the financial crisis. Kalotay testified concerning his investigation before the Securities and Exchange Commission (SEC) in a general inquiry on municipal finance practices.\(^5\)

Kalotay determined that the school district was overcharged by more than $13.5 million, an immense amount for such a commonplace derivative. Troubled by his finding, Kalotay estimated that state and local governments throughout the country had been overcharged by $20 billion by the financial sector between 2005 and 2010.

Overcharging of private companies is even more shadowy and is more likely to involve derivatives that are less liquid, having prices that are less transparent. However, practitioners believe that the evidence of general overpricing is compelling.

**Why Do Businesses and Governments Overuse Derivatives**

Derivatives involve costs—including risk—that often outweigh their benefits in the real world. What are the other factors that must be influencing businesses and governments to use derivatives so much?

Tax and accounting results can affect the decision. Holding cash can be inefficient from a tax perspective depending on the funding source. In addition, the accounting for debt transacted under a derivative by a company or a government that is hedging a risk is obscure.\(^6\)

Another important factor is that the end users simply do not understand the costs and risks. They may not even have the tools to make an informed decision. This is particularly a concern with municipal users of derivatives.

However, this is not a sufficient answer since the use of a derivative requires an affirmative act so that concerns about lack of knowledge must be overcome.

One factor is that the embedded credit extension in derivatives allows an end user to synthetically borrow without having to report debt as such. The most extreme example may be the Government of Greece that entered into a currency derivative with Goldman Sachs that was out-of-the-money, meaning that the pricing was off-market at inception. From day one, there was credit extended to the Government of Greece. The credit extension under the derivative allowed Greece to transact debt
without having to consume its borrowing capacity under EU rules. This form of “shadow borrowing” occurs frequently.

Another factor is the extreme emphasis that credit rating agencies place on hedging price risk with derivatives. Credit ratings are not an evaluation of how profitable a business may be. Instead, they are an evaluation of how likely default on debt is. Here is how Standard & Poor’s describes ratings:

Credit ratings are opinions about credit risk. Standard & Poor’s ratings express the agency’s opinion about the ability and willingness of an issuer, such as a corporation or state or city government, to meet its financial obligations in full and on time.⁷

If a price consequence is hedged with a derivative, the end user avoids adverse price consequences and foregoes positive price consequences. Thus, the risk of default is reduced in exchange for foregoing potential profit. From a credit rating standpoint, this is a sensible exchange, even though it may be sub-optimal in terms of the value of the enterprise to shareholders or, in the case of a government, to taxpayers.

Additionally, in large part because derivatives business is so profitable, banks market derivatives aggressively to end users. Often, derivative business can be tied to other bank business that the end user finds advantageous so that derivative prices are not rigorously negotiated. Also, a bank can strongly advise a treasurer or chief financial officer to enter into a derivative transaction as a hedge. If the treasurer or financial officer decides to reserve against the risk instead and if the adverse price movement occurs, he or she can be criticized for not heading the advice of the banker. The safer course for the individual, though not for the end user, may be to use the derivative.

Conclusions

Powerful innovations over the last 35 years, especially since 2000, have changed trading markets dramatically. By far the largest and most dangerous innovation is the derivatives market. Derivatives were created and marketed aggressively by the large financial institutions that dominate trading. These sophisticated market participants are very well situated to understand the distortions and inefficiencies that are embedded in derivatives.

Armed with superior technological and analytical capabilities as well as intimate knowledge of distortions and inefficiencies, these large financial institutions are able to exploit them. They understand the pricing and valuation of derivatives much better than their customers. This knowledge advantage is immensely profitable for them.

The value that they extract is large. For the most part, it exceeds the value provided by the derivatives themselves. For example, most studies indicate that the value of using derivatives to manage risk is roughly the same as the value of using a reserve
for the same purpose. Yet the cost of a derivative is much higher. Unfortunately, the complexity of even the simplest derivative goes largely unaccounted for in the academic literature and in the marketplace. Complexity obscures the evaluation of efficient results. Studies that find that the use of derivatives to hedge provides little if any advantage over alternatives omit many costs that would tip the scales against derivatives.

The marketplace is biased toward complexity because it favors market participants with asymmetric information advantages and oligopolistic market power. Under these circumstances there is an inherent bias toward risk taking by large financial institutions: the larger the risk, the larger the reward. If the rewards are structurally higher, immediate profits—which translate into shareholder value and executive compensation—can be seized. The periodic catastrophic failure is worth it for traders and executives who keep their prior earnings.

Meanwhile, however, American businesses, governments and the general public suffer. Inefficiencies that transfer earnings to the financial sector are like a tax that redistributes wealth upward. This system cannot persist. Constraints on innovation, especially innovation in derivatives, based on much greater evaluation of costs and benefits, are desperately needed.

The capital intermediation system, and as a result the economy as a whole, would benefit greatly from a reduction of the derivatives markets. A number of regulatory measures have been suggested that would move in this direction.

The end user exemption from clearing and price transparency provisions of the Dodd-Frank Act could be eliminated or interpreted very narrowly. This exemption was included for political expediency in the debate over the Dodd-Frank Act. Businesses and governments with direct access to members of Congress continue to support the exemption, but the value that they perceive from it is misguided and springs from illegitimate incentives, such as obfuscation of debt in disclosure and tax technicalities.

Pricing of derivatives, especially for state and local governments, must be made more transparent and fair. Two measures would improve this situation. Generally, state and local governments employ independent advisers to evaluate derivatives. Many of these advisers are ill equipped to evaluate the transactions. Even worse, they are highly susceptible to influence by banks in direct and indirect ways. Registration and a strong set of standards would be beneficial. Further, a bureau like the Consumer Financial Protection Bureau for state and local governments—or a department within that bureau to serve these governments—is completely justified. The mispricing of financial products, particularly derivatives, to these entities imposes a heavy burden on the economy.

The problem of proper evaluation of the use of derivatives by businesses and governments is daunting. Derivatives impose dangerous and costly risks that ultimately are
material to investors in the businesses and governments that use them. Comprehensive disclosure of these risks and costs would require the businesses and governments to actually examine them. The SEC should develop a template for rigorous evaluation of these risks and costs and require disclosure under its terms. Investor disclosure would improve, but even more importantly businesses and governments would be provided the tools to understand the consequences of their transactions.

Endnotes


Wallace C. Turbeville
Wallace Turbeville, practiced law for seven years before joining Goldman, Sachs & Co. in 1985 as an investment banker. In his twelve years at Goldman, he specialized in infrastructure finance and public/private partnerships. From 1990 through 1995, he was posted to the London office where he was co-head of a group tasked to pursue financing of transportation, energy and environmental projects, particularly in the newly opened eastern European nations. From 1997, Mr. Turbeville managed a financial advisory firm and business specializing in the post-trade management of credit exposures in over-the-counter derivatives transactions.

Starting in 2010, Mr. Turbeville devoted his efforts to financial reform, energy and environmental policy issues. He served as Visiting Scholar at the Roosevelt Institute and authored nearly 30 articles concerning financial reform, energy, the environment and political opinion.

In October 2010, Mr. Turbeville joined Better Markets, Inc. He was the primary author of dozens of comment letters relating to proposed rules and studies implementing the Dodd-Frank Act. He resigned from Better Markets in late 2011 to devote time to interests New York City as a Senior Fellow at Demos, a national public policy research and advocacy organization, and as an Adjunct Professor of Law at the University of Maryland Law School.