Derivatives: Benefits, Risks, and Regulations

By
Kristopher Nguyen

A thesis submitted to the faculty of The University of Mississippi in partial fulfillment of the requirements of the Sally McDonnell Barksdale Honors College.

Oxford
May 2016

Approved By

Advisor: Professor Bonnie Van Ness

Reader: Professor Seong Byun

Reader: Professor W. Mark Wilder

Acknowledgements

I would like to thank Seong Byun. Even though he did not work directly with me on the paper, he was very helpful during the process. Dr. Byun is the teacher for the intermediate corporate finance classes that I previously took, and I would like to saw he is a great teacher. The principles, that I learned from his instruction, helped me shape this paper. Also, in the beginning when I was trying to come up with research ideas, he took the time to talk with me and helped me to start thinking of areas to research and ways to come up with a research question.

I would also like to thank Dr. Bonnie Van Ness for her guidance. She is a very busy woman, and even though she is very busy, she took the time to advise several honors students. Dr. Van Ness did not have to be the advisor for all of us, but she took the time to be our advisor anyways. I brought her areas that I wanted to research, but unfortunately the empirical research that I was interested in was not possible for me to do. However, she saw my interests and helped to guide me along the way. Thank you Dr. Van Ness for all of your help.

Abstract

This paper explores much preexisting research and history about derivatives. Derivative contracts can be used to hedge risk and to speculate in markets. To find the affects of hedging and speculating, I explored what other researches had found in studies and documented in history. Through out history, the regulations of derivatives have changes. I further explore some of the most recent changes in legislation and included those changes and some of the affects in this paper.

Based upon the research of others I find that when non-financial firms hedge, those firms receive a lower cost of equity and cost of debt than firms that do not hedge. Firms that use derivatives also can experience savings in tax liabilities. Many studies find that non-financial firms that hedge experience a higher firm valuation than firms that did not hedge. However, there were a few studies that did not find any significant affect on firm value from derivative usage.

By reading research, books, and other historical information on the Tulipmania, South Sea Company, and Subprime Mortgage Crisis, I find that speculation increases risk. Price risk, liquidity risk, counterparty risk, and systemic risk are some examples of risk that increases when derivative users speculate. When the markets took a turn in each of these historical examples speculators realized these increased risks.

I also find that deregulation of industries including the financial industry is part of the reason why derivatives began growing so much around the 1970's in the United States. Regulators tried to regulate swap contracts, but they ended up backing off when

dealers moved overseas. The lack of investor protections and regulations of swaps hurt investors during subprime mortgage crises. After the crises, countries with major economies and emerging economies came together to increase regulations on derivatives.

I conclude that hedging with derivatives is beneficial for firms and can allow firms to increase firm value in different ways, and that speculation increases risk. Even though speculation increases risk, these risks may not be as severe in the future now that countries are coming together to regulate derivatives.

Table of Contents

Introduction

Derivatives give traders the opportunity to earn massive gains. At the same time, traders may face great risks when holding derivative contracts. Some people acknowledge the contracts as a risk management tool, while others compare derivatives to gambling. Earning profits from derivative trading sparked my interest in the area. My goal is to have a better understanding of the market in areas such as the benefits, risks, and regulations.

Hedging creates shareholder value while speculation increases risks, although new regulations have been set in place to lower those risks. Some possible benefits that firms are able to realize by using derivatives are a lower cost of capital, lower taxes, and lower agency costs. A firm's cost of capital can be reduced by lowering the cost of equity and the cost of debt. The cost of equity is the return required by equity holders of the firm. The cost of debt is the interest rate paid to bond holders and creditors. A lower cost of capital allows firms to raise money at a cheaper rate and will transfer to a lower required rate of return and discount rate. Lowering the cost of capital is one possible benefit of using derivatives, while increasing cash flows is another possible benefit. When firms decrease their tax liability, their after-tax revenues increase. Reducing a firm's agency costs can also raise cash flows. Managers often worry about their jobs, and may not take on riskier projects that could result in larger profits. Creditors are another source of agency costs, and may reduce profits by placing restrictions on the firm as

requirements in bond and loan contracts. One of the goals of a firm is to maximize shareholder value. To raise shareholder value, firms may use derivatives to increase cash flows and lower the cost of capital.

Some of the risks that holders of derivatives face are price risk, counterparty risk, liquidity risk, and systemic risk. Examples of the reality of these risks are shown when previous speculative bubbles, such as the Tulipmania, shares of the South Sea Company, and the housing bubble, collapsed. When these bubbles burst, derivative contracts associated with the bubbles became worthless. At the same time, many holders of the contracts faced the risk of not being paid. After each of the bubbles burst, governments set new regulations to protect investors. Some regulations attempted to undermine the validity of derivatives, and by doing so would make derivatives unenforceable, while some regulations sought to increase transparency and have derivatives listed on exchanges with certain requirements.

Characteristics

Derivatives take on many different forms. The Options Clearing Corporation defines a derivative as a financial contract where the value is derived from the performance of underlying market factors (OCC, N.D.). Underlying market factors can range from, but are not limited to, financial instruments, risk factors, and commodities. The underlying market factor is just one way that derivatives can differ. The contracts have different structures such as forwards, futures, options, and swaps. The holders of the contracts could be subject to risks such as price risk, counterparty risk, liquidity risk, and market risk. First, the different forms of the contracts will be explained and defined.

Types of Contracts

A forward contract is an agreement for a seller to deliver a particular asset to a buyer at specific price on a specified day. The buyer takes what is known as the long position and the seller takes what is known as the short position. Forwards are customized to fit the needs of the buyers and sellers and are sold by dealers over the counter. Futures are similar to forwards, but differ because the contracts trade on standardized exchanges. Payoff from the contract depends on the difference between the spot rate and the contracted rate. The spot rate is what the asset could be bought or sold for today.

Here is an example of how the payoff structure works. A person or firm could purchase a forward contract from a farmer. The contract could state that the underlying

asset is 100 bushels of wheat being sold for $150 on a particular. If the price fluctuates above or below $150, then the buyer will have a positive or negative payoff, respectfully. If the spot price rises to $160, then there will be a payoff of $10. If the spot price dips to $140, the buyer will realize a negative payoff of $10 (Hull, 2009).

Options are different from futures and forwards. The option buyer has the option, rather than obligation, to execute the contract. The price agreed upon in the contract is known as the strike price, and the specified date is known as the expiration date. Other than not having the obligation of executing the contract, the buyer may have the opportunity to execute early. American options have the benefit to execute early if the buyer wishes. European options cannot execute early. In the case that executing the option contract would have a negative payoff, the buyer could choose not to execute the option or to sell the option. Choosing not to execute would result in the buyer having a payoff of zero. The payoff does not reflect net profit, because the buyer would have lost the money used to purchase the option. By allowing option holders not to execute, options offer more protection than futures and forwards. Options can be purchased over the counter or through an exchange.

The following is an example of how a European option works: a buyer could purchase an European option for five dollars with the underlying asset being the stock of a specific company. The terms of the option could be an expiration of three months with a strike price of $50. If, at the expiration, the spot price of the stock is below $50, the buyer would not execute because execution would result in a loss. However, when the price is above $50, execution would result in a positive payoff but not necessarily a

positive net profit. If the price rose to $54, then there would be a positive payoff of four dollars, but a negative net profit of one dollar (Hull, 2009).

Swaps differ from the previous types of derivatives in their transaction dates. Swaps typically have multiple transactions dates, whereas forwards, futures, and options typically have one. Prior to the Dodd-Frank Act, swaps were primarily customized over the counter, with some being standardized on exchanges (Funk and Hirschman, 2013). Usually one party would exchange a fixed rate payment for a floating rate payment from another party. The floating rate is normally tied to some type of index, such as the LIBOR. A swap can allow firms to change fixed rate assets to floating rate assets and vice versa. The same applies to liabilities. For example, Company A issues bonds with a floating rate tied to an interest rate index. Company A enters into a swap agreement with company B. Company B pays Company A the floating rate, and Company A then uses the money to pay it's bondholders. Company A now pays company B the fixed rate (Hull, 2009).

Exotic Derivatives

Aside from the commonly known structures of the contracts, exotic forms exist. Exotic derivatives typically have non-standard features. Non-standard features could include an unusual payoff structure or a nonstandard underlying market factor such as the weather. Usually exotics are custom fitted to the desire of the parties involved. (Jin and Jorian, 2006). The nonstandard features show innovation in the derivatives market. Options and swaps have the most common nonstandard features. A credit default swap is an example of an exotic swap. Some popular exotic options are Asian options, barrier

options, and lookback options. Many exotic options are path dependent (DeRosa, 1998). A mixture of a swap and an option is the swaption.

One type of exotic option, an Asian option, has a payoff that depends on the average price of the underlying asset during a specified period of time before the option's expiration. The average can be calculated using arithmetic or geometric averages and periods of time can be weighted differently, Asian options offer flexibility. Using an average price over a period of time reduces volatility with the options. On top of having more flexibility, Asian options are priced lower than plain vanilla options (Zhang, 1995).

Barrier options, on the other hand, can be calls or puts with conditional paths. The payoff structure of barrier options depends upon whether or not some barrier or target level is passed before the option expires. Barrier options can be further classified into knock-in and knockout options. A knock-in option gives the option holder the opportunity to receive a European option if the barrier is hit and a rebate if it is not. A knockout option is the opposite. The holder will receive a rebate if the barrier is hit and a European option if the barrier is not hit. The payoff can also depend on whether the barrier is crossed from above or below. What makes barrier options attractive is that barrier options are priced lower than vanilla, or plain, options (Zhang, 1995).

A look-back option has a payoff that is determined by the difference between the strike price and a maximum or minimum of the underlying asset's price during the life of the contract. The call option takes the difference between the strike price and the minimum. The put option takes the difference between the strike price and the maximum. These options catch the essence of buying low and selling high. However, lookback options are more expensive than vanilla options (Zhang, 1995).

A swaption is a mixture of an option and a swap. This type of contract is an option on a swap. The buyer has the option to enter into a swap before the option expires. The buyer usually has the right to exercise the option as a fixed ratepayer and then become the floating ratepayer. Swaptions are similar to forward swaps but the buyer is not legally bound to the swap unless exercised (Eales and Moorad, 2003).

A credit default swap's underlying factor can be various credit related events such as bankruptcy or failure to pay. The credit related event could depend on one reference entity or multiple reference entities. The protection buyer pays a yearly premium until the expiration of the contract or until the entity defaults. The protection seller takes on the default risk and must settle the debt at the end of the swap contract or if the reference entity defaults. The debt can be settled by a predetermined agreement of cash or a physical asset. If settled with the physical asset, the protection buyer gives the protection seller the asset in exchange for face value. If through cash, the protection seller pays the difference between the underlying asset at the time of settlement and the face value of the credit default swap contract (Stulz, 2010).

Underlying Market Factors

When a derivative has interest rates as the underlying market factor, the derivative is known as an interest rate derivative. An interest rate derivative is a contract where two parties exchange interest payments based on a fixed rate and a referenced floating rate. Interest rate derivatives can trade in one or more currencies. The floating rate will be updated to the reference index on specified days and will be noted in the contract. One example of a reference index is the three month LIBOR index (Fleming, et al, 2012).

Interest rates are, by far, the most common underlying market factor, when

comparing the contracts based on notional value, according to the Bank of International Settlements (BIS) (BIS, 2016 a and BIS, 2016 b). Notional value is the total value of the underlying asset being traded at the spot price specified in the contract. Interest rate derivatives are recorded to have a $494,674 billion notional value in the first half of 2015. Of that amount, over the counter trading of interest rate derivatives was recorded at $434,740 billion in regards to notional value. The interest rate swap holds the most notional value in the entire derivatives market with a notional value of $319,954 billion. The BIS defines an interest rate swap as "an agreement to exchange periodic payments related to interest rates on a single currency. This could be fixed for floating, or floating for floating based on different indices. This category includes those swaps for which notional principal is amortized according to a fixed schedule independent of interest rates" (BIS, 2016 a and BIS, 2016 b).

A derivative that uses exchange rates as the underlying market factor is known as aforeign exchange derivative. Foreign exchange derivatives trade currencies at a specified rate a specified future date. In essence, each party will be selling one currency and purchasing another. The size of the foreign exchange derivatives market sums up to be $74,871 billion during the first half of 2015. During the same time period, the BIS groups outright forwards and foreign exchange swaps in the same category and lists those two as the largest group with a total of $33,128 billion. According to the BIS, an outright forward is, "a transaction involving the exchange of two currencies at a rate agreed on the date of the contract for delivery (cash settlement) at some time in the future (more than two business days later). Also included in this category are forward foreign exchange agreement transactions, non-deliverable forwards, and other forward contracts for

difference." The BIS defines a foreign exchange swap as, "a simultaneous transaction that involves the exchange of two currencies, first the near leg and then, subsequently, a reverse transaction at a forward date (the far leg). Short-term swaps carried out as overnight and 'tomorrow/next day/ transactions are included in this category" (Triennial Central Bank Survey: Foreign exchange turnover in April 2013: Preliminary Global results.").

The commodities market consists of a wide range of assets. The only commodity specifically listed by the BIS is gold (BIS, 2016 a and BIS, 2016 b). Some other commodities include precious metals, crude oil, natural gas, electricity, coal, agricultural products, and biofuel. Typical, commodity derivative participants are buyers or sellers that want to hedge price movement risk (Schofiel, 2008). The BIS listed a notional value of $247 billion for gold, $61 billion for other precious metals, and $1,363 billion for "other commodities" (BIS, 2016 a and BIS, 2016 b). There are several risks involved with derivatives. One type of risk associated with derivatives is unwanted price movement, which can lead to negative payoffs. Liquidity risk is the possibility that it will be difficult to sell the contract. Another form of risk is counterparty default risk. Counterparty default risk is the risk that the party on the other side of the contract will not fulfill the obligations of the contract. (Allen, 2012). Allen also notes three ways that counterparty risk could become systemic risk. "First, a market participant with a robust derivatives portfolio could trigger unexpected losses on its derivative trades, which could seriously impair the financial condition of one or more of its counterparties." Second, the fear of a market participant's failure could create systemic risk if the counterparties try to reduce exposure to the large, weak market participant to avoid potential losses. This

behavior can contribute to a "run" that accelerates failure of that participant. Third, the fear of a market participant's failure could also foster systemic risk if the counterparties suddenly try to replace their positions with the distressed firm, thereby creating a 'fire sale'." Unwanted price movement, liquidity risk, and counterparty risks are all risks that come with a derivatives contract.

The global market for derivative, is in the billions. Derivatives can vary greatly from the structure of the contract to the underlying asset the contract derives its value from. The interest rate market is the largest followed by foreign exchange derivatives. Futures, forwards, options, and swaps are the basic forms of derivatives, but there are exotic forms that exist. Users face risks such as counterparty risk, liquidity risk, and systemic risk.

Benefits in Non-Financial Firms

Non-financial firms can benefit from derivative usage. A possible benefit is increasing shareholder value which is a primary goal of firms. Lowering the cost of capital and increasing cash flows are two ways that firms may increase shareholder value. When risks are reduced, the cost of capital and agency costs may be reduced. One way to reduce risks is to hedge with derivatives. Derivatives may also be used to lower taxes, which will lead to an increase in cash flows. Much of the research on hedging with derivatives are empirical studies focusing on non-financial firms that use derivatives compared with non-financial firms that do not use derivatives. The research on derivatives in non-financial companies shows that firm-value, for the most part, increases in relation to Tobin's Q. If firms realize some of these possible benefits, then the firms should have an increase in shareholder value.

Lowering the Cost of Capital

Lowering the cost of capital should lead to an increase in shareholder value. The cost of capital depends upon the cost of debt, equity, and preferred stock. Research shows that derivatives can lower the cost of debt and equity. A lower cost of capital can prove to be beneficial, because it results in a lower discount rate for projects and firm valuation. A lower discount rate for projects leads to more possible projects with a higher net present value. A lower discount rate when valuing the firm leads to a higher valuation.

The cost of equity is the return that shareholders require. The Capital Asset Pricing Model measures the cost of equity. A firm's market beta, measured as the covariance is one of the factors in the model that alters the cost of equity. Gay, et al's (2011), results from their study show that derivative usage can lower market beta and the cost of equity. In their paper, Gat, et al stated, "We suggest that while risk management can potentially affect levels of future expected cash flows, it may also have an effect on discount rates through a reduction in the covariance of future cash flows with the stochastic discount factor or pricing kernel. If this covariance is indeed reduced, the effective discount rate for the cash flows will also be reduced and a resulting lower cost of equity could potentially lead to an increase in firm value." Their findings show that, on average, non-financial firms had a 4.9% lower market beta than the firms that did not use derivatives. Also, users on average, had a 7.46% cost of equity compared to an 8.06% cost of equity for non-users. The range of their results 24-78 basis points lower users compared to non-users. Gay, et al's, study shows that hedging with derivatives may lead to a lower cost of equity for a firm.

The cost of debt can also be lowered with the use of derivatives. Loans and bonds are two primary ways that firms raise funds through debt. Some studies have shown that firms can use hedging to decrease interest rates for loans and bonds. Beatty, et al (2011) finds that firms that have hedging commitments in their loan requirements receive lower interest rates from their lenders. Their results show that loans with hedging covenants had lower interest rates by 63.5 basis points when compared to those who voluntarily hedged. When compared to those who did not hedge at all, there was a 115.8 basis point difference (Beatty, et al). Chen and King (2014) find that derivative usage can also lower

the bond spread. Their findings show that speculative grade bonds are more affected than investment grade bonds. Speculative grade bond issuers have a 45.2 basis point difference relative to non-users, and investment grade bond issuers have a 19.2 basis point difference relative to non-users. These two studies show that derivatives can lower the cost of debt, which will in turn, lower the cost of capital.

Lowering the Tax Liability

Another benefit that derivatives can give non-financial firms is tax savings. Tax savings are important because the savings will raise cash flows, or in other words, increase the cash the firm has available for other uses. Higher cash flows should result in higher firm value. Smoothing pre-tax cash flows, timing taxes, and raising the tax shield are some ways that firms can lower taxes paid to the government.

Smith and Stulz (1985) argue that derivatives can smooth pre-tax corporation values, which will, in turn, reduce the corporate tax liability when the tax function is convex. A convex tax function means a progressive tax system is being used. Smith and Stulz state, "The structure of the tax code can make it advantageous for firms to take positions in futures, forward, or options markets. If effective marginal tax rates on corporations are an increasing function of corporations' pre-tax value then the after-tax value of the firm is a concave function of the corporation's' pre-tax value. If hedging reduces the variability of pre-tax firm values, then the expected corporate tax liability is reduced and the expected post tax value of the firm is increased, as long as the cost of the hedge is not too large." Graham and Smith (1995) also said that a convex tax function makes it possible for hedging to lower the tax liability. They find that a five percent reduction in cash flow volatility led to a 5.4% decrease of the expected tax liability, on

average. In very rare cases, they find that the tax liability could be reduced up to 40%. For firms with a progressive tax code, they state that, “If such a firm hedges, the tax increase in circumstances where income would have been low is smaller than the tax reduction in circumstances where income would have been high thus lowering expected taxes.” They noted that hedging will not reduce the income tax liability with a flat tax.

One of the ways that derivatives could help with tax smoothing is by allowing firms to control the timing of losses. Managing the timing of losses can be beneficial when the savings in taxes, due to the progressive tax code, are larger than the losses. Schizer (2000) argues that 6 U.S. Code § 475 gives more incentive for derivative dealers to help their buyers with aggressive tax planning. Section 475 requires dealers to report derivatives using a mark-to-market accounting system instead of a lower of cost or market. Using a mark-to-market accounting system means that the dealers have to report gains and losses even when the gains or losses aren't realized. Here is an example of how using a mark-to-market accounting system can help non-financial firms. A non-financial firm could enter into a forward contract to buy a stock. If the stock were to fall below the contracted price before the expiration time, the buyer could terminate the contract early, take the loss, and reduce taxable income. Since section 475 states that dealers must report unrealized gains, terminating the contract early does not affect the dealer’s taxes. Section 475 may give the dealers incentive to allow the contract to be terminated early in order to help their clients save taxes. Donohoe (2015) finds that much of the tax savings that firms realize comes from aggressive tax planning. He noted that, for his sample, the firms saved $4 billion in taxes through derivatives use, and that only $0.7 billion was because of the savings from cash flow smoothing that Smith & Stulz (1985) mentioned. Donohoe

(2015) believes that the other $4.3 billion are due to the tax timing opportunities that derivatives present.

Another way that derivatives can increase tax savings is through increasing the tax shield. When firms take on more debt they decrease their taxable income because of higher interest payments. Hedging can allow firms to increase their debt capacity, which will allow them to raise their tax shield. Graham and Rogers (2002) estimate that firms can add up to one percent to the firms' value if the firms increase debt capacity with derivatives. Derivatives can allow firms to reduce taxes by lowering cash flow volatility with convex tax functions, by allowing for aggressive tax planning, and by providing an increased tax shield.

Lowering Agency Costs

Lowering agency costs are a third way that derivatives can benefit firms. Derivatives can be used to tie managers' compensation to company performance. Giving the managers stock options of the company can reduce agency costs. Stock options may give managers incentives, to take on riskier projects that may raise the stock price and create shareholder value. Stock options as compensation has become the largest part of executive compensation within the United States, which could mean that it has become effective in influencing managers to create shareholder value (Belghitar and Clark, 2015).

Derivative usage by firms without good reporting and monitoring standards may not benefit the firm. Fauver and Naranjo (2010) find that firms, with reporting and monitoring problems, had a negative correlation with Tobin's Q, which means when these problematic firms used derivatives they experienced a lower firm value. Tobins Q is calculated by dividing the total market value of the firm by the total asset value of the

firm. If the ratio is shrinking, then the market value of debt or equity could be shrinking (Investopedia).

Beatty, et al, (2011) find that derivatives can also lower debt-related agency costs. Their research shows that creditors will force borrowers to hedge interest rate risk, when borrowers showed high default risk and when borrowers' sales fell in a rising interest rate environment. The study found that when borrowers hedged their position they often received lower interest rates and less restrictive covenants. Since managers received less restrictive covenants, they had more freedom to make decisions. Firms can reduce sanctions between managers and lenders through the use of derivatives, which can encourage managers to take on riskier projects.

Most research has found that derivative usage positively affects firm value. Even though studies have found that derivatives lower different measures of risk, such as Batran, et al, (2009), some researchers argue that derivative usage does not always enhance firm value, such as Jin and Jorian (2006). Many studies cite whether users and non-users have a higher or lower Tobin's Q. Batran, et al, (2009) conducted a study between 1998 and 2003, in 47 countries, and on 6,888 non-financial firms. They find that derivative users have a higher Tobin's Q. They also find that users have higher alphas, which measure excess returns for a firm's level of risk. Gomez-Gonzalez, et al, (2012) also found that derivatives have positive effects on Tobin's Q for non-financial firms in Columbia, which is an emerging economy. Kim, et al, (2006) also find that derivatives used to hedge currency derivatives results in a higher Tobin's Q with firms in the United States. They found that the firms had a 5.4% higher valuation than non-users. A study on French firms by Khediri and Folus (2010) found that derivatives have no significant

effect on firm value. Jin and Jorion (2006) also found that derivatives do not affect firm value in the gas and oil industry in the United States. For the most part, studies have found that derivative usage raises firm value, but in some cases, research did not show significant effects.

Firms may benefit from derivative usage in different ways. Derivative users have the opportunity to lower the cost of debt and equity, which can lower the cost of capital. By lowering the cost of capital, firms will be able to use lower discount rates when evaluating the net present value of projects and the value of the firm, which should raise the values. Lowering the tax liability through smoothing of pre-tax firm values, tax planning, and raising the tax shield are ways that firms may use derivatives. By lowering the tax liability firms should realize higher cash flows. Reducing the agency costs of debt and equity and tying company performance to manager's pay should also increase the cash flows of companies. Empirical evidence shows that derivative usage can be associated with higher firm value.

Risks of Speculation

Tulipmania

Futures contracts were a popular instrument used to speculate on tulip bulbs during the Tulipmania. Speculation started in Amsterdam during 1634 and ended in 1637. During the 16th Century, Western Europe saw tulips as rare flowers introduced by the Ottoman Empire. After tulips arrived, the Dutch experimented with the flowers to make variations that were considered rarer and seen with a higher value (Mackay, 1852). Unique patterns on the bulbs is what made tulips appear to be rarer. To get unique patterns, the plant would have to be infected by a Mosaic virus which caused the plants to "break" or produce patterns. Once infected, growers cultivated the buds into new bulbs with patterns (Garber, 1989). The price of unique tulip bulbs rose so high that one transaction recorded one Semper Augustus bulb being traded for $50,000 worth of gold at $450 an ounce. (Mackay).

A futures market developed for speculation in 1636. After the futures market developed, futures became the primary method of speculation on tulip bulbs. Usually neither party intended on transferring the bulbs, but instead the parties were seeking profits by cash settlement of the difference between the spot price and the contracted price, which is also known as a contract for differences. Futures contracts were riskier during that time compared to today. Equity margins were not required and the contracts were not updated daily on a mark to market basis. When the price of tulip bulbs collapsed

during February 1637, the lack of protections lead to a loss of the gross position rather than the net position (Garber, 1989).

Lawmakers in Amsterdam realized the speculation with futures contracts posed a problem. In 1637, Holland suspended the contracts, but gave the sellers the right to sell bulbs for current market prices during the suspension. The buyers had to pay the difference between the market price and what authorities set as the settlement price (Garber, 1989). Also, between 1621and 1636 the legislature passed laws making contracts of differences unenforceable to undermine the futures. The passage of the undermining laws made default risk very high (Kellenbenz, 1957). De la Vega noted trading these contracts relied heavily on credit and reputation (de la Vega, 1688). Weber (2008) believes that because the contracts during the Tulipmania were unenforceable, the lack of enforcement could be the reason why Amsterdam did not go into a recession when the market crashed in 1637.

Joseph de la Vega (1688) wrote a book on stock trading in Amsterdam during the Seventeenth Century. In his book, he notes that the notional value in the forward agreements became so high that only the very wealthy could take acceptance of the goods if the contracts were not settled in other ways. De la Vega says that settling by the difference in the spot price and contracted price was acceptable, and that the people could borrow up to four-fifths of underlying value to take acceptance (de la Vega, 1688). In his book, de la Vega mentions his discovery in options and he believed that option contracts were safer than futures (de la Vega, 1688).

South Sea Company

Another example of a speculative bubble is trading of the shares of the South Sea Company. The South Sea Company started in England during 1711. The reason, why the people thought the company would be profitable, was because the company had exclusive trading rights of British trade with South America and other islands of the South Sea. As part of the deal with Parliament, the South Sea Company had to take on part of the public debt of England in exchange for the exclusive rights. In 1719, the directors of the South Sea Company proposed to take on all of England's national debt in exchange for a fixed rate for life. Parliament accepted the proposition the following year. After the acceptance one of the directors of the South Sea Company, John Blunt, manipulated the prices of the shares. First, he issued shares on an installment plan which drove prices up. Next he issued loans at low rates. Last he issued new subscriptions of stock to get the money back from the loans (Myers, 2015).

The subscription shares resembled call options. The holders purchased the shares by making small payments on the shares. Shea (2007) says the subscription shares are a series of options. If a payment was missed, the holder had three months to pay or forfeit the shares. If the shares were forfeited, the company would sell the shares in the market and give the forfeiter the residual. The window of time presented an opportunity to speculate on the price of the subscription shares, which could also be traded in a secondary market (Shea).

The shares became worthless by September, 1720. The rising prices began losing momentum and John Blunt sold all of his shares. Eventually everyone was trying to sell their shares with no one to buy the shares (Myers, 2015). The burst of the bubble

negatively affected the economic growth of London. Some say that there was no economic growth in London between 1720 and 1750 (Kindleberger, 1984 and 1996). The severity of the effects of the collapse could be because the contracts were enforceable, unlike in Amsterdam where the contracts were not enforceable. In 1734, the British Parliament passed the St. John Barnard's Act, which voided future delivery of contracts of securities. The passage of the act is likely due to the bubble burst of the South Sea Company in 1720 (Weber, 2008). Since security based derivatives were illegal and therefore could not be traded on exchanges, trading took place in the "Exchange Alley" which was outside the Royal Exchange and consisted of small shops and coffeehouses (Swan, 2000)

Another bubble in the Compagnie des Indes Company in France collapsed at the same time as the South Sea Company. France followed England's lead in issuing derivative regulations. During the 1720's, Paris restricted all securities and commodity activities to an exchange by taking away the dealer's privileges in financial markets (Coffinière, 1824) Throughout the century Paris, passed legislation restricting activities of financial markets, and derivative contracts were made illegal during 1823 (Weber, 2008). During the 1850's contracts for future delivery were once again made legal under the condition that the expiration time was within two months (Proudhon, 1857). In 1885, derivative contracts became legally enforceable.

Housing Bubble

The housing bubble is the most recent bubble with ties to derivatives. First an explanation of how the crisis happened will be given. Then the relationship to derivatives will be shown. Subprime loans were given to borrowers who may not have been able to

make the payments. Subprime mortgages experienced explosive growth between 2001 and 2006 as loan values increased from $57 billion to $375 billion. Loosening underwriting standards, deteriorating loan performance, and risk premiums that did not match the default risk are factors that led to the rise and, then, the collapse of the loans. Rising home values between 2003 and 2005 helped to hide the problems associated with subprime mortgages. Starting in 2006 many of the loans started having late payments and foreclosures (Demyanyk and Hermert, 2008). The late payments and foreclosures did not have the impact it should have on lenders (Arentsen, et al, 2015).

Mortgage backed securities aided the lenders in not suffering the consequences of the problematic loans. Subprime mortgages were being securitized, which means the mortgages were grouped into securities and sold. By securitizing the mortgages, the lenders did not hold default risk (Stulz, 2010). The separation of the risk could be part of the reason that lenders did not have tight restrictions and monitoring of the loans (Mian and Sufi, 2011; Keys, et al 2010; and Purnanaman, 2011). The most secure mortgage backed securities were rated as AAA bonds and thought to have a very low default rate. Even though the mortgage-backed securities were rated AAA, investors still purchased protection on the securities. When the subprime mortgages experienced high default rates starting in 2006, the mortgaged backed securities did not prove to be as safe as investors thought (Stulz).

Credit default swaps provided investors with protection on the mortgage-backed securities. The swaps allowed investors to hedge default risk on the mortgages by transferring the risks to other parties (Arentsen, et al, 2015 and Stulz, 2010). Stulz argues that credit default swaps were essentially insurance on the subprime mortgages. Arentsen,

et al, said that, “since mortgage backed security market participants could limit their exposure to securitizations of risky loans, they were less concerned about the decline in credit quality of loans being pushed out by originators. The decrease in sensitivity to loan quality together with the increase in demand for highly rated mortgage backed securities by investors chasing high yields drove a reduction in lending standards by mortgage loan originators who earned lucrative fees to supply the loans.” Arensten, et al, (2015) also blames credit default swaps for the increased lending since lenders and the security buyers were not linked to the default risk. However, Stulz argues that the credit default swaps did exactly what the swaps were created to do, mitigate risk. If the investors did not have credit default swaps on the mortgage backed securities, then they would have realized the steep losses instead of the counterparties, such as AIG. AIG is an example of a firm that had a substantial credit default swap position to provide insurance to the investors that purchased mortgage backed securities (Stulz). AIG lost nearly 100 billion due to the defaulting mortgages, with an estimated 30 billion due to credit default swaps on mortgage backed securities. Assets were shrinking and collateral calls for credit default swaps were increasing. Due to decreasing liquidity, AIG nearly went bankrupt and could not meet the required obligations without outside help. AIG eventually received loans in excess of $150 billion from the Federal Reserve and the Treasury Department. The example of AIG illustrates the counterparty risk associated with derivatives (Stulz, Goldman 2008, and McDonald and Paulson 2015).

Bubbles in the past have shown that speculation with derivatives is risky. One example was when futures were used to speculate on tulips during the Tulipmania. A second example was when the South Sea Company issued shares using option like

contracts. A third example is when swaps were used to speculate on subprime mortgages. Speculators lost much in each of the bubbles. The futures contracts on tulips and the shares of the South Sea Company became worthless. Credit default swaps left speculators with many margin calls when subprime mortgages started defaulting. The South Sea Bubble and the Subprime Mortgage Crisis show systematic risk because the whole financial system was affected during those times. The Tulipmania and South Sea Company show price risk because the underlying assets became worthless. Each of the cases show that liquidity risk can also be an issue, because the derivatives contracts and underlying assets will be difficult to sell when the price collapses. The example with AIG shows the reality of counterparty risk, because the firm would not have been able to pay the margin calls without the bailout money.

Change of Regulations

After the Subprime Mortgage Crisis, regulators tightened the regulations surrounding derivatives. Prior to new regulations, swaps did not have many regulations. The lack of regulations could be related to the period of deregulation following the 1980's. Later, after the Great Recession world economies sought to have global sanctions on derivatives to increase reporting and margin standards to reduce systemic risk and increase transparency. Two acts that came from the G-20 meeting during November 2008 in Washington are The Wall Street Accountability and Transparency Act and The European Market Infrastructure Regulation.

Prior to 2008 Recession

Even though derivative use was common, the United States did not experience explosive growth in derivative usage until the 1970's. Computers aided in the growth of derivatives by allowing for electronic exchanges and by solving complex algorithms. The development of the Black-Scholes Model was an important discovery that helped in pricing exotic and vanilla derivatives (Stulz, 2004). The Chicago Mercantile Exchange developed the first online trading platform for futures in 1997 (CME). Government policies affected derivative growth during that time period. During the 1970's, the volatility of interest rates and exchange rates were high and created a need for hedging these instruments. At the same time, deregulation of industries led to much uncertainty and created more need for ways to hedge risk (Stulz, 2004).

Deregulation in some industries increased demand for ways to hedge risk. One example is the electricity industry. Deregulation caused electricity prices to become volatile as the rates became market determined instead of regulated by the government. The companies that generated power could now face the risk that the spot rate for electricity was less than the cost to produce the electricity. Marketers sell the power to wholesalers and consumers. Marketers faced a situation similar to that of the power generating companies. The rate that marketers paid for the electricity could be less than the fixed rate that consumers and wholesalers paid. In other words, market conditions could lead to a loss for the sellers. Consumers faced much uncertainty with electricity prices throughout the year and the uncertainty could lead to difficulty in forecasting their financial position. The electricity industry is just one example of an industry where deregulation caused a need for hedging (Stoft, et al, 1998).

Deregulation and the lack of regulations of the financial industry also played a role in the growth of derivatives. Deregulation caused the repeal of the Glass-Steagal Act. The Glass-Steagal Act was enacted shortly after the Great Depression to separate banks into two categories: investment banks and commercial banks. Around the Great Depression, commercial banks were incurring losses from speculation on equity markets. By separating banks into two categories, commercial banks were prevented from using customer funds for speculation purposes (Mauses,1933).

The Glass-Steagal Act faced problems with regulating swaps. Regulators could not determine if swaps were futures or options, and for this reason regulators could not identify whether or not swaps could be covered under the Glass-Steagal Act. Because there were no specific regulations regarding swaps, the lack of regulation allowed for

regulatory arbitrage. Regulatory arbitrage happens when there are loopholes that allow firms to circumvent unfavorable regulation. The lack of regulation is a possible explanation for the explosive growth of swaps. Investment banks held many swaps, and regulators saw the use of swaps as an investing activity. Commercial banks wanted access to swaps, which led them to challenge the Glass-Steagal Act. Around the 1970's, the Glass-Steagal act faced opposition and was later repealed. (Funk and Hirschman, 2014).

In 1987 The Commodities Futures Trading Commission attempted to regulate swaps under the Commodities Exchange Act. The purpose of the Commodities Exchange Act was to ensure financial integrity of transactions and to avoid systemic risk. One of its key aims was to prevent fraudulent practices and misuse of customer assets, such as price manipulation. The Commodity Exchange Act made the sale of futures not listed on an exchange illegal. As a result, more transactions took place on a centralized exchange. Since more transactions took place on an exchange, regulators were better suited to regulate futures (7 U.S. Code Chapter 1). The tactic, used by the Commodity Futures Trading Commission, was to imply that swaps were futures (Romano, 1996).

Many of the swaps contracts would have been unenforceable since majority of the swaps were traded over the counter instead of on exchanges. Many swap dealers moved overseas, because regulators were trying to regulate the swap market. The Commodity Futures Trading Commission backed down on their regulatory efforts, because the dealers were moving overseas and the United States was losing business. (Romano, 1996). In 1989 the Commodity Futures Trading Commission passed regulations that exempted most swaps from regulations. They also took measures to keep swaps from the

general public by preventing swaps from being traded on exchanges. To prevent swaps from being traded on exchanges, they required swaps to be customized (Federal Register, 1989). In 1992 Congress passed the Futures Trading Practices Act. The act authorized the Commodity Futures Trading Commission to exempt swaps from the Commodity Exchange Act. When the Commodity Futures Modernization Act was passed in 2000, the Commodity Futures Trading Commission was prevented from regulating swaps in the over the counter market by declaring that swaps were not futures, options, or securities. (Cravath, et al, 2001).

After 2008 Recession

After the 2008 recession, the Group of Twenty (G-20) agreed to set new standards regarding derivatives (Jackson & Miller, 2013). The Group of Twenty is an informal international forum for discussing and coordinating economic policies in advanced and emerging-market countries (Nelson, 2014). Following the 2008-2009 crisis, the G-20 set priorities for regulating and overseeing over the counter derivatives. The first priority being that all standardized over the counter derivative contracts should be traded on exchanges or an electronic trading platform. Second, over the counter derivative contracts should be cleared through central counterparties by the end of 2012; and for those not cleared through a central counterparty, should be subject to higher capital requirements. Third, report over the counter derivatives to trade repositories. The global collaboration of these goals now prevent derivatives dealers from moving overseas to have regulatory arbitrage as in the past. Now that many countries will be enacting new regulations, dealers will not be able to evade regulations (Jackson & Miller, 2013).

America's response to the G-20 meeting is Title VII of the Dodd-Frank Act. Title VII is the Wall Street Transparency and Accountability Act of 2010. The Wall Street Transparency and Accountability Act of 2010 puts the Securities and Exchange Commission and the Commodity Futures Trading Commission in charge of implementing the Dodd-Frank Act. The Dodd-Frank act is important because the Commodity Futures Trading Commission finally gained control of regulating all forms of swaps and derivatives like swaps (Dodd-Frank Act Title VII). Title VII gives swap dealers and major participants regulations including capital and margin requirements; documentation, reporting, and recordkeeping; and internal and external business conduct requirements (7 U.S.C § 6s(e)). The dealers and major participants must register with the Commodity Futures Trading Commission (7 U.S.C.§ 6s(c)). A major swap participant is defined as a participant that maintains a substantial position in any major swap category. A position is "substantial" when it can "significantly affect the United States" (7 U.S.C § 1a). Dealers and major participants must also clear as soon "as practicable after execution", and submit their positions of the swap to derivatives clearing organizations. The derivative clearing organization is subject to margin requirements (7 U.S. Code § 7a–1).

One of the effects of the Title VII of the Dodd-Frank Act is that some swap participants are moving into the futures market. The move of swap users into the futures market is known as the futurization of swaps. Dealers are creating "swap futures," which are classified as futures, but mimic the cash flows of swaps (Aditya, 2013). Goldman Sachs, ICE, and the CME Group are some examples of such dealers. Since Title VII requires swaps to have higher margin requirements than futures, futures have become

more attractive when futures can be used. Futures clearinghouses may not be able to accommodate futurization. Also futurization can be argued as regulatory arbitrage since the move to futures circumvents the new regulations (Litan and Riley, 2013 and Aditya).

Europe's response is the European Market Infrastructure Regulation. The European Market Infrastructure Regulation was enacted during 2012, with the European Securities and Markets Authority as the overseeing regulatory body. The European Market Infrastructure Regulation has similar goals to that of the Commodity Futures Trading Commission, which is to reduce risk and improve transparency. The goals include having a central clearing party. The European Securities and Markets Authority made notes on determining which derivatives needed to be centrally cleared and set standards for risk mitigation techniques for those not centrally cleared. They also mandated that all derivatives must be reported to a trade repository (ESMA, 2015). European regulations include setting central counterparties as the intermediaries, which must be registered and meet margin and liquidity requirements (European Commission, 2012). The European Securities and Markets Authority was given authority to regulate derivatives contracts, which is a broader authority than the Dodd-Frank Act gave the Commodity Futures Trading Commission (ESMA, 2015).

The Commodity Futures Trading Commission recognizes the similarities between the European Market Infrastructure Regulation and the Dodd-Frank Act, but they note in a press release "without coordination, subjecting the global market to the simultaneous application of each other's requirements could lead to conflicts of law, inconsistencies, and legal uncertainty" (CFTC, 2013). The Commodity Futures Trading Commission and the European Securities and Markets Authority agreed to a "path forward" on derivative

regulation that relies on the concept known as substituted compliance or equivalence (CFTC). The individual governing bodies are not applying their cross border derivative rules upon participants, but will allow the regulatory body of the jurisdiction to enforce the rules.

World derivatives market are safer because of the legislation set in place during 2012. For example, the United States and Europe have more control of the derivatives markets in their respective countries as shown through the Wall Street Transparency and Accountability Act and the European Market Infrastructure Regulation. World economies are coming together to regulate derivatives as shown through the G-20. Even though the rules may differ from country to country, the rules have the same goals of transparency and market safety. Through heavier regulations and more transparency, users will be more protected from counterparty and systemic risk than they were previously.

Conclusion

The derivatives market is large and provides benefits. Different types of derivatives include forwards, futures, options, and swaps; as well as other exotic forms. Futures and forward contracts require future delivery of an underlying asset, whereas an option does not necessarily require future delivery. Swaps, on the other hand, typically have multiple delivery dates. Interest rate swap derivatives are recorded to have the most notional value in the derivatives market. In regards to underlying market factors measured by notional value, interest rates take up the highest portion of market share of derivatives followed by foreign exchange rates.

For the most part, empirical evidence shows that firm value increases when non-financial firms hedge with derivatives. By increasing the value of the firm, managers achieve the goal of creating shareholder value. A lower cost of capital and smoother cash flows are possible ways that hedging may increase shareholder value. Evidence has shown that hedging can lower the cost of equity and the cost of debt, and as a result the cost of capital. A lower cost of capital should lead to a lower required rate of return and discount rate. By lowering the discount rate and the required rate of return, the firm could could have a higher firm valuation and more positive net present value projects. Hedging can also smooth cash flows, which could lead to higher after-tax cash flows. Also, agency costs from managers and lenders can be lowered with derivatives, and in return could

also result in higher cash flows. If the result is higher cash flows, then the value of the firm should be higher.

When firms are speculating instead of hedging with derivatives, the firm may be subject to greater amounts of risk. The bubbles around the tulip bulbs, the South Sea Company, and subprime mortgages show how intense price risk, counterparty risk, liquidity risk, and systemic risk can be when the bubbles collapse. When bubbles collapse speculators may be left with worthless contracts and large market participants may not be able to pay their debts. AIG is a good example of a firm that experienced this result as the company nearly went bankrupt and had to be bailed out by the government in order to pay off it's credit default swaps.

Prior to the Subprime Mortgage Crisis and Great Recession, swaps were not regulated in the United States and there was not a global consensus on regulating derivatives. Now that many of the large and growing economies have come together to set general rules regarding derivative regulation, dealers will not be able to move from country to country to circumvent the regulations. New regulations include higher margin requirements, reporting activities to trade repositories, making major participants and dealers subject to even higher standards, pushing more derivatives to exchanges, and making more derivatives clear through a central counterparty. These new regulations should make derivatives safer by increasing transparency and reducing systemic risk.

Bibliography

Abdel-khalik, A. Rashad and Chen, Po-Chang. "Growth in Financial Derivatives: The Public Policy and Accounting Incentives." *Journal of Accounting and Public Policy* in special issue *Accounting and Risk Management Volume 34.* Issue 3 (2015): pg. 291-318. Print.

Allayannis, George and James Weston. "The Use of Foreign Currency Derivatives and Firm Market Value." *Review of Financial Studies Volume 14*. Issue 1 (2001): Pg. 243-276. Print

Allen, Julia Lees. "Derivatives Clearinghouses and Systemic Risk: A Bankruptcy and Dodd-Frank Analysis." *Stanford Law Review Volume 64.* Issue 4 (2012): Pg. 1079-1108. Print.

Arentsen, Eric, et al. "Subprime Mortgage Defaults and Credit Default Swaps." *The Journal of Finance Volume 70.* Issue 2 (2015) pg. 689-371. Print

Belghitar, Yacine and Ephraim Clark. "Managerial Risk Incentives and Investment Related Costs." International Review of Finance Analysis Volume 38. (2015): pg. 191-197. Print.

Bartram, Sohnke M., et al. "International Evidence on Financial Derivatives Usage." *Financial Management Volume 1.* Issue 38 (2009): pg. 185-206. Print.

Beatty, Anne, et al. "The Effects of Derivatives on Firm Risk and Value." *Journal of Financial and Quantitative Analysis Volume 46.* Issue 04 (2011): pg. 967-999. Print.

Beatty, Anne, et al. "Hedge Commitments and Agency Costs of Debt: Evidence from Interest Rate Protection Covenants and Accounting Conservatism." *Review of Accounting Studies Volume 17.* Issue 3 (2012): pg. 700-738. Print.

Belghitar, Yacine, et al. "Foreign Currency Derivative Use and Shareholder Value." International Review of Financial Analysis Volume 29. (2013): pg. 283-293. Print.

BIS. "Exchange-Traded Derivatives Statistics." Bank of International Standards, Bank of International Standards. (2016 a). Web

BIS. “Semiannual OTC Derivatives Statistics.” Bank of International Standards, Bank of International Standards. (2016 b). Web

CFTC.“The European Commission and the CFTC Reach a Common Path Forward on Derivatives.” *CFTC.* CFTC. Web. 2013

Chen, Jun and Tao-Hsien King. “Corporate Hedging and the Cost of Debt.” J*ournal of Corporate Finance Volume 29*. (2014): pg. 221-245. Print

Choudhry, Moorad and Brian Eales. *Derivative Instruments: A Guide to Theory and Practice*. Butterworth-Heinemann. 2003. Print

“CME Group Overview.” *CME Group.* CME Group. Web.

“Commission Delegated Regulation (EU) no 153/2013.” European Commission, *Eur-Lex,* 2012. Web.

Cravath, Moore, and Swaine. “Memorandum for ISDA Members: Commodity Futures Modernization Act.” ISDA. ISDA. 2001. Web.

Demyanyk, Yuliya and Otto Van Hermert. “Understanding the Subprime Mortgage Crisis.” Federal Deposit Insurance Corporation. *Federal Deposit Insurance Corporation,* (2008). Web.

“Dodd-Frank: Title VII - Wall Street Transparency and Accountability.” Cornell University Law School. *Cornell. Web.*

DeRosa, David F. *Currency Derivatives: Pricing, Theory, Exotic Options, and Hedging Applications.* John Wiley & Sons Inc. 1998. Print.

Donohoe, Michael. “The Economic Effects of Financial Derivatives on Corporate Tax Avoidance.” *Journal of Accounting and Economics Volume 59*. Issue 1 (2015): pg. 1-24. Print.

Fauver, Larry and Andy Naranjo. “Derivative Usage and Firm Value: The Influence of Agency Costs and Monitoring Problems.” *Journal of Corporate Finance Volume 16.* Issue 5 (2010): pg. 719-735. Print.

ESMA. “Post Trading” European Securities and Markets Authority, *European Securities and Markets Authority (2015)* Web.

Fleming, Michael, et al. “An Analysis of OTC Interest Derivatives Transactions: Implications for Public Reporting.” *Federal Reserve Bank of New York Staff Reports.* No. 557 (2012): Web.

Ehrenberg, Richard. *Capital and Finance in the Age of the Renaissance.* Forgotten Books., 2012. Print.

Federal Register. "CFTC Policy Statement Concerning Swap Transactions" (1989): Web.

Funk, Russel J. and Daniel Hirschman. "Derivatives and Deregulation: Financial Innovation and the Demise of Glass-Steagall." *Administrative Science Quarterly Volume 59*. Issue 5 (2014): pg. 669-704. Print

Garber, Peter M., "Tulipmania." *The Journal of Political Economy Volume 97.* Number 3 (1989): pg. 535-560. Print

Gay, Gerlad, et al. "Corporate Derivatives Use and the Cost of Equity." *Journal of Banking & Finance Volume 35*. Issue 6 (2011): pg. 1491-1506. Print.

Goldman, David. "AIG: Uncle Sam's Do-Over." CNN. *CNN,* (2008). Web.

Gomez-Gonzalez, Jose, et al. "Does the Use of Foreign Currency Derivatives Affect Firms' Market Value? Evidence from Colombia." Emerging Markets Finance and Trade Volume 48. Issue 4 (2012): pg. 50-66. Print.

Graham, John and Clifford Smith. "Tax Incentives to Hedge." *The Journal of Finance Volume 54*. Issue 6 (1999): pg. 2241-2262. Print.

Graham, John and Daniel Rogers. "Do Firms Hedge in Response to Tax Incentives." *The Journal of Finance Volume 57*. Issue 2 (2002) pg. 815- 839. Print.

Grant, C. "Why Treasurers Are Swapping Swaps." Euromoney Volume 4 (1985): pg. 19-30. Print

Griffith, Sean J. "Substituted Compliance and Systemic Risk: How to Make a Global Market in Derivatives Regulation." *Minnesota Law Review Volume 98.* Number 1291 (2014): 1291-1371. Print

Guay, Wayne R. "The Impact of Derivatives on Firm Risk: An Empirical Examination of New Derivative Users." *Journal of Accounting and Economics Volume 26*. Issues 1-3 (1999): pg. 319-351. Print

Gyntelberg, Jacob and Christian Upper. "The OTC Interest Rate Derivatives Market in 2013." *BIS Quarterly Review, December 2013* (2013). Web

Hazen, T. L. "Disparate Regulatory Schemes for Parallel Activi*ties: Securities Regulation, Derivatives Regulation, Gambling, and Insurance" Annual Review of Banking & Financial Law,* Volume 24 (2005): pg. 375-442. Print

Hull, John C. "How Are the New Rules for OTC Derivatives Working." *Journal of Risk Management in Financial Institutions Volume 8.* Issue 4 (2015): pg. 312-313. Print.

Hull, John C. *Options, Futures, and Other Derivatives Seventh Edition*. Prentice Hall. 2009. Print.

International Monetary Fund. "Durable Financial Stability: Getting There From Here" *Global Financial Stability Report* (2011): Web.

Jackson, James and Rena Miller. "Comparing G-20 Reform of the Over-the Counter Derivatives Markets." Congressional Research. Service *Federation of American Scientists, (*2013): Web.

Jankensgard, Hakan, et al. "Derivative Usage, Risk Disclosure, and Firm Value." Journal of Accounting and Finance Volume 14. Issue 5 (2014); pg. 159-174. Print.

Jin, Yanbo and Philippe Jorion. "Firm Value and Hedging: Evidence from U.S. Oil and Gas Producers." *The Journal of Finance Volume 61*. Issue 2 (2006): pg. 893-919. Print.

Mai, Stefan. *The Global Derivatives Market - An Introduction.* Deutsche Borse AG, (2008): Web.

Keys, Benjamin J., Tanmoy Mukherjee, Amit Seru, and Vikrant Vig," Did Securitization Lead to Lax Screening? Evidence from subprime loans." *Quarterly Journal of Economics* 125 (2010): pg. 307– 362. Print.

Kellenbenz, Hermann (1957) *Introduction* to the English translation of Joseph de la Vega (1688) *Confusion de Confusiones*. Baker Library, Boston, MA: Harvard Graduate School of Business.

Khediri, Karim and Didier Folus. "Does Hedging Increase Firm Value? Evidence from French Firms." Applied Economic Letters Volume 17. Issue 10 (2010): pg. 995-998. Print.

Kim, Young, et al. "Is Operational Hedging a Substitute for or a Complement to Financial Hedging?." *Journal of Corporate Finance Volume 12*. Issue 4 (2006): pg. 834-853. Print.

Kindleberger, Charles P. *A Financial History of Western Europe*, Economic History (1984): Print.

Kindleberger, Charles P. *Manias, Panics and Crashes: A History of Financial Crises. Basic* Books (1996). Print.

Leland, Hayne E. "Agency Costs, Risk Management, and Capital Structure." *The Journal of Finance Volume 53.* Issue 4 (1998): pg. 1213-1243. Web.

Mian, Atif and Amir Sufi. “House Prices, Home Equity-Based Borrowing, and the US Household Leverage Crisis.” American Economic Review Volume 101. Issue 5 (2011): pg. 2132-56. Print.

Maues, Julia. "Banking Act of 1933, Commonly Called Glass-Stegall." Federal Reseve History. *Federal Reserve Bank of St. Louis, 1933.* Web.

Myers, Alice “Collapse of the South Sea Bubble.” *Salem Press Encyclopedia*, (2015) Web.

Nayberg, Yevgenia. “What Went Wrong at AIG?.” Kellogg Insight. *Kellog*, (2015). Web.

Nelson, Rebecca M. “The G-20 and International Economic Cooperation: Background and Implications for Congress.” Congressional Research. Service *Federation of American Scientists,* 2014. Web.

OCC. “Derivatives.” *OCC.* Office of the Comptroller of the Currency. (N.D.) Web.

Perkins, E. J. “The Divorce of commercial and investment banking: A History.” *Banking Law Journal Volume 88* (1971): pg. 483-528. Print

Purnanandam, Amiyatosh, 2011, Originate-to-distribute model and the sub-prime mortgage crisis, *Review of Financial Studies* 24, 1881–1915.

Romano, Roberta. “A Thumbnail Sketch of Derivative Securities and Their Regulation.” *Maryland Law Review Volume 55* (1996): pg. 1-83. Print.

Salazar, Mauricio. "Swapping More than Regulations: Reexamining the Goals of the Dodd-Frank Act and the European Market Infrastructure Regulation on Over-the-Counter Derivative Markets." *Southwestern Journal of International Law* 21.1 (2014-2015): 217-236. Print.

Schizer, David. “Sticks and Snakes: Derivatives and Curtailing Aggressive Tax Planning.” *Southern California Law Review Volume 73.* Issue 6 (2000): pg. 1339-1401. Print.

Scholfiel, Neil C. *Commodity Derivatives: Markets and Applications.* Wiley Finance. 2008. Print

Shea, Gary S. (2007) Understanding Financial Derivatives During the South Sea Bubble: The Case of the South Sea Subscription Shares, *Oxford Economic Papers* 59, i72-i104.

Smith, Clifford and Rene Stulz. “The Determinants of Firms’ Hedging Policies.” *The Journal of Financial and Quantitative Analysis Volume 20*. Issue 4 (1985) pg. 391-405. Print.

Stoft, S., et al. “Primer on Electricity Futures and Other Derivatives” *University of California*. 1998. Web.

Stulz, Rene M. “Rethinking Risk Management.” *Journal of Applied Corporate Finance Volume 9*. Issue 3 (1996): pg. 8-25. Print.

Stulz, Rene M. “Should We Fear Derivatives” *Journal of Economic Perspectives Volume 18.* Issue 3 (2004): pg. 173-192. Print.

Stulz, Rene M. “Credit Default Swaps and the Credit Crisis.” *Journal of Economic Perspectives Volume 24*. Number 1 (2010): pg. 73-92. Print

Swan, Edward J. *Building the Global Market, A 4000 Year History of Derivatives.* Kluwe Law International. (2000). Print

Wallin, James and Camille Clingan “An Overview of Dodd-Frank as it Relates to OTC Derivatives Reform.” *Journal of Securities Operations & Custody Volume 5.* Number 4 (2013): pg. 312-316. Print.

Weber, Ernst J. “A Short History of Derivative Security Markets.” *The University of Western Australia.* (2008). Web.

Weistroffer, Christian “Credit Default Swaps: Heading Toward a More Stable System.” *Deutsche Bank Research* (December 2009). Print.

Whalen, Christopher R. “The Subprime Crisis -- Cause, Effect and Consequences.” *Journal of Affordable Housing & Community Development Law Volume 17*. Number 3 (2008): pg. 219-235. Print

Van de Mieroop, Marc (2005) The Innovation of Interest. Sumerian Loans. In Goetzmann, William M. and K. Geert Rouwenhorst (eds) *The Origins of Value: The Financial Innovations that Created Modern Capital Markets*, Oxford: Oxford University Press.

Zhang, Peter G., "An Introduction to Exotic Options.” *European Financial Management Volume 1.* Issue 1 (1995): pg. 87-95. Print