

## **ASYMMETRIC INFORMATION AND BENEFITS OF FINANCIAL DERIVATIVES**

**Aleksandra Stankovska\***

**Ljupco Stojceski\*\***

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### **Abstract**

The purpose of this paper is to present the main trends regarding the asymmetric information, using the available statistical data on OTC financial derivatives. Information failure occurs when people have inaccurate, incomplete or misunderstood data and so make potentially wrong choices. In modern financial economics; managerial adverse selection & moral hazard are widely accepted as impediments to effective contractual arrangements between the manager and investors, resulting in inefficiencies of overall corporate management.

Financial derivatives amplify the consequences of asymmetric information through implicit leverage if a party to the contract fails to follow agreement. Use of derivatives and the extent of derivatives usage are associated with lower asymmetric information. The companies facing medium level of information asymmetry are more likely to hedge, while companies with very high and low levels of asymmetric information tend to speculate.

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### **Keywords:**

Asymmetric information;  
Adverse selection;  
Moral hazard;  
OTC financial derivatives;  
Hedge & speculation.

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**\*Associate Professor in Corporate Finance, European University – Republic of Macedonia, Skopje**

**\*\*Full time Professor in Finance, European University - Republic of Macedonia, Skopje**

## 1. Introduction

Asymmetric information is a problem that economists should always consider in the analysis of markets, as it tends to create market failures in product markets where low quality products drive out good quality products, insurance markets where low risk groups do not take out insurance and high risk groups do, and other markets where principals do not receive return from agents. In the context of financial markets, this means that parties to a transaction do not have access to the same quantity and quality of information. Considerable information is needed in order to assess potential risk and reward, and to make a rational decision about whether to purchase a financial product or not, and how much to pay for it.

Asymmetric information can seriously impair the process when parties to the financial contract are not fully aware of the risks involved and, as a result, can limit their exposure to financial agreements to prevent themselves from possible losses.

Examples of asymmetric information include the following:

- Insider information of traders in financial markets;
- Information advantages for high-frequency stock market traders;
- Mortgages: A borrower knows more about their ability to repay a loan than the lender, insufficient checks might be made;
- Car insurance companies who cannot tell the risks associated with selling premiums to each single driver – they have to pool risks;
- Some students have superior knowledge about how to get into the elite / best universities including which prior courses to take;
- Doctors have superior knowledge about which drugs and treatments to recommend to their patients;&
- A used-car seller knows more about vehicle quality than a buyer - this gives rise to the problem of the Market for Lemons.

The presence of asymmetric information leads to adverse selection and moral hazard problems and may invalidate standard competitive market results. In adverse selection models, the ignorant party lacks information while negotiating an agreed understanding of or contract to the

transaction, whereas in moral hazard the ignorant party lacks information about performance of the agreed-upon transaction or lacks the ability to retaliate for a breach of the agreement.

Although the existence of asymmetric information is debated, the presumption of the existence of asymmetric information in the markets is often why some investors simply invest in indexes and mutual funds, which simply diversify the investor's money across a host of investments. Other investors "get in the game" by investing in hedge funds and other securities run by those with access to that asymmetric information.

The behavior of financial markets with imperfect information about the characteristics of financial products and services has been the focus of a great volume of literature. Stigler(1961) states that "information is a valuable resource: knowledge is power", and information can determine actions such as where purchasers buy higher quality goods at lower prices in their allocation of scarce resources, or where Governments regulation of the environment can be more efficient if they have the good scientific information. Therefore information can be seen as a valuable economic factor, especially in the allocation of scarce economic resources, and the level of uncertainty that can ultimately determine utility levels (Nicholson,1998).

In 2001, the Nobel Prize in Economic Science was awarded to Akerlof, Spence and Stiglitz "for their analyses of markets with asymmetric information". Each of the three quoted papers investigates the implications of adverse selection on the product, labor and insurance markets respectively.

George Akerlof's 1970 article, "The Market for Lemons": Quality Uncertainty and the Market Mechanism, is a foundation stone of information economics. The article examined the markets for used motor vehicles, insurance, credit and employment. Akerlof explores adverse selection by the use of asymmetric quality information about the purchase of used motor vehicles to show market failure.

Michael Spence's flagship contribution was a 1973 paper called "Job Market Signaling" that looked at the labor market. He proposed that in a situation with information asymmetry, it is

possible for people to signal their type, thus believably transferring information to the other party and resolving the asymmetry. Employers may struggle to tell which job candidates are best. Michael Spence showed that top workers might signal their talents to firms by collecting gongs, like college degrees. Crucially, this only works if the signal is credible: if low-productivity workers found it easy to get a degree, then they could masquerade as clever types.

Joseph Stiglitz in his 1975 paper *The Theory of 'Screening,' Education, and the Distribution of Income*, explore whether this could be used by the seller (employer) to screen the applicants (potential employees) into categories that reflect their productivity or some other capability. In this way the under informed party can induce the other party to reveal their information. They can provide a menu of choices in such a way that the choice depends on the private information of the other party. Examples of situations where the buyer usually has better information than the seller include estate sales as specified in a last will and testament, life insurance, or sales of old art pieces without prior professional assessment of their value. This situation was first described by Kenneth J. Arrow in an article on health care in 1963.

Stiglitz states that there are many important differences in the qualities of goods, individuals, brands and other items. He defines screening as identifying these qualities. Further, devices that perform screening activities are called screening devices.

Michael Rothschild and Stiglitz in their 1976 paper *Equilibrium in Competitive Insurance Markets: An Essay on the Economics of Imperfect Information* continues the work of Stiglitz. In this paper they study the effects of imperfect information using insurance market as an example. Rothschild and Stiglitz define a competitive equilibrium in the insurance market of their model as a set of contracts chosen by the customers to maximize their expected utility such that, (i) no contract in the set makes negative expected profits to insurance companies, (ii) there is no contract outside the equilibrium set that would make a nonnegative

Information that is distributed asymmetrically between economic agents can be categorized as ex ante, pre-contractual of the transaction, or ex post, post-contractual of the transaction, that will influence economic behavior and operation of the market (Stiglitz, 1993).

Adverse selection is a situation where one party in a transaction knows something about its own characteristic that the other party does not know. Adverse selection is often referred to as a hidden information problem in a market, where for example sellers may know more about a product than a customer (Estrin and Laidler, 1995). Adverse selection problems arise from information asymmetry between the manager and investors before and/or after contracting, and moral hazard problems stem from the unobservability of managerial effort after contracting.

Moral Hazard is situations where one side of the market can't observe the actions of the other (Varian, 1990). The results of moral hazard are an increased probability of undesired outcomes for one party and the market, post contractual.

Principal agent problems are "any situation in which one party (the principal) needs to delegate actions to another party (the agent), and thus wishes to provide the agent with incentives to work hard and make decisions about the risk that reflect the interest of the principal" (Stiglitz, 1993) e.g. the property owner and the real estate agent managing it on the owners behalf. Problems may occur because principals cannot monitor every action that the agent undertakes, agents will therefore have better information, and the collection of this information by the principal may also be costly, if at all possible. As defined at the start of this essay, this principal relationship demonstrates the characteristics of asymmetric information being prevalent (Pindyck and Rubinfeld, 1989). One of the major issues in economics, that of unemployment, and the failure of the labour market to clear, has been addressed through efficiency wage theory (Hillier, 1997).

Much of the new research has proceeded in two agendas, modeling (i) the role of asymmetric information in linking movements in inside finance and investment, holding constant underlying opportunities, and (ii) the importance of information problems in accounting for observed differences in financing patterns and mechanisms for corporate control. The extent to which corporate insiders have more information regarding the firm than outsiders, commonly known as information asymmetry, is well documented in finance. Corporate insiders can capitalize on their informational advantage and realize abnormal gains from trading in securities of the firm.

Derivatives are powerful instruments and are able to affect the financial structure of a firm and its risk exposure by modifying future cash flows. A derivative is defined by the BIS (1995) as “a contract whose value depends on the price of underlying assets, but which does not require any investment of principal in those assets. From the viewpoint of economic theory, derivatives can be beneficial by "completing the market" and by helping ameliorate the effect of asymmetric information (Sanjeev Arora, 2012).

The use of derivative instruments in corporate risk management has grown rapidly in recent years, caused partly by financial deregulation and partly by the success of the financial industry in designing a great variety of OTC and exchange-traded contracts. Part of the reason for the success of financial derivatives is that they provide opportunities for hedging, speculation and arbitrage. Generally, financial derivatives, specifically, structured finance products such as CDOs and CDSs, reduce the negative costs imposed due to asymmetric information between buyers and sellers. From the viewpoint of economic theory, derivatives can be beneficial by "completing the market" and by helping ameliorate the effect of asymmetric information.

DeMarzo and Duffie (1995) and Breeden and Viswanathan (1998) explore this connection between hedging and asymmetric information using models in which shareholders learn about the quality of a firm's management by observing the firm's operating performance. In two studies utilizing this intuition, DeMarzo and Duffie (1995) and Breeden and Viswanathan (1998) consider settings where managers have superior knowledge (relative to shareholders) regarding the nature and extent of a firm's various market exposures, such as exposures to foreign exchange, interest rate and commodity price risks. In both studies, managerial choices regarding risk management strategies are useful in resolving informational frictions between managers and shareholders. DeMarzo and Duffie (1995) suggest that hedging improves the informativeness of corporate earnings as a signal of management ability and project quality by eliminating extraneous noise.

In the only study that addresses the potential relationship between derivatives and information asymmetry, to the authors' knowledge, Dadalt, Gay and Nam (2002) find that, in a sample of US corporations, banks and other entities during 1992 and 1996, firms that use foreign currency and

interest rate derivatives are associated with a lower level of information asymmetry as proxied by the accuracy of earnings forecast and the extent of disagreement between analysts. They also report that there is less information asymmetry regarding a firm's interest rate exposure than there is regarding its currency risk exposure due to accounting and reporting conventions. This reported relationship between derivatives and information asymmetry is less than certain since their measures of information asymmetry are noisy and proxying for other firm and market characteristics apart from information asymmetry.

## **2. Research Method**

To achieve the object of this paper, the asymmetric information data and financial derivatives data has been collected. At first, historical and comparative data are involved, as well as a full range of quantitative research methods. The secondary information is mostly from websites, books, journals, etc.

## **3. Results and Analysis**

The concept of information asymmetry was able to explain many common phenomena that could not be otherwise explained when it was first introduced in the early 1970s. Since then it has become a valuable tool in the field of economics and it is used to explain a diverse set of phenomena. The failure of financial intermediation and the resulting increase in asymmetric information is the best way to explain the recent financial turmoil that has led to global downturn. Financial crises are caused by increases in adverse selection and moral hazard problems that prevent financial markets from channeling funds to people with productive investment opportunities, leading to a sharp contraction in economic activity.

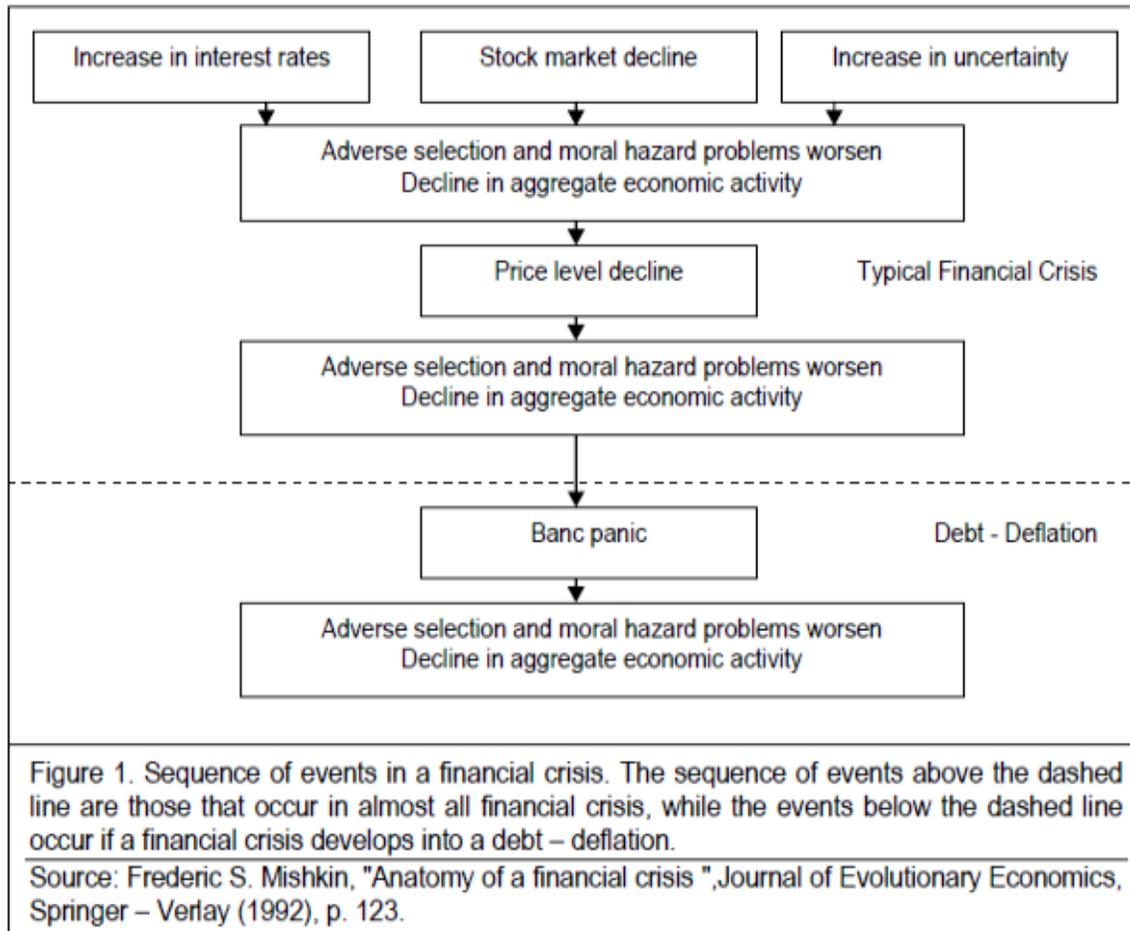
Several consequences can result from asymmetric information. It can affect firm's cost of capital; efficiency of capital markets; and firms financial and investment decisions; and managerial incentives compensation contracts. Higher information asymmetry also leads to lower market liquidity, to lower social gains from trade and, in extreme circumstances, to market failures.

Typical of asymmetric information in capital markets is that the level of internal net worth becomes a critical determinant of the terms under which firms can borrow, holding constant true

investment opportunities. This role for internal finance in the investment decision is potentially important for models of aggregate investment through two channels. First, to the extent that movements in firms' collateralizable net worth are procyclical, an "accelerator" mechanism emerges. This effect would not be present under perfect capital markets. Second, distributional considerations will be important for aggregate investment variability because of the impact of the redistribution on firms' internal net worth. A second mechanism through which informational asymmetries can precipitate a difference in the cost of internal and external finance—that is, making internal net worth more valuable, holding constant investment opportunities—is a "lemons market" problem in valuation. The classic argument (due to Akerlof 1970) is that some sellers with inside information about the quality of an asset will be unwilling to accept the terms offered by a less informed buyer. This may cause the market to break down, or at least force the sale of an asset at a price lower than it would command if all buyers and sellers had full information.

Depending on per capita levels of internal net worth, the allocation of new funds across classes of borrowers could either follow the symmetric-information credit allocation or ration funds away from some classes of borrowers who would receive credit in the absence of asymmetric information. A "financial collapse" may occur, in which some or all classes of "asymmetric information" borrowers are denied loans. In summary, these approaches model the differential cost of external finance from securities and banking markets under asymmetric information and the role of internal net worth in influencing the cost of finance.

Financial derivatives help economic agents to improve their management of market and credit risks. They also foster financial innovation and market developments, increasing the market resilience to shocks. The main challenge to policymakers is to ensure that derivatives transactions being properly traded and prudently supervised. This entails designing regulations and rules that aim to prevent the excessive risk-taking of market participants while not slowing the financial innovation aspect. And it also calls for improved data quantity and quality to enhance the understanding of derivatives markets. In volatile markets, an option can provide leverage, especially when the price of the underlying asset moves in a favourable direction. And speculating lets investors bet on an asset's future price.



Derivatives are powerful instruments and are able to affect the financial structure of a firm and its risk exposure by modifying future cash flows. They are able to reduce cash flow variability if they are used for hedging purpose or to increase cash flow variability if used for speculation. Moreover, they are able to increase the asymmetries of information between firm insiders and outsiders by their ability to modify accounting results.

Hedging has traditionally been defined as a strategy for reducing the risk in holding a market position while speculation referred to taking a position in the way the markets will move. Today, hedging and speculation strategies, along with derivatives, are useful tools or techniques that enable companies to more effectively manage risk.

The emergence of complex derivative products in the early 1980s, and the increased popularity of securitisation in the late 1980s, increased the inefficiency of many financial transactions. This inefficiency was the result of one party, usually the seller, possessing much better information than the other party, usually the buyer. Furthermore, with the rise in the importance of specialist third parties, like hedge fund managers, the actual buyer and seller may be unaware of the actual risks associate with a given transaction, and oblivious to the source of the investment income.

During the financial crisis in 2008, the root cause of the meltdown was derivatives. Specifically, CDOs, or Collateralized Debt Obligations related to mortgages and CDSs, or Credit Default Swaps. These derivatives represent bilateral insurance contracts between a protection buyer and a protection seller, covering a corporation's or sovereign's specific bond or loan. They typically last for five years, can be resold to another party, and are subject to counterparty risk — the risk that the protection seller will not be able to pay a claim.

Swaps are not standardized instruments and have been generally traded in over-the-counter markets — that is, directly between buyers and sellers rather than through a regulated exchange. An important aspect of CDSs is that an investor can purchase CDS protection without actually owning the insured security. In the period leading up to the financial crisis the advantageous leverage and convenience of CDSs fueled a speculative frenzy. Dealers on both the buy and sell sides rushed to issue and purchase CDSs written on debt they did not even own. While there are relatively safe CDSs based on interest rates or corporate bonds, some financial institutions wrote CDSs on low-quality subprime mortgage-backed securities (MBSs).

The BIS compiles and publishes one set of statistics on exchange-traded derivatives and two sets on over-the-counter derivatives markets. The semiannual survey is conducted under the auspices of the Committee on the Global Financial System and provides information about the size and structure of the largest OTC derivatives markets. It captures notional amounts outstanding, gross market values, gross credit exposures and Herfindahl concentration measures. Central banks and other authorities from the following 13 jurisdictions currently participate in the survey: Australia, Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, Spain, Sweden, Switzerland, the United Kingdom and the United States. Triennial Central Bank Survey enhances the

semiannual survey by collecting data from a much broader sample of derivatives dealers - as many as 53 jurisdictions participate in the survey. Like the semiannual survey, the Triennial Survey captures notional amounts outstanding and gross market values. In addition, it captures turnover in OTC interest rate and foreign exchange derivatives markets.

The OTC segment accounts for 90 percent of the market in terms of notional amount outstanding. Here, the market volume is split equally between bilateral trading among market participants and multilateral trading, i.e. trading across a number of different market participants on organized marketplaces such as interdealer-brokers or electronic crossing networks. Exchange trading accounts for 10 percent of the market and is multilateral by definition.

The increase in OTC derivatives positions that took place in the first half of 2016 reversed in the second. The notional amount of outstanding OTC derivatives declined from \$553 trillion to \$483 trillion between end-June and end-December 2016. Their gross market value - that is, the cost of replacing all outstanding contracts at current market prices - fell from \$21 trillion to \$15 trillion over the same period.

**Table 1 Global OTC derivatives market**

*In billions of US dollars*

	Notional amounts outstanding				Gross market value			
	H1	H2	H1	H2	H1	H2	H1	H2
	2015	2015	2016	2016	2015	2015	2016	2016
All contracts	551,489	492,707	553,452	482,900	15,485	14,492	21,154	14,986
Foreign exchange contracts	73,607	70,446	74,171	68,598	2,539	2,579	3,086	2,988
Interest rate contracts	434,507	384,025	426,797	368,356	11,062	10,148	15,508	9,992
Equity-linked	7,544	7,141	6,631	6,140	606	495	515	472

contracts								
Commodity contracts	1,671	1,320	1,401	1,350	237	297	188	163
Credit default swaps	0	0	11,880	10,015	0	0	346	297
Other derivatives	0	0	84	96	0	0	6	6
Unallocated	19,566	17,481	32,487	28,346	588	550	1,505	1,066
Gross credit exposure					2,870	2,862	3,699	3,310

Source: <http://www.bis.org/statistics/derstats.htm> (Updated 4 May 2017).

Approximately one-third (33 %) of the market's notional are cleared via central counterparties (CCPs), which consolidate and manage risks. For OTC derivatives that are not CCP-cleared, risks are partially mitigated through bilateral collateralization, i.e. the pledging of assets to secure fulfillment of a transaction. The gross market value of outstanding derivatives contracts – which provides a more meaningful measure of amounts at risk – also declined in the second half of 2016, from \$21 trillion to \$15 trillion. Gross credit exposures, which adjust gross market values for legally enforceable bilateral netting agreements, fell from \$3.7 trillion to \$3.3 trillion during the same period. However, as a share of gross market values, gross credit exposures rose from 17% to 22%.

Financial derivatives amplify the consequences of asymmetric information through implicit leverage if a party to the contract fails to follow agreement. Meanwhile, OTC markets allow for less transparency on such agreements and OTC forward agreements, allow parties to engage into contract and settle it only on the maturity; this way party losing money in the contract avoids daily margin calls to cover marginal losses should the market turn out unfavourable. Again asymmetric information and specifically moral hazard is at its height since party to the contract is not aware if the counterparty will be able to meet the obligations on maturity. The losses by the end of the contract might be so huge that the party losing money might not be able to follow the

agreement. Finally, even more complex derivative contracts such as CDO's enable debt to be repackaged and resold to multiple buyers while staying off the bank's balance sheets; the debt loses its origins – risk characteristics are modified and information related to the original debtor is lost. Instead, risk characteristics are assigned by parties that are intermediating the contract as well as those that are trusted to monitor them (i.e. rating agencies).

The absence of regulation played a major part in causing the crisis as the derivatives were traded in the OTC or the Over the Counter segment meaning that they were not subject to regulation. This meant that banks could play hard and fast with the rules and devise their own rules for derivative trading outside of the purview of the regulators.

Corporate hedging is believed to be a potential source of information asymmetry due to the firm specific nature of the hedging program which is not usually clearly communicated to market participants. First, each firm has a unique exposure profile which is a function of their underlying operating and financing activities, and second different hedging techniques are available to manage different types of risks. Information concerning the amount of timing of exposure is privileged to the firm in most cases. Additionally, information about one firm's hedging program has little informational value to investors in an attempt to evaluate another firm's hedging program. Consequently, unless firms clearly communicate to market participants the nature and extent of their underlying exposures, the timing and magnitude of their derivative positions, investors are likely to face a certain degree of information asymmetry.

Managers with private information about firm's exposure to risk may, in the best interest of shareholders, engage in speculation instead of hedging. The reason is that when profits serve as a signal of firm's values, speculative trades can be used to distort profits and hence manipulate stock prices to the shareholders' advantage. A consequence of such corporate speculation is that stock prices become less informative about firms' true value.

#### **4. Conclusion**

Information asymmetries tend to be greatest in those areas where information is complex, difficult to obtain or both. Recognizing that the presence of information asymmetries could be

the source of large economic inefficiencies, focus is put on the characterization of mechanisms or institutions that could alleviate the information asymmetry. Corporate insiders can capitalize on their informational advantage and realize abnormal gains from trading in securities of the firm. Derivatives are powerful instruments and are able to affect the financial structure of a firm and its risk exposure by modifying future cash flows. They are able to reduce cash flow variability if they are used for hedging purpose or to increase cash flow variability if used for speculation. Moreover, they are able to increase the asymmetries of information between firm insiders and outsiders by their ability to modify accounting results. The extent to which corporate insiders have more information regarding the firm than outsiders, commonly known as information asymmetry, is well documented in finance.

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