THE MINISTRY OF EDUCATION OF THE REPUBLIC OF AZERBAIJAN

AZERBAIJAN STATE UNIVERSITY OF ECONOMICS

INTERNATIONAL GRADUATE AND DOCTORATE CENTER

MASTER DISSERTATION

ON THE TOPIC

"REPORTING AND VALUATION OF FINANCIAL DERIVATIVES UNDER QUANTUM MECHANICS "

Anar Abdiyev Yashar

BAKI – 2021

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MASTER DISSERTATION

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"REPORTING AND VALUATION OF FINANCIAL DERIVATIVES UNDER QUANTUM MECHANICS"

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Elm andı

Mən, Abdıyev Anar Yaşar oğlu and içirəm ki, "Reporting and valuation of financial derivatives under quantum mechanics" mövzusunda magistr dissertasiyasını elmi əxlaq normalarına və istinad qaydalarına tam riayət etməklə və istifadə etdiyim bütün mənbələri ədəbiyyat siyahısında əks etdirməklə yazmışam.

MALİYYƏ TÖRƏMƏLƏRİNİN KVANT MEXANİKASI ƏSASINDA DƏYƏRLƏNDİRİLMƏSİ VƏ HESABATI

XÜLASƏ

Tədqiqatın aktuallığı: İpoteka əsaslı maliyyə törəmələrinin səbəb olduğu "2008 maliyyə böhranı" – dan sonra törəmələrin hesabatı ilə bağlı yeni qaydalar yaradıldı. Lakin bəzi sahələrdə boşluqlar yer alır. Əsas boşluqlardan biri maliyyə törəmələrinin bazar dəyəri ilə əlaqədardır, çünki onların düzgün qiymətləndirilməməsi törmələrlə əməliyyat aparan şirkətlərin 4 əsas maliyyə hesabatına da təsir göstərə bilər. Yeni qiymətləndirmə metrikin tətbiqi həm maliyyə törəmələrinin nəzəri, həm də praktiki bazar dəyərini nəzərə alır.

Tədqiqatın məqsədi: Əsas məqsəd maliyyə törəmələri üçün yeni bir qiymətləndirmə metodunu tətbiq etmək, maliyyə törəmələrinin mühasibat uçotunda tanınmasına töhfə vermək və yeni sahələri (kvant fizikası, sinir şəbəkəsi, süni intellekt) maliyyə və mühasibat sektoru ilə birləşdirməkdir.

İstifadə olunmuş tədqiqat metodları: İnduktiv metod, statistik analiz (Ortalama Kvadrat Kök Xətası, xətti reqressiya, normal ehtimal paylanması funksiyası), maşın öyrənmə.

Tədqiqatın informasiya bazası: İstinad olunan nəşrlər 3 əsas verilənlər bazasında, "Researchgate.net", "Google scholars" və "Tandofline" mənbələrində tapılmışdır. Təhlili aparmaq üçün istifadə olunan məlumatlar onlayn mənbələrdən toplanır. Verilənlər bazası ya dövlət orqanlarının rəsmi saytları ya da maliyyə brokerlərinin bölüşdüyü dataya əsaslanır.

Tədqiqatın məhdudiyyətləri: Hesablama gələcək hadisələri proqnoz edən modelə əsaslandığı üçün gələcək hadisələrin proqnozunda xəta ehtimalı var. Məlumat kifayət qədər böyük deyil və model bitərəf mütəxəssislər tərəfindən təsdiqlənməyib.

Tədqiqatın elmi yeniliyi və praktiki nəticələri: Testlər müxtəlif müddətli fərqli səhm qiymətlərinin həqiqi məlumatları ilə aparılmışdır, və statistik nəticələrin qəbul edilə bilən etibarlılıqdadır. Həmçinin, yeni hesablama modeli təklif edilmişdir.

Nəticələrin istafadə oluna biləcəyi sahələr: Təklif olunan hesablama metodu korporativ və hedc maliyyə sektorunda, və maliyyə hesabatları sahəsində tətbiq oluna bilər.

Açar sözlər: Maliyyə derivativləri, Opsiyon, Bazar dəyəri, Kvant mexanizmi, Neural şəbəkə

“REPORTING AND VALUATION OF FINANCIAL DERIVATIVES UNDER QUANTUM MECHANICS”

SUMMARY

The actuality of the subject: Since the “2008 financial crisis” caused by mortgage-based financial derivatives, new reporting rules were added regarding recognition of derivatives. Fair value of financial derivatives is a concern because of sensitivity to 4 financial statements for companies transacting with derivatives. The introduction of a new valuation metric will be targeting both the theoretical fair value of financial derivatives and their reporting in practice.

Purpose and tasks of the research: The main aim is to introduce a new valuation method for financial derivatives and combine emerging fields (quantum mechanics, neural network, Aİ) with accounting and finance sector.

Used research methods: Inductive method, statistical analysis (Root Mean Square Error, linear regression, normal probability distribution function) machine learning.

The information base of the research: Referenced publications have been found on 3 main databases, namely “Researchgate.net”, “Google scholars”, and “Tandofline”. The databases are either official websites of the governmental bodies or financial brokers.

Restrictions of research: The analysis is based on forecasting which has bias parameters. The data is not big enough and the model is not verified by experts.

The novelty and practical results of investigation: The results can be applied in practice to value the derivatives applying the suggested model. Since the testing is made through the real data, and statistical results are acceptable, practical significance is reliable.

Scientific-practical significance of results: The suggested calculation method can be applied in the corporate, financial reporting and hedging.

Key words: Financial derivative, Option, Fair value, Quantum mechanics, Neural network

ABBREVIATIONS

AI	Artificial Intelligence
ANN	Artificial Neural Network
BSM	Black-Scholes Merton
C	Call option price
CAPM	Capital Asset Pricing Model
D	Dividend
DAX	Deutscher Aktienindex
EFV	Expected Future Value
FX	Foreign exchange
ITM	In the Money
QM	Quantum Mechanics
LSV	Local Stochastic Volatility
LN	Natural Logarithm
NN	Neural Network
OTC	Over the Counter
OTM	Out of the Money
PV	Present Value
FV	Future Value
RMSE	Root Mean Square Error
SABR	Special Assessment Baseline Review
SD	Standard deviation
S&P	Standard and Poor
SV	Stochastic Volatility
US	United States
USD	United States Dollar
USA	United States of America

CONTENTS

INTRODUCTION

The relevance of the research topic. The main reason for the "2008 financial crisis" is claimed to be unregulated usage of mortgage derivatives when in time they caused a real catastrophe. The financial derivatives can be used as both risk neutralizers (hedging) and risk bearers. Because of its nature and hardships in fair value calculation, its fair value can be manipulated which causes fraud and shady accounting.

Currently, financial derivatives are valued under Black-Scholes, binomial models, or other relative models. This research considers more complex calculations considering quantum mechanics principles, probability concept, and the neural network

Level of studying the issue. The valuation of financial derivatives has been in the study since the middle of the past century, but the application of quantum mechanics to derive it is quite a new subject. Hence level of learning is not mature and requires quantitative research and analysis.

It should be noted that the methodological and practical features and valuation methods in financial derivatives under quantum mechanics were studied by Teschl G., Ivancevic V., Gonzáles-Gaxiola., Hayashi M., Ozawa T., B.E. Baaquie., Byrne, Lindsey T, etc.

Purpose and tasks of the research. The main aim is to introduce a new valuation method for financial derivatives, contribute to the recognition of financial derivatives in accounting and combine new emerging fields with accounting. Those fields include quantum physics, neural network, etc.

Object and subject of research. The object of the research is the valuation methodology of the financial derivatives and the subject is phenomena observed in quantum mechanics such as superposition, entanglement, and quantum foam and other functions such as neural network, statistical tools (Root Mean Squared Error, linear regression, normal probability distribution function). The formulas arising from these aspects were applied to drive the fair value of financial derivatives since the nature of

these phenomena justifiable to how the fair value of financial derivatives is formed.

Research methods. Inductive method, statistical analysis (Root Mean Square Error, linear regression, normal probability distribution function) machine learning (neural network), and so on.

Research database. Referenced publications have been found on 3 main databases, namely Researchgate.net, Google scholars, and sci-hub. The data used to run the analysis is collected from online sources. The databases themselves are either official websites of the government bodies or financial brokers.

Research limitations. The analysis is based on forecasting which may not reflect exact future events. The data is not big enough and the model is not verified by neutral experts. Also, more advance computers are needed for deep research and apply machine learning in full depth.

Scientific and practical significance of the results. The suggested calculation method can be applied in the finance and accounting sector. Calculating the fair value of financial derivatives is related more to the corporate and hedge finance sector. Since the calculation is different the final value obtained from it is also different. Hence, it will change the reporting framework which is related to the financial reporting and accounting sectors.

Structure and volume of dissertation work. This research consists of an introduction, three chapters, conclusion, 4 tables, 8 figures and 4 pictures. In work - 66 pages of text. During the work on the thesis 40 sources were used.

CHAPTER I. FINANCIAL DERIVATIVES AND THEIR REPORTING

1.1. Introduction to financial derivatives

Financial derivatives are important and evolving financial instruments that are traded in the financial markets. As derivative name itself implies, derivatives are derived from the performance and cash flow of the security or asset they are connected to.

There are different purposes why investors enter into derivative agreements. For instance, hedging a portfolio can be used to reduce the risk, or speculation-based purposes may increase the risk to gain profit.

Under hedging term, an asset can be contracted to be bought at $100 within a certain time interval. It can be bought at a given certain price until the expiration date thats is agreed in advance, even if the market price reaches $1,000,000. Hence, it brings certainty by reducing risk. Under speculation purpose, an asset is contracted to be bought at a certain price within a certain time period. But investors do it as a bet on a future price, and if the price of a call option (predicted to be going up) goes down it causes loss to the investors. If it moves upward as predicted, investors buy the asset under the market price which gives investors profit as much as differences between market value and contract price (excluding additional costs that occurred during the contract).

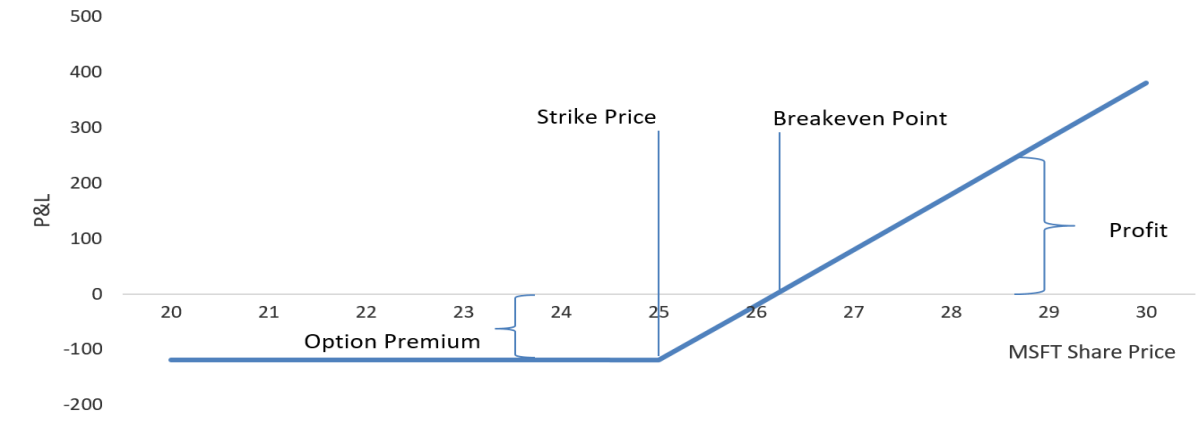
There are three general categories of derivatives as elaborated below; Options, forwards, and futures. Futures are like options with the main differences that, buyers have to exercise the option. And forwards are traded between 2 parties over-the-counter which makes it less liquid. More information is given as below:

1.2. Options, futures, forwards

Options: Investors who are more interested in making profit instead of actually possessing contracted asset itself, prefer options over futures or forwards. There are two kinds of options depending on the action: call option and put option.

An option O is a contract agreed by both parties and it is entered into an agreement by a buyer or seller. For instance, the seller of the option has to sell the stock S to the buyer at the pre-determined price P within some certain time if the buyer wants to exercise the contract. But the buyer of the option can either buy or not buy it. For a call option, if the price of the stock has become less than P, a rational buyer of a call option will not buy it, because it is available on the market for a lower price. In this case, the buyer loses the contract price (usually, premium price) which is assumed to be 1%. If the price of the stock rise and passes price P, then the rational buyer will exercise option or buy it to gain profit. The opposite is applicable for a put option.

Figure 1: Payoff for Call Option



Source: http://www.trade-stock-option.com/call-options.html

In figure 1, it is readable that the Contract is made at loss for the buyer at the start because of the premium price to lock the contract. When stock price rises from $23.5 to $25 initial loss is covered. Above $25 it starts to make profit.

Futures: Futures are like options with the main differences that, buyers have to exercise the option. And forwards are traded between 2 parties over-the-counter which makes it less liquid.

With futures contracts sellers can close at the price of an asset or commodity alongside an expiration date and set known price. The future is marked by its expiration month. For example, the April oil futures contract expiring in April. The

name of the future often represents the entire market. There are many types of futures contracts in the market. Some them is mentioned below as following:

- The future of commodities: Petroleum, gasoline, cotton, and corn
- The future of the stock index: Nikkei 225 Index
- Future currency: USD and Turkish Lira
- The future of the precious metal: Platinum and copper
- The future of notes: Government treasury bonds and other products

Future markets use leverage which enables the trader not to set 100% of the total value of the agreement when entering the trade. Instead, the seller can use a portion of the total contract price. The size of the contract, the suitability of the debt, and the terms and conditions also determine the total price.

Futures trading can be made with using real contracted items (ex: crude oil, metals) or cash. Type of payment is predetermined by seller and buyer. The parties can enter into an agreement to lock the price of the items they traded in a set price. But, most of the futures contracts is used among speculative traders where difference between set price and market price at maturity is paid in cash.

If a futures contract is bought, and the market price of the item rises pass contract price, then buyer is profitable because market price is higher than set price, and buyer can sell the item in the market immediately after buying the item at contract price. Before expiration, a buy trade - a long position - can be approved or traded with a bargain sale of the same price at the current price effectively closes the long-range. However, the buyer may also lose if the price of the item fall down and at expiration date buyer buys the item at the price higher than the current market price.

Forwards: The contract made between two parties to buy or sell an item at a fixed price in the future is a forward contract. Hedging or speculation are options for traders getting into this contract. Its unusual nature makes it particularly suitable for hedging which is used to get rid of the risk.

Unlike standard futures contracts, forward contracts can be customized for the goods, price, and delivery date. Commodities can be grain, precious metals, natural gas, oil, or even poultry. Advance contract charges may be made in cash or delivery.

Future contracts involve parties who have agreed over the trade of an item at a fixed price in the future. There are a few differences between these two contracts. While a forward-looking contract does not sell in exchange, a future contract does. Continuing contract settlement occurs at the end of the contract, while futures contract remains daily. Most importantly, future contracts exist as guaranteed contracts that are not negotiated between partners.

An example of a forward-looking contract is as following. Suppose an agricultural producer has two million bushels of maize to sell six months from now and is worried about the fall in maize prices. Thus, it enters into a forward-looking contract with its financial institution to sell two million bushels for $ 4.30 per bus in six months, with cash payments.

In six months, the local price of corn has three possibilities:

- It costs $ 4.30 per bus. In this case, the contract is terminated and no parties are at loss excluding commissions and other costs.
- Higher than the contract price, says $ 5 per bus. The manufacturer owes the institution $ 1.4 million, or the difference between the current property price and the contract level of $ 4.30.
- Lower than the contract price, say $ 3.50 per bus. The financial institution will pay the producer $ 1.6 million, or the difference between the $ 4.30 contract price and the current price.

1.3. Financial derivatives as speculative capital

Financial derivative is part of a three-dimensional circular social framework. The first one among these is the speculation of the currency. This is a large, decisive, non-productive, and ever-directed production of mobile, portable, opportunistic residences in the hands of major investment banks (ex: JP Morgan, Morgan Stanley), private equity, and financial divisions especially large corporations. These banks, finances, and divisions are found culturally and psychologically if not always the European and American territories. The second is the products taken from the finances and markets. This group of affiliated institutions participates in global markets in many ways, the

most important of which is the continued marketing of these products. This is important because the financial derivative is a key tool used by speculation in global markets. Financial outflow is a bet on changing currency prices or the relationship between national currencies. From a market point of view, it seems necessary and natural because it is motivated by the risks associated with the heart-to-heart connection. The last part is a recently presented and demonstrative view of risk: new because risk here has been removed from the universe of uncertainty and uncertainty because it is the basis for production and prices from other sources. The formation and integration of elements create the molecular structure of what we call the distribution culture. While none of these three innovations are in themselves, their combination, redefined, institutionalization, and technological expansion represent a dramatic change in the way the world economy operates, characterized by the growing strength and independence of the rotating sector.

Financial implications are therefore important because they are predictable earnings in the markets and because they are a constructive method that circulates and incorporates global risk. Guessing money takes this form because the alternatives include in one tool resistance to various types of risks, the almost unlimited use of those combined risks. The process of opposition is central because what comes out of it is not concrete, but is a social ideology that uses the power of language divisions to unite sets of unique and different relationships. The objection here, therefore, refers to the process by which todays financial society, which operates mainly as an orchestra without a conductor, guarantees a complex integration of social, economic, and political relations into one tangible object, as an alternative agreement that already stands for this relationship. The acquisition appears to be a contract that allows buyers and sellers to guess or enclose, however, as the analysis progresses, it will become clear that this is just the emergence of a more complex situation.

Derivatives are also an ideal vehicle for speculation because it allows for unconventional profits, which offer two potential benefits of using this strategy (Vennet V., 2018). The first advantage is that a given amount of capital can control a much larger amount of underlying assets. An investment bank, for example, can strengthen its

control of more than 10 billion USD by investing only a fraction of that amount, which means that its vehicles can undergo major economic revisions. Risk use thus refers to how the consideration of risk receivables is less than the result of a return because the investment amount is a certain percentage of the contract value. By using assumptions from other findings, it can effectively dispel the profits gained by considering the risks associated with land connections. The second major advantage is that the rate can allow the proceeds to make wagers too large to have an impact and sometimes determine the outcome of the bet. Indeed, economists who study exchange rates increasingly admit that they are no longer defined by production-based variability, e.g. related products. The bottom line is that, while the use of projected risk-based financing is based on a long history of international finance, it also presents economics that is more accessible than ever before.

In this context, the account of the notion that the re-consideration of risk, its performance in financial receivables, and its operation in finance is considered to promote the growing independence of the cycle. That being said, what emerges is a vague and historic view of danger. To further the argument, we created two sets of divisions: the first between production and speculative revenue and the second between non-derivatives whose derivatives are derived from production and derivatives based on the actual capital, financial outflow. This analysis leads to the realization that legitimate segregation and stock-based prices at an unforeseen risk in the context of questionable and deep-seated contract belief introduces controversy that portrays the spread as a social form as it declines and does not allow social forms to express it.

There is a comparison between capital letters. Capital is the definition of the relationship between money and the economy. Therefore, the guesswork comes from the available currencies, first as its surplus and then as its competitor. Because speculative capital facilitates the acquisition, monetization, and derivative prices, which makes it very important in building a photography market for companies, it seems to be the most important factor in modern finance. Most importantly, although the money spent is thought to have been around for a long time, its financial

appearances provides a change in quality to its core character. To understand how this quality change can occur, it is important to compare currency types.

In the capitalist economy, the monetary manifestation is composed of three main forms corresponding to the various periods of the production process. Each contributes to the primary purpose of funding to increase the rate of return. In most of the history of capitalism, the dominant person in the production process has been the head of industry or manufacturing. This indicates, of course, the company's investment in plants, machinery, and people to increase productivity and therefore the rate of return. So, for example, a cell phone maker is putting his capital into new factories and machines in the hope that he can successfully distribute and sell enough of his phones to make a good profit in the capital. But the production itself cannot produce a return to the capital. This requires the intervention and intervention of one of the vendors, dealers, and retailers to deliver the product. The capital they use to pay for their services is commercial in the sense that the purpose is to link supply and demand. The commercial capital depends on its industrial cousin because it deducts a portion of the residual value attached to the asset at the time of production to allow the production capital to convert more rapidly and grow. In addition, due to the division of labor where retailers, distributors, and retailers are more efficient in their expertise than manufacturers, the use of commercial funds allows one of the industry partners to convert very quickly, thus increasing its return rate. Continuing with the example, the mobile phone manufacturer will use the most electrically distributed distributors to supply stores.

Spending on capital in excess, such as debt, can add more efficiency to the goal of increasing the rate of return (Chen P., 2015). Financial credit services, such as the promotion of industrial and commercial finance, provide them with ways to increase their productivity and hence profitability. As long as the producer can successfully spend more money, and the yield on the use of that capital is greater than the interest rate charged by the lender, the credit increases the total return on industrial production costs. Note that, when sales revenue accelerates the pace at which an industrial capital is turning, the credit increases the amount of capital converted (Chen P., 2015).

Historically it happens in family-owned businesses, relying entirely on domestic revenue. Consider, too, that, as is the case now in many of the city's manufacturing sectors, producers are unable to spend more money or, in many cases, even incur existing costs, there will be an inevitable huge increase in revenue that will lead to China's production and other points near the multipolar border. These are the social conditions in terms of the global connectivity problem that are now recording the rising cost of speculation.

Commercial and debt finance is fed up with industry revenue, and for this reason, shares its characteristics. Their profits are derived directly or indirectly and are determined by the producers of the goods. As generations of analysts since Marx have pointed out, the program is based on social work in which each of us has to sell our work to buy from others what we can produce (Chen P., 2015). Therefore, in this case, the profit and expansion of capitalization are always directed by the workers, however, rotate and unambiguously. These currencies are found internally and are categorized internally by sector, production, thus forming the financial base of capitalist-focused capitalism. That industrial, commercial, and debt financing all share the same ultimate purpose is an example of that. A brief look at the business history, with the ups and downs of so many industries and businesses, should be enough to convince us that seeking to raise the level of industrial return is always fraught with countless risks. Natural elements, such as hurricanes and blizzards, can destroy or destroy plants and equipment, distribution centers, and shops. The company's top executives could die suddenly. New, highly profitable industries can employ innovators and producers. There is always a high risk that, given the time left between pregnancy and product use, consumer preferences may change. And the list goes on and on. What is common about these various risks is that they are all concrete and outside the production process. Without them, the product would only continue; it would be better not to have them.

All major industry-related investments operate with the view that the best way to combat these risks is to take a long-term view. Dangerous causes, such as fires, storms, and general strikes, occur more frequently than they do in general. Entrepreneurs,

therefore, assume that flexibility in the risk of something going wrong will always be solved in the long run and that insurance is available to ensure that the business can continue to produce or distribute even in the worst-case scenario. The speculative capital, on the contrary, focuses on the volatility itself, describing them as their for-profit. It is, therefore, a bet on the likelihood that individual events and processes will interfere, if at all, in the long run. By assuming this view, the cost of speculation differs in both the material and the basic asset tracking.

This has several consequences. The first is that the connection between the market and the underlying asset becomes completely unimaginable. Traders can use any contract obtained to enclose or speculate: that the property owned by them is the owner of the item only if they use the lower one to make the transaction less expensive. Predictable currencies, for example, can bet that the yen will fall in value against the euro without having a yen or euro. The second result is that the risk is central to the construction of the findings. The reason is that the bet itself is likely to be a single event or variable. Effectively, then, the projection money applies to the use of risk; operates in the determination and distribution of risks through the production and price of products. The third result is that time itself becomes a form of uncertainty or danger. Assuming that the longer the contract is not outstanding, the greater the likelihood of volatility. As analysts have demonstrated both psychologically and with traders, the short-term route is to reduce the time between the acquisition of the acquisition and the expiration date. The highest point is that the time between purchase and expiration is zero: that is, arbitrage.

Globalization of financial emergence in addition to amplifying the effects of a predictable financial system; creates a change of quality in its character (Meragerts V., 2016). Before the emergence of a global culture of financial circulation, options and transfer contracts were built into production because the underlying asset was ultimately a feature of that state. For example, a mobile phone buyer from a mobile phone manufacturer, such as Nokia, was betting that the growing demand for mobile phones and their services would increase its profits and thus lower its price. Similarly, a consumer of mobile banking options, such as Citicorp, bet that the growing demand

for credit, for example, mobile phone manufacturers who wish to purchase new monetization equipment to improve productivity and sales, could lead to a bigger bank profit and hence higher prices. In the same way, the contracts for the transfer of cattle, soybeans, wheat, petrol, and other commodities were not only in production but basic production at the time. All of these stock options and forwarding contracts represent the conditions of production-based items. In the manufacturing sector, inputs and labor unions, capitalists, consumers, and the state all pose challenges to product delivery, which also hinders the size and power of consumer spending (Conrad J., 2011). These issues range from the shift in consumer demand to government control of the production of goods and their markets.

Financial implications change this: at present, the basic commodity is no longer linked to production and markets, but the medium and circulatory system, money (Taylor & Francis Group Ltd., 2019). Appropriately called the financial community financial markets, here money links like money, interest, and so on. The critical consequence is that the basic asset itself can now be an intangible relationship. Imagine that the emergence of other considerations, for example, in the volatility of the USD/EUR, takes their invisible relationship as low. Or, imagine that a common type of transaction called an exchange takes on an inexplicable relationship between fixed and floating interest rates. Whereas in the case of a product-based commodity a low-value commodity is produced from real assets, in the form of, expected growth rate, in the financial gains the low-income is just a monetary relationship. The relationship between the dollar and the euro, like all cross-currency relationships, is not a commodity or a real asset and has nothing to do with the expected rate of growth. The only thing in the relationship for shortcuts and interest rates is instability. In a single sentence review, the only thing on the market for financial products is the interaction of currency types.

When the subordinate has an intricate, broadcast-focused relationship, the new world opens up to the main currency of speculation, the world it wants to make in its image (Bryan D., 2018). Freed from the problems posed by the product, there seems to be no real size limit on the market for financial availability. And, of course, all of the

output of production, futures for commodities, and general stock options, over the past two decades has been an insignificant part of the stock market. As soon as the whole market, it is now less than 1 percent in the clinic for millions of businesses. Most importantly, when the speculative capital given to the financial findings becomes insecure and self-sufficient, it has the power to regulate the independent and self-sustaining form. It operates independently without production and becomes world-class, the largest and most growing, starting almost empty in 1973 to be, thirty years later, according to estimates by the World Bank, the largest and most profitable and influential market in the world. great. So, finally, the development of another risk-driven approach to the interaction of the types of funds allowed for the rise of a new and more powerful form of capital-based speculation.

1.4. Reporting of financial derivatives

The main reason for the "2008 financial crisis" is claimed to be unregulated usage of mortgage derivatives when in time they caused a real catastrophe. That is why, since 2008 they have been under improved control and attention (The Baesel Committee, 2010, 2011).

IAS 39 Financial Instruments outlines recognition requirements and measurement of financial assets, liabilities, and some contracts to buy or sell securities or non-financial items (Kaplan Schweser, 2020). The distinction between a derivative and non-derivative financial instrument is crucial because of derivatives (with certain exceptions) recognition at fair value which impacts the Profit and Loss statement.

Ideal valuation is the present value of the real future value, but it is not possible to know the exact price in the future. So, sophisticated prediction models are required to get rid of this problem.

Derivatives are defined in IFRS 9 as a financial instrument or other contracts in the IFRS 9 class with all three of the following components:

- its value changes in response to changes in so-called basic, i.e. changes in specified interest rates, price of financial instruments, commodity prices, foreign exchange prices, price or price index, credit or credit index, or other

variables (in the case of financial differences). , variables must not be specified in the contract group)

- Initial net investment is not required. Even if it is required initial payment would be smaller than other types of contracts with the same interaction change in the market.
- paid in the future.

The reasons for modern accounting laws are very important:

Some naughty people are tempted to use company money and products from speculation where it is not appropriate.

- Their guesses often lead to losses.
- It is advisable for people not to under-report their predictable losses.
- If that were allowed by accounting rules, they would continue to be tempted to continue speculating, hoping they would recoup losses before they were discovered.

Such kind of excessive speculation eventually erases the existence of the companies and harms the very market itself and the public. Modern accounting rules are structured to guarantee that any expected losses are recognized and reported immediately. This helps to discourage speculation and identify unauthorized or random guessing.

- Accounting rules require:
- A recording of everything that comes out of its fair value, and its periodic measurement of fair value.
- Identify the purpose of the findings and prove the purpose and function of any hedge.
- Prompt reporting of gains or losses not included in the profit and loss account.

This means that reporting any suspected losses cannot be reversed. Automated accounting treatment is not a hedge, which includes speculation. If we cannot prove that we have a working hedge, we must answer it as a hedge. Indeed, if we fail the strongest test of hedge effectiveness, we should always respond under non-hedging

rules, regardless of our purpose or motive.

CHAPTER II. FINANCIAL DERIVATIVES AS RISKY CAPITAL AND VALUATION METHODS

2.1. Abstract of risk in market

In a capitalist-oriented society, the risk continues to be progressive and systematic and replaces what is described as the kind of labor that affects society in the economic-based sectors of production. Seriously, as long as the analysis understands the spread as simply the tissues that connect to production and consumption then the risk is unaffected by problems category in society. Its meaning seems pragmatic as it is clear: the possibility of economic losses due to production failures, injuries during transportation and storage, or the disappearance of storage needs. And, of course, future commodity markets have faced these types of risks for a long time. Such risks are concrete and arise from internal power and economic planning. This view holds risks as transhistorical and transcultural truth. Likewise, the difference in time and culture is to recognize the risks and the steps taken by the agents to reduce them. It has been found that in this case, risk resistance is not an internal element of financial circulation but an external reality that the financial community deals with in building financial instruments as an alternative. We emphasize this view because it is a predominant view of economic risk in business and commitment-based models used for price acquisitions.

In contrast, the approach taken here sees risk as socially and historically constructed. It, therefore, understands the consideration of risk as it emerges from the risk-finding findings as a direct focus on the corporate culture that forms today’s global trade, not the smallest of which is the culture of financial broadcasting. This view implies that these post-accident issues are not about peace or morality. Instead, they have a social and heart character that is specific to these circulatory traditions. To put it another way, the way the culture of money laundering deals with risk is more than a technical process because public opposition to risk defines this process. The advent of the culture of financial dissemination is therefore inseparable from the public

opposition to risk as a fundamental and critical argument between historical and risk bases and their analysis by stochastic models based on rejecting those bases. Controversy emerges from within, too, as a risk management field. It is seen in its research and practice as a recurring situation where a very senior manager fails to reach the risk limit because suddenly, unexpectedly, unexpected social fluctuations stabilize the portfolio and cause total losses established in risk management to prevent. As analysts have pointed out, the end of long-term financial management indicates such risks.

In one case, the alternative is to cover the risks posed by certain concrete conditions, such as the possible depreciation of the dollar in euros. In another, a deeper, more dramatic, financial outburst is the antitrust risk. It is the second dimension that defines and determines the character of global cash flow on these new financial instruments and what distinguishes this type of distribution from the long history of world commodity trading. Therefore, derivatives are a common form of communication or connection in this blood circulation process or, financial implications from one side, why the financial community calls any product that promotes communication to be taken from something else (LiPuma E & Lee B., 2018). Recognized in this way, the financial findings should assume that there is a real risk to the action and presentation to reduce the interaction of the physical and other risks.

The culture of financial circulation applies to the findings also based on the objections and disclosure of the risk. Risk resistance is seen as a process that has several stages of accumulation and mixing. In the first case, the risk is separated from the context of the community that created the risk and the relationships immersed in it. A financial society starts with a perception of a risk situation and then puts something at risk in the social, economic, and political contexts that define it. Risks that can be identified are moved to the point of view where they can be considered independently without these conditions. The financial community sets out the process by including names that include these risk factors in the classification system, transforming certain historical risk factors into historically universal. Therefore, foreign markets recognize interest rate risk, competition risk, volatility risk, country

risk, credit risk, regulatory risk, transaction risk, and more. The process, action, and reality of putting risks in a formal system assure them that they can be present and, after one step, that they may be separated from the functioning of their social conditions. The acceptance of all the meaning of a word or the suggestion of words conveys how agents, especially in the financial and scientific community, have come to understand the concept because its truth no longer seems to be inseparable from other relationships. So, it becomes a public function: something with a clear and independent character. This concept also applies to the discovery that the financial community labels and manages a set of financial instruments that are as diverse and flexible as the types that come out of each other as long as they pose the risks associated with the connection.

Given this deeply embedded concept, equivalent to an anonymous social study or method of globalization, it is certain that different types of risk will fit in most cases. So, the next step is to combine the various signed tokens into an unambiguous form of the findings. The abundance of immeasurable risk types is reduced to unity: risk in the abstract. Different types of concrete and concrete hazards are concrete and targeted because they are taken from real social situations and released into a single, coherent whole so that the financial community can price it. Similarly, prices taken from other sources, for example, the return of Brazil during the 2002 presidential election, which could be costly, with the stereotype, all political risks, partnerships, instability, and funding generated by popular socialist presidential support. It is important to understand that it is the process of segregation and reorganization that creates resistance to risk. So, no matter how the natural phase may begin to emerge, it has a great personality because it is based on the process that those in the Western financial community have explored during their collective history and found it in the course of their lives.

The social development of the concept of flexibility became the next step in risk mitigation. The main idea is that the market can better define and predict the performance of the intangible risk by measuring its variability over time. Understanding that size or delta has a direction in a change in the values of a particular

derivative conveys all the required financial information to the value based on the other. Note that the measurement of volatility is not subject to a legal attempt to reconcile the social data that the financial community had to remove from the outset to create an unforeseen risk. The community was re-introduced and revered as a history of evolution. The result is that the complexity of embedded, historically integrated social structures that create the value of relationships based on acquisitions is now simply a pattern of price movements. In addition, we should here point out that it is argued that price models emerge successfully not because they find existing price patterns, but because financial markets have changed in ways that make their assumptions more accurate.

The final dimension to the development of risk resistance has been its quantification with stochastic formulas, such as those coined by blacks and Scholes, and advancing with growing numbers of specific products. All exit price models are differentiated between exit types and also take it as axiomatic that record flexibility patterns, detect and measure the invisible risk profile included by any other. When the differentiated estimates used by the financial community is reconstructed to find the most cost-effective / most inclusive distribution work with a multidisciplinary structure / it is found that it depends on the three perspectives on the reality of the community being presented. To be effective, stochastic models must assume that the event space is limited and transient, that all future events are the same as past events, and that the application conditions are equal between time and place. Statistics, therefore, assume that society and history do not play a role in determining risk. In this regard, the formation of equations and the institutional structure of the financial finance sector are all but ensures that the analysis of the motions will not examine or question the proposals about the social reality that records the performance of the mathematical foundations. That the financial community has unquestionably relied on these statistics produces and reinforces the idea that risk is legitimate, invisible, and sensitive content.

Mostly in the financial community as in the popular tradition, statistics maintain a privileged position. On the one hand, it is thought to present pure truths in the sense

that they are not tainted by politics, big and small, and to do this in argot is so much removed from every day that it is beyond common sense. Even the middle class of understanding / the ability to use mathematical models mechanically without a real understanding of their basics / is considered to be a worthy achievement to be feared. The mathematics of derivatives thus works to sanctify the concept of intangible risk, just as this concept of risk makes mathematics possible. That means that, without the ever-present opposition to the unpredictable risk, the financial community would not have changed or tested its types of derivative prices.

It should be noted that the difference between the physical and the intangible risks does not mean two different types of risks, but the magnitude of the two risks divided into the design and distribution of products. The findings do not cover two types of risk: rather, these risk factors vary depending on whether they are perceived as concrete and specific risk factors or as a complete relationship conflict. The most important thing based on this is that this is the whole of sale, marketing, and distribution. This intangible quality enhances the relationship of the object, the findings, in ways that, paradoxically, obscure its relationship by supporting, measuring, and evaluating all kinds of social relations objects to specific concrete hazards. For example, the risk that social and political unrest could reduce a change in government to a post-colonial supplier, the risk that central bank economic policies could drive rising interest rates and inflation, the risk that a foreign partner could exploit bankruptcy laws to avoid payment and more can be combined. Although they do not know much about the theoretical weight of their statement, this is what analysts say when they say that what the current financial system presents is risk use: that is, that many social, economic, and political relationships add certain risks emerge as one parallel. As the analysis has sought to show, this redesign provides the market with the tools to combine, measure and price these types of risks, but it does so at a high and hidden cost: the way the financial community chooses to take risks makes it difficult to pay the price on social and historical risk. the price risk of the system in the circulatory system is complete.

The financial culture on which the source is based is a common form of

distributed product producing a new type of direct social interventions and contributing to the growing liberty of the circulatory system (Abdel K., Chen P., 2015). As one expert put it, it is no longer the real economy that drives the financial markets, but the financial markets that drive the real economy. Risk-based findings are therefore a new way in history to integrate a global circulation system. This tube distribution approach is in line with the types of reliance on a production-based economy, just as, as the quotation suggests, it is beginning to direct and govern their tracks. In a global circulatory system where the ingredient market has become the largest and most influential, risk resistance becomes the most critical foundation for making and dealing with connections. While the alternatives may help a company to mitigate its risks, the increased role of speculation ensures that transaction volume far exceeds the cost of hedging for certain firms. Thus, on the one hand, the derivative serves as an asset for the companies operating in the production while on the other hand, it acts as an unreliable exchange rate of the guessing currency. Therefore, the result is bipolar disorder. At the same time as the market in which the use of global currency eliminates the risks of connection and the author of its type of connection has nothing to do with external connections, for example. Risk has therefore become a very special and specific social phenomenon: to reduce specific and tangible risks through the output, the risk must be eliminated and monetized; and, to deal with the connection, should contribute to the creation of a circulatory system organized by speculation.

This is in stark contrast to the ideals and circumstances of danger under the capitalist-based capitalist state. There, risks are unplanned, created and companies face specific risks through certain actions. Foreign exchange risk is managed by ensuring that most of the company's profits come from domestic sources; the risk of product shortages is addressed by increasing the advertising budget and distribution areas; the risk that the company's suppliers may be sidelined during the economic downturn is fostered by the promotion of personal relationships and a commitment to other matters between good corporate governance and so on. Conversely, in a modern, industrialized economy in which access to finance represents the spread of globalization, firms cannot reduce the risks posed by communication only through direct public action.

The result is that, as the distribution of investment in a projected investment leads to an independent growth cycle, the risk arises as a public intervention, as a key, and an outsourcing contract, in which individuals and companies plan to rely on around the world.

Risk does this by serving as a means of organizing social relations in the circulatory community structures. Agencies and anonymous organizations are brought into the relationship through their participation in the blood-circulation system of risk-based transactions. In a similar but different way to the work of unscrupulous workers in the manufacturing sector, risk itself is a form of social mediation because it takes the forms of connectivity that can be made through direct economic actions. In this sense, the emerging culture of global financial circulation is dominated by society in a thought-provoking and productive form of risk. Therefore, Financial Disclosures the incomprehensible form acts as an independent agent within the circulation system. Risks in this relegated feature do not, as we have emphasized, determine the type of risk, but specify the pre-existing function of risk in building global connections. In this regard, the function of the ingredient from linking is independent of the specific risks you want to incorporate. Therefore, each output is partially oriented in its attempt to capture a fixed set of risks and social order because it enables the intangible risks that link the performance of the connection. To underline the comparative note that in the manufacturing sector, risk has a different effect; undermines communication by disrupting time and resources for the production and distribution of goods.

The composition of the financial findings and the fact that speculative funds drive markets from other sources determine that, in the tradition of financial circulation, risk itself will mediate social relations rather than alternative means of social mediation. One result is that agents immersed in this practice of blood transfusion, including those in commercial, investment, and non-commercial settings, do not recognize or endanger the social character. Instead, the risk appears to be the purposeful and systematic release of certain business, economic, political, social, and other relations. Invisible risk poses certain types of risk and, at the same time, facilitates the creation of connections. Likewise, the nature of the hidden danger seems to be an undeniable

one because it appears to those involved as a uniform and a common ground of the inevitable inevitable need that operates in the same way as the law. In this sense, the election of an additional socialist president in one country or the states implementation of a low-cost housing project increases the risk in the same way that a prolonged drought increases the risk of crop and livestock failure. What is social and historical in this way of capturing the world is that both the internal structure of the products found and its function as a means of mediating society in generating connections hides the relationship between certain aspects of the event and the realities of real people. It seems, for example, that there is no link between removable engineering that removes what big city retailers think are the dangers posed by the transition from apartheid to black democracy in South Africa, from other factors that undermined the rand and caused economic instability, as well as this governments ability to build political stability. through reconciliation and past injustices.7 From the perspective of principals, because the risks associated with globalization appear to be completely inhuman, purposeful, and legal, they see the compulsion to eliminate risk as a completely natural response. While the market for managers is responsible for creating risks, the risk detection is that the needs of the business itself appear to be a source of demand. The culture of financial dissemination obscures the fact that economic activities everywhere contain uncertainty and the fact that they create risks that are historically determined and created in society: unseen, explicit risks, and immeasurable risks. These two types of risks are confined to a seemingly insurmountable need: companies operating around the world must spread the risk of staying in business. Therefore, the most powerful form of contextual naming may prove to be a definite need. The magic of misunderstanding is that the basic actions of resistance that bring about the perceived danger and the production of resistance through the distribution of certain products are hidden. And of course, brokers can buy and sell financial products as if their only social element is a contract.

That is the case of global financial risk risks are tangible and intangible, it does not mean that risk is universal and remains precise and orderly. In non-capitalist economies, the risk exists only as analysis rather than in the cultural sector. It is not a

clear cultural dimension that emerges as the risk arises as the economic concept of modern capitalism becomes a global perspective on how societies operate. The fact that a few languages have a word that can be interpreted as infallible in the sense of the present tense is an example of the fact that it is not an independent, universal, or united concept; rather, agents see more opportunities for uncertainty with each risk tied to certain social contexts, where each situation is defined and can be differentiated, with some difficulty in local social relations. Likewise, the modern notion of capitalist risk does not contribute much to the understanding of situations in which ambassadors have a non-capitalist worldview. However, with the development of capitalism, the risk exists as a traditionally recognized economic sector. This new social reality is reflected in institutions through the development of mass commodity markets, insurance, formal accounting, credit consolidation, risk assessment methods, and more. Indeed, not only is there a risk category but also a certain level of financial risk. As noted, notes, economic outcomes that seem to affect only individual firms are now thought of as risk-based, systematically produced, statistically defined, and therefore can be predicted as types of events that companies can take steps to mitigate, distribute or avoid, rather than at least long-term production and consumer demand. In this regard, productive capitalism breeds and requires a vision of a particular economic risk. In other words, the emergence of tangible risks as production factors includes a new type of common among different conditions / are classified equally as sources of risk types. However, recent accounts on risk development also show that what propagates distribution under the capitalist regime is focused on producing that no single relationship is removed and thus clearly defines general distribution or financial culture in particular.

Once this comparison has been established, it is clear that what creates systemic risks in today's broadcasts is not the fact that risk is common to all types of international transactions, rather, if the risk exists in financial findings in invisible form, it could take a lot of work to mediate the production of the communication itself. In addition, because each calculation of unexplained risks works constructively in the same way, it creates a general mediation that applies to the entire circulatory system.

Mediation is systematic because it links different types of concrete hazards, thus defining them as comparable to similar mathematical processes, and also because its character is broad and extant to any social and historical contexts. Considered from a circulatory perspective as a field of operation, the physical risk is unique and is part of a global transferrable and dynamic circuit, but, as a visible risk, the individual size of the same systematic intervention strives for full blood circulation production. While this imperfection is unattainable because, as it is suggested, it is not possible to reduce the risk of the occurrence of its production, it is a circulatory system, which can adapt to the idea that stochastic models can adequately handle the risk in dangerous situations.

2.2. Beyond risk

Derivatives also affect the communication between market segments and institutions. Thus, disruptions in a single market are more likely to break down and affect other markets that could create a chain reaction. In addition, banks had a strong incentive to make products so sophisticated that they could not be traded on exchanges. Eight percent of properties are now sold over the counter at invisible private deals. Hiding the risks posed by distributors and distributors adds light to the market and jeopardizes the effectiveness of the financial system if traders fail. When the risk is high it may not prevent system crashes. Therefore, we need to take responsibility for the risk itself before it is too late - before the danger becomes apparent.

It can be concluded that, in the financial markets, risk has become something that can be bought and sold under a mutual agreement and looks more flexible than any other product. Here, the term "risk" refers to both possible (negative) events in which opportunities may be shared and potential (negative) events in which there is no possibility to be provided. While the previous definition describes risk in a small sense, the latter definition corresponds to what we call “uncertainty”. For economists, risk is an artistic term that means variability in outcome, chances of gain, and loss. Think of a person who gives his friend the opportunity to earn a euro or deposit a euro and then earn two euros when the heads appear, not nothing when the tails appear. A 50 percent

chance of earning two euros, statistically, costs one euro. Investigating a coin is dangerous, however, because two euros or nothing is a very different result than one euro for sure.

In the financial world, there are very few problems associated with money laundering problems. In the case of coinage, we are faced with sharp and clear opportunities for our decisions to be guided by them. The regular cash flow is uncertain because we know for sure that the chances of the event are 50 percent. Financial decisions are often influenced by very complex and varied circumstances. Concerning derivatives, we can prove that their value changes over time and depends on the future behavior of the underlying financial asset (prices, prices, etc.) where the transaction took place. This behavior, as of today, is unknown. Depending on the unknown future, the risks associated with consumer goods are therefore very difficult to assess. When we deal with the outcome, we cannot know the risks we are facing, now or in the future, but we should pretend to act when we strike an agreement.

Risks are present in all business activities except the economic order. A serious concern, therefore, is not whether a dangerous object exists in particular business activity. (Risk creates opportunities for economic activity, investment, and trade that contribute to a more efficient and productive economy.) Rather it is the impact of a given trade on the combined level of risk that society must bear. At each trader's level, the risk can be reduced or remained the same through conversion and transfer. But this is not the case at the systemic level. If the transactions received lead to an increase in the combined level of risk, it could adversely affect economic activity and place a burden on those who are not particularly involved in the transaction. From a moral point of view, acquired transactions should be considered risky social situations as the risks may need to be borne by individuals or groups that have not created a risk. So, what comes out of something is from public appearance. Either damage or losses are only possible, as decisions are made under uncertain conditions, consistent with ethics.

The term risk management as a way to understand emerging emergence comes from an orthodox, and classical financial perspective. The question that arises is to make decisions under uncertain conditions. Future futures and options are the

deliberate (correct) positions in future asset prices and selling or taking price risk risks in a calculated manner. Another risk trading will occur because teams have different risk options (gamblers buy risk; cautious players sell it) and because different teams have different risk exposure. In the latter case, one party may lose profits if the dollar goes up; one loses when descending. They are both happy to lock up the next dollar price to buy a guarantee. Alternatively, either party can choose a contract that gives them the option, but not the obligation to buy (or sell) dollars at a certain price in the future. With this option contract, they can lock in the selected level of exposure to dollar movements.

What makes alternatives unique to risk management is that they are cheaper: they are products that offer risk in the risk (price or index change) but without having fewer assets from which the risk originated. In this sense, the product is harmful to the product. You can buy (or sell) a display of the price of wheat without having to buy (or sell) any wheat, moving at a dollar price without trading the dollar itself. Contracts obtained that generate these opportunities carry the greatest risk of minimal expenditure. All of the risk management costs are attributed to one risk exposure. A simple illustration to make this clear. In anticipation of an increase in oil prices, you can purchase one barrel of oil for $ 60, store it and wait. Or you can buy an oil product that offers the same price range for the oil barrel for just a few dollars. Put another way, at the price of one barrel of oil, the output of which gives the expression of the price movement in thirty barrels. Compared to the buy-and-wait-and-wait-oil strategy, the alternatives provide power and reduce the cost of hedging unwanted price movements. As an agreement, they also reduce the cost of guessing at price movements.

They are designed as risk management tools (or speculation), which, in turn, are similar to a dollar futures contract, which may deal with money as their own, but do not appear to them to be cash. And, in fact, in the economic orthodoxy that treats money as numbers in the exchange, out of 5 is not mentioned as money. A critical issue is the efficiency of resource allocation, and the alternatives are seen as promoters of periodic and local efficiency, not units of measurement.

Likewise, the neo-classical issue is how market participants use strategic-based factors to make their risk profile more selective. In this case, the key question is how to put the price at risk in terms of the futures prices and options that they should trade with? Once that problem is resolved, the timely and in-depth allocation of resources under uncertain conditions should be effective. When the neo-classical framework shifted to social policy, in the name of the political climate of market processes and the positive behavior of market outcomes, a general analysis of derivatives followed. Derivatives here are seen as ways to manage not only corporate risks but also social and personal risks. Thus, within the economic culture, from the outset, it seems to have reached a middle-class level as risk management tools, leading to economic and social performance. But the role of money is not involved.

Guessing, when orthodoxy is gone, dynamic analysis has followed, creating the same analysis in general, but with an emphasis on thinking rather than hedging, governance and market power rather than competition, and ethical analysis rather than economic efficiency. Increased cash flow is portrayed as gambling (risk) and is carried out with anonymous strong currencies. They are seen as a sign of secrecy and the disintegration of the united role of the nation. Where Shiller sees the democracy of the market votes, radicals see the power of the rich. However, while radicals place a similar economic role in ingredients such as orthodoxy, despite contradictory conclusions, there is no further involvement with the concept of monetary value.

Under the opposition of hedging/speculation there is, however, an obvious, but limited, and financial inclusion. It shows the difference between neoclassical and Keynesian methods in money. Is money a fabric, as the neoclassical believe you are the driver of real processes? If money is a veil, the output helps to seal the holes in the veil. Unexpected stops in the global monetary system (for example, uncertain exchange rates, stopping economic neutrality) can be offset by acquired products that lock in future exchange rates. They can add stability to transformation where the market (for unknown reasons) does not provide that. If, on the other hand, money can drive real processes, then the result is a drunk driver and, prone to speculation, can ruin the real economy. For post-Keynesians, the exceptions made the 1930s even more

impressive.

However, this is not an argument about the emergence of something like money is about the outflow of related money. If one believes that money is a veil, the alternative is to help tie the knotholes in the veil but they are not part of the veil itself. If one believes that money has an impact on the real economy, the findings may help predict and distort investment incentives, but not part of the money. The risk framework (hedging-speculation) is not clear, especially if we are interested in assessing the financial side of the findings.

A different view of the findings, apart from risk statement and speculation, evaluates them in terms of their role as money. There are some aspects of this exhibition within the broader social sciences, though not the neo-classical orthodoxy where the currency type is by no means a viable argument. Unfortunately, and, even without this custom, it is surprising that, when a money label sticks to something else, it is removed so quickly. What kind of currency has been created by financial capitalists? The answer would be a kind of sign that replaces the common sense of money, the value of a piece of paper with its promise of redemption in gold or silver, with a note of money that promises nothing but a copy of it; and determines its value, what it signifies as a token, by some kind of identification. : focuses on the type of self-expression of the other output that is limited to them. The downside is that this feature is true for all fiat money, the most prominent form of credit, and credit is not something new. Receiving an outflow as a form of credit does not mean anything different about an exit as cash. Moreover, self-identification is not a separate product-like attribute of money. In the case of credit, the alternatives may be considered as indicators, but, as we will soon examine, the profound value of acquisitions is in direct conflict with the fact that their value as money does not depend on their value or identification but on their ability to convert. This is not an internal force.

With this new, but vigilant, product and investment agreement there is a need to ask what kind of products are acquired and what specific functions they perform, without simply knowing that they are driven by new risk formation and involve a significant increase in the amount of money (credit). But it is another thing to say what

is so different about this particular type of money.

The responsible role of the risk management function as described above is organized only in an integrated public manner rather than the private role of the products obtained. It can be said that alternative markets now offer financial stability that replaces (albeit unsuccessful) stability that has been provided by the Keynesian government. In the post-war period, the state has defended the present with the future of market regulation, most common among them with fixed exchange rates, stable interest rates, and commodity price consolidation schemes. Countries are no longer doing this work, but the need for future reforms has not disappeared with changes in national policy. Bonds include certain significant financial transactions such as a rate that simplifies the role of cash in periodic exchanges and as a value store.

What is important here is the element of the originals mentioned in the context of use. That is, the alternative does not require ownership of the underlying asset (wheat, oil, dollar) exposure to a specific risk (usually indicated) associated with that asset. That separation and ownership of the property is key to the financial performance of the exit because it provides credit and transfers that do not have wheat, oil, bonds, or funds themselves. If the bond were the sole financial transaction, we would focus on debates about efficiency and speculation, and a different aspect of this finance would be the pressure of time/space, and, in the general context, on the reduction of transaction costs. But it is not their only job.

It is in the mixing area where new and different revenue is generated. In this output, the function takes the broad range of properties of the different properties and combines them into a single product. This is a process that is only possible because the derivatives are separated from the ownership of the underlying asset-related assets. Without this division, there would be no concept of a collective inheritance of the characteristics of many other asset forms

While the convertible bond addresses the issue of debt consolidation and equity, there are thousands of other products taken from one that covers many aspects of the asset. Depending on the risk exposure the customer desires, there may be a product available or designed to produce the desired exposure. If you want to be exposed to

the performance of US companies, but not the US dollar, there is a contract based on another (ex: fixed note) that will pay interest in Euros when the interest rate is determined by the S&P 500 index. The possibilities for the meeting are almost endless.

Each derivative product is a package for the conversion of one type of capital into another whether this is a future asset contract or a complex conversion of a particular monetary index to a particular stock market index. When all these products are put together, they form a complex web of conversions, a list of removable items, where any capital, anywhere and anytime or local profile, can be measured compared to any other capital, here it is.

This mixing process has a direct impact on our understanding of money. Going back to the changing nature of the bond, we see that we are introducing something that is commonly understood as a liability (or debt) and something that often sounds like money, but not equal money. The mixing, therefore, involves providing capital and cash equivalents by effectively breaking the distinction between money and money. But, more than that, a flexible bond, as the name suggests, is not just a combination of debt and equity. The right to change for a duty involves comparing the rates of restitution of these different types of finances. Similarly, the volatile nature of the bond works to strengthen the price relationship between one currency and another.

Generalizing derivatives, we see that the mixing process as described has both financial and monetary properties; and they are the same features. If all kinds of goods are measured continuously, markets from other sources form (produce) the type of capital we thought to be the only release. By providing a refund process, there is a continuous rate of total refund, by all means, in all areas and at all times. There is, therefore, a unit size of the capital: and this can easily be seen as a major monetary function. Derivatives not only contain a lot of liquid but, because they do not involve the necessary ownership of the underlying property, they can perform the financial functions of the account unit and the value store. The act of re-invigorating the financial process and the fact of consolidation work to integrate the concepts of money and money.

This brings the question back regarding the outflow of funds like money. That

which arises from a monetary value is its competitively determined value, based on the estimated value (competitive performance, availability, and expectations) of different underlying assets. This is an idea where it's not just electronic money. In this sense, they can be considered a global standard. This makes them capitalist capital. While gold and silver and credit (interest) are pre-capitalist currencies designed to work for capitalist accumulation, which is regarded as money is a form of capitalist competition.

Once we move into a world of conflict, each of these contracts plays an important new financial role. An exchange or forward market is the most commonly traded market created by large financial institutions such as banks, investment brokers, insurance companies, and companies. Here retailers of fashion contracts contain a combination of options and forward to meet the specific needs of their partners. The terms of the agreement are likely idiosyncratic. Since the contract is designed to meet customer demand, the seller acts as the principal and receives the other side of the agreement. Traders, however, want to reduce the risk to the overall market. For example, they chose to avoid the risks associated with changing the value of the lower bond index, a risk they had no profit against. The seller's risk of entering into a particular contract is slightly reduced by the risk of other contracts in the seller's portfolio. Many traders, however, enter the lower market to prevent a large portion of the remaining risks. The seller can sell or buy bonds, futures, or strategic risk protection options available in the customer contract.

To stay competitive, the seller is forced to choose the lowest cost among the various options to prevent the entry of money into certain contracts. With efficient financial markets, futures markets, and options markets, traders can offer idiosyncratic contracts to companies and investors at a lower cost than the absence of these markets. Traders use standard form contracts in future markets and options to protect the risk components of these idiosyncratic contracts. It is often too expensive for retailers to protect all contract risks. They keep a certain risk, the so-called "basic risk". Although companies and investors pay brokers' costs to enter into these contracts, brokers offer low-cost payment patterns, using tools and other instruments rather than old-fashioned

financial instruments.

The buyer of a telephone option should rely on the seller of the call option to fulfill the obligation to pay the difference between the market price and the price of the exercise in case the buyer uses the option. The buyer assumes the risk of the seller's debt. The buyer of options is indicated that there may be a trader error in the agreement. The seller, however, is not concerned about the consumer's automatic risk, as the option is the buyer's property in the event the buyer falls.

Although these contracts are initial investment contracts - no currency is exchanged - their value changes as the value of the asset changes because options are only adjusted from time to time. Since these contracts involve the sale of placement options, in addition to the purchase of telephone options, each party is exposed to the credit risk of the other. As the bond price index increases, the call option becomes more valuable and the placement option is less expensive. As a result, the recipient of refunds on the bond index can be identified and exposed to the risk of credit card author (a business that pays a refund on bonds). As the bond value index decreases, the placement option becomes more valuable, and the call becomes less valuable; the recipient of refunds on the bond index owes money to the agreement. The magnitude of the credit risk has shifted to the other side.

Advances in technology have reduced the cost of risk management. Many tools for understanding the outflow and price risk have been made available to investors, company executives, investment advisers, accountants, attorneys, rating agencies, and more. Financial institutions have developed complex risk management reports and controls to manage risk. Authors of accounts have become increasingly familiar with the management problems associated with alternatives. The valuation agencies have expanded their understanding of the equity instruments for their measurement of fixed bonds, securities bonds, contingent corporate debt, and many other contracts. Taxes and corporate attorneys have been involved in the formulation of alternative contracts. In general, users of the derived elements have been better educated.

As the market grows, the cost of using these tools is falling. Many investors understand how valuable they can be and apply them to their global operations.

Investment mediators convert contracts from one form to another to meet demand. For them, the cost of producing these contracts is falling as futures markets and options grow around the world.

The media, the public, and the regulators are afraid of being made because it is new and complex. Although widespread and growing, the results are still surprising to the general public. Due to the uncertainty associated with the new infrastructure, there is control uncertainty. Regulators are concerned about whether investors, companies, banks, and other organizations are now aware of the price and risk protection. They are concerned about their political exposure to failures and market disruptions.

Unfortunately, regulators and legislatures around the world tend to focus only on system risk. Their focus should be on building the right infrastructure to support the emergence of acquired products and other financial contracts. With this focus, regulators can encourage and help coordinate development. Infrastructure is being built. If governments focus only on risk issues and draft new laws to address this question, they could create devastating consequences. There may be severe restrictions on the role of government in the changing global financial sector.

There are significant concerns associated with changes in financial infrastructure. The pace of institutional transformation has increased over the years. With the new financial system in place, regulatory conferences have become obsolete, or lag in new procedures. New currencies do not easily enter the old control boxes. Tax laws have been hampered. Security descriptions and contracts have been withheld.

A whole new risk calculation system needs to be developed. Current accounting systems focus on static estimates. Exchanges, foreign exchange contracts, and other transactions from OTC have no initial value. As a result, "they are out of balance." There is no place for them in the current world of accounting. The economic balance sheets of financial firms and companies are strong. Financial instruments change the risk characteristics of economic balance sheets and have value. Administrators can encourage accounting work to create a robust conversion system with a focus on risk exposure - how the rate sheet changes in response to various risk exposures such as interest rates, cash price movements, and commodity price movements. If a response

that controls system risk, however, requires more reporting, the result could be disastrous. The details are not good at all. It can divert attention from the long-term need for a more robust accounting system.

System risk is not well understood. What are taxpayers' expenses? Who should stop reducing program risk if not government agencies? If there is a chain reaction of some kind that leads to potential deviations, the government should give credit to the system. What's out? Externally, market turmoil causes a lot of collapses and destroys vital infrastructure that calls for reconstruction. The argument goes like this: If market participants had more time to filter and add data to the new estimates, prices would return, and the public would be able to prevent this financial collapse, avoiding their costly deaths. On the other hand, even after the required period of information testing has passed, if market prices do not recover, organizations will not reduce public costs.

Regulatory agencies can provide secure funds to financial companies for the short time required to assess market conditions. By providing only temporary temporary protection, governments do not create institutional incentives to perform tax-subsidized activities; for example, some banks are considered "too big to fail." With securities, the losses, if any, remain with the shareholders of the financial business. While the government may lose some of its revenue if its mortgage rate decreases or if it is overdue initially, there may be no less costly alternatives unless the government enters risk-sharing programs with financial institutions.

Certain financial contracts do not increase the risk of a plan in the system. As we have seen, innovations reduce the cost of providing financial services. As institutions develop multiple ways to provide financial services to various businesses successfully, no single process has a significant impact on the global market for financial services. As a result, we reduce the risk of the system by reducing the importation of any one-way system for the provision of financial services. The regulatory agenda should not focus on the emergence of the OTC. The policy should be comprehensive and include alternatives and alternatives.

2.3. OTC derivatives

Other clues as to what could lead to a meltdown in the market were evident in the definition of contracts obtained and related security. First, these contracts are complex and difficult for many, including government officials, to understand. Second, they provide easy access to a limited return on underground structures. Aggressive buyers can lure financial managers into companies of many different types to enter into highly OTC-based contracts based on their performance independent of the same economic factors. Treasurers may not understand the environmental risks to these OTC contracts. In addition, senior executives of large financial institutions may not understand the extent of the risk or the types of contracts with which they sell their reserves to consumers.

Compensation schemes, which rely heavily on annual performance, encourage retail workers from other countries to sell more complex contracts with higher profit margins, as they are less clear to end-users. Since these contracts are unregulated and are sometimes considered consumer-related, end-users should rely on the investment bank not only to purchase these contracts but also on future assessments before maturity. Corporate investors are less skilled, if any, but may have an idea of the future of structured market factors such as interest rates or inflation. This puts them in a position to buy contracts based on high and risky prices

It may take years to get profit from such contracts, but the current amount of cash flow is recorded by financial institutions. And these are the future cash flows that are expected to be the profitable current year. As a result, only unexpected gains or losses affect profits in the coming year. This accounting treatment is ideally correct when measurement models offer unlimited estimates of the economic benefit itself. This means that all structured items have a price or that the folding models provide unbiased protection strategies. Systematic errors can divert current profit and current risk estimates.

Informal pricing errors encourage traders to sell more complex contracts with tangible, but non-existent, high profits. Some firms compete to sell the same but separate contracts. Some firms, however, will not sell these contracts, as their models

show little or no profit from the prices quoted by their competitors. When price errors are detected in the future, the founding institutions suffer losses. Employees who previously benefited may no longer be employed at the factory, and they will not reimburse any previous compensation to their employer. The compensation scheme encourages employees to sell contracts with the highest interest rates.

Typically, more complex and transparent contracts are sold to the bimodal group: either complex companies, which consider the contracts to be less expensive and profitable from a financial institution, or to non-technical partners, who have to rely on the institution for price and future measurement but have no direct vision.

The short-term perspective of marketers and contractors may differ from the long-term perspective of many senior executives. Young traders do not have a market history and a small amount of long-term money with their institution. The explosive growth of these markets over the past few years has encouraged many new and inexperienced retailers to enter the business. In addition, senior executives may not be able to control sales power during dynamic growth and change. They may not be able to determine if the profit is real or long-term. This asymmetry of information causes top executives to dominate the commercial power of generating high reported profits.

One could argue that the short-term perspective, power in these contracts, and the unusual nature of buyers and sellers set the stage for the meltdown in the market. Many unscrupulous partners enter into these very powerful contracts. Many partners may fail because of large changes in random interest rates, interest rates, or prices around the world. This could lead to further melting and failure of the system in the absence of government intervention.

While this may be a possible situation, it is very unlikely that speculation about market indicators using contracts obtained could lead to widespread failures and lead to market fragmentation. For every buyer of these contracts, there is a seller. Not everyone can be a loser. Moreover, not every treasurer, who uses contracts based on directing assumptions, has the same view of the markets. If everyone had the same idea, market prices would have already changed to reflect these ideas. Therefore, only a few firms may fail (while others make a profit) in large prices representing only a

small fraction of the value of goods in the economy. Moreover, not all institutions are on the same side of the market or offer the same contracts to investors. There are differences in contract allocation and specification. In addition, the contracts obtained are one of the features for companies, investors, and institutions to take opinions on market indicators. Variety can even reduce the likelihood of a meltdown in the market. The failure of a few firms may affect sub-markets, futures markets, or acquired markets. With most markets, there is little pressure on any of these different markets. On the other hand, without these distinct channels, the pressure of failure on several corporations or financial institutions can be very strong.

In general, financial institutions prevent systematic risks associated with contracts based on what they sell to their partners. Some would argue that, because hedging is far from direct science, many financial institutions that improperly hedging can fail simultaneously, leading to market fragmentation and systemic risks. Building models to understand and protect risks is expensive and, as a result, models are not compatible. In addition, the cost of transactions to block all organized traffic in most markets can be quite high. Given the economic tradeoffs, many institutions do not encircle all planned contractual risks. Preventing the risks of a complex contract may require the institution to estimate variability, covariances, and a number of systematic factors for multiple global security. If financial institutions do not have models to measure the sensitivity of their profits to changing market factors, or to negative outcomes, or if the models are incomplete, many negative effects on the business or financial markets can cause many financial institutions to lose and fail at the same time, leading to market fragmentation. This is especially true for those financial institutions that do not allocate or withhold sufficient securities to carry risky market positions from other sources. In addition, risk management systems within financial institutions are natural and evolutionary. The structure and input are not subject to change in market conditions. A financial institution may have significant but unknown risks and a small risk of unseen interest to senior management and external auditors. This sets the stage for the failure of many organizations, in particular, where unknown risks are common in many financial institutions.

Market disputes arise not only in financial institutions that issue derivative contracts, but also in institutions that issue collateral, buy bonds of less developed countries, or make corporate loans, or do any other financial contracts. With market shocks, financial firms will fail if the change in their credit rating is not closely related to the change in the value of their assets, and the level of capital is insufficient to protect the volatile market which significantly reduces the value of their assets. and/or increase the number of their debts. The question of whether many financial institutions have a focus on capital assets or debt on the same side of the market as a result, whether the asset risk or liability is not hedged off, or whether the risk factor is insufficient to cover losses, cannot be answered without strong evidence. However, even if the category is set for multiple failures, it is not clear whether this could lead to market failure or system risk. From the evidence presented in Swaps magazine, and from other industry publications, as well as from government studies, financial institutions around the world differ greatly in their foundations. Some focus on forwarding currency exchanges and options, some on standard bond exchanges and options, some on interim exchanges, some on equity exchanges and options, depending on their technology and the needs of their clients. Some focus on the same books, on less risky traders, while others make unusual and more selective trading. Letters from other sources are very different.

Lack of money or market depth can lead to the failure of financial institutions. Contracts from OTC are illegal. There is no second best market for these available, and it is almost impossible to re-market contracts based on esoteric, let alone short-term. In OTC price-based contracts, financial institutions should save money or lose a lot if they are forced to close their positions for a short period of time. That is, if the markets are waterless, the spread of market prices is likely to increase significantly as more traders try to reduce the size of their positions and they are all on the same side of the market. When losses reduce to a large extent, financial institutions are forced to reduce their level of performance. With reduced assets to finance their debt, their financial risk can be very high: the level of risk could jeopardize the survival of the financial institution.

In addition, many of these institutions use temporary funds to obtain non-current assets. When the business risk increases, they may not be able to maintain their financial status in the short term. This will force the financial institution not only to rely on short-term financial reliability but also to reduce the size of its balance sheet. However, because it is very expensive to close their contractual positions (and other illegal positions), many financial institutions tend to release their liquid assets first to reduce the size of their balance. In contrast, liquids are also more likely to be in their protective positions. The sale of these positions exacerbates the risk of their remaining funds. In addition, firms may be forced to relinquish their illegal positions and lose out on that. As a result of these high collision costs, poor market movements can lead to many failures for inefficient financial firms. This sets the stage for the meltdown in the market.

The above discussion can apply equally to small business loans, illicit loan contracts, direct foreign loans, and financial and bond trading positions. Financial institutions make money, in part, from funding. There has been a huge price movement in the market over the past decade which has not caused many failures. There has been a lot of money, a stock market, wealth, and interest rates in Japan over the past four years. There was a sharp decline in commodity prices in Mexico and South America in 1994 and 1995. Europe experienced a dramatic change in inflation in 1991, which led to the collapse of monetary policy. There is no strong evidence that it separates contracts obtained from these illegal positions.

To the extent, however, that financial institutions and companies use acquired contracts to prevent or share risks across the economy through contracts acquired, the risk to the financial system may not be significant. Their money at risk does not change much. The alternatives allow for more risky foreign exchange at a lower cost than direct equity. The contracts obtained that is used to prevent commitment are more targeted and less equal than non-restrictive equity issues.

Some have argued that the credit risk for imports could lead to volatility, which could lead to market failure and deregulation. Many corporate partners do not have a place to send money or mark their contracts from the market. Entering into a similar

OTC contract may limit the obligations in form of reduced liability. In fact, for a fee, the financial institution sends the collateral to the organization.

Other pathologies that set the stage for systemic failure are those of risk and functional controls. If retailers from OTC do not establish effective operating controls in their organizations, market price movements could create previously unknown problems to many firms, which could lead to huge losses and lead to the failure of many organizations. Internal control and an adequate accounting system are required to operate and transfer accurate information to external accountants. Diseases occur.

The first reason for a system crash is behavior. This is the situation the bank is creating. Fear creates fears that are widespread among many organizations. For example, the losses experienced by a bank-based broker cause the market to believe that the bank will fail. This has led to operations in the country and in other banks with major OTC positions, which has led to a sharp collapse of the system. As discussed, this is unlikely to be marketed from any other source.

The second reason for a system crash is structural failure. Somehow unknown, the financial infrastructure is flawed. System failure leads to widespread failure. For example, the record-keeping of a major retailer is faulty, causing it and others to make a mistake. The screening of a large number of OTC ingredients in major banks, as reported by GAO, could make the problem worse. The torment, however, is based on speculation, not on termination. In addition, traders from OTC are in business from very different backgrounds; they are not the same. However, as discussed, this is an unexpected cause of systemic risk in the market for managers.

Another danger that can lead to systemic trouble is the invention of innovation. The composition can be so large and so large that the volume of transactions can be too large for financial infrastructure to be managed. Given the high cost of building financial infrastructure, the system may be weak in the context of rapid, multi-product development. In a changing environment, change leads to systemic weaknesses. This is the force of nature. Industry partners and external monitors, however, do their job to protect their business franchises.

In general, innovators are faster than infrastructure builders in the financial

markets. The new designation of OTC-based contracts has been huge, and the market has exploded in size. Economists suggest that designers use existing infrastructure to build model products. It is very likely that after the designers expected the new products to be successful it was the infrastructure built to support the business. With explosive growth, it is at this early stage that the system is weakened.

There is a reason why a decline in the last few years is observed. However, despite the reported losses, there have been a few failures in comparison. With the explosive growth in the market, we are likely to expect many failures and losses. To maintain their business, businesses build infrastructure to manage and understand the risks to the business from OTC. This caused general support groups such as accountants, attorneys, legal teams, and administrators to play a major role in this process. Without these controls, internal controls and external controllers will reduce market growth. All groups in accounting companies provide resources to build controls and educate managers and administrators about the emergence of OTC Forms and legal institutions are adapting to the new environment. There is a greater understanding of agreements from OTC by senior executives in financial institutions and companies, including members of the board of directors; there are many risk management systems and systems in place; many resources are used to create performance controls; there have been clear responses to credit risk, and standards are set for dealing with unscrupulous partners.

Another risk factor for the system is unexpected changes in regulatory, jurisprudential, jurisprudential, and other laws, which create segregation in markets where those rules are considered to benefit. Many types of OTC are long-term contracts. Regulations can change (see bills proposed in Congress), causing markets to collapse. Certain exit contracts may be legal for release. Arrangements in a previous agreement may be considered invalid. The status of previous contracts can be changed by the courts and legislatures. For example, at a loss, many businesses (especially state-owned enterprises) claim to have managed the risk under a contract and are asking for their initial investment to be considered illegal. Various states in the U.S. They have pending buildings that would make it unfair for state-owned enterprises to

use contracts obtained from their investment activities.

Over-regulating foreign markets can destroy well-functioning markets. This can destroy spending in the market. Foreign retailers are likely to lose a lot of these markets are downgraded by regulations. Declining cash flow rates reduce hedging spending. This increases the exposure of traders to market risk, which in turn can lead to unexpected losses and the failure of the seller. In addition, the business would be less attractive, and financial institutions would fail to attract and retain more skilled workers. Managing an existing business book can be very difficult. The difficulty of control also creates the potential for the consequences of illness. For example, the initial transition to international financial institutions in financial institutions - the requirements of the International Settlements Bank - is based on strong and resilient standards, which enable banks to undergo transactions and other OTC-based contracts, instead of acquiring basic assets.

2.4. Existing valuation methodologies

The most widely used pricing models for options are Black-Scholes Model and Binomial Model. Black-Scholes is one of the most well-known models for determining the fair value of an option based on 6 variables, namely volatility, type of option, underlying stock price, time, strike price, and the risk-free rate. The model is used to value the European option. Unlike American option, European option can only be exercised on the expiration date.

The formula for valuing option price is as following:

Call Option Premium C = SN(d1) - Xe- rt N(d2)

Put Option Premium P = Xe–rT N (–d2) – S0 N (-d1)

d1 = [Ln (S / X) + (r + s2 / 2) X t]

d2 = [Ln (S / X) + (r - s 2 / 2) X t]

Here,

- C = call option price

- P = put option price
- S = price of the asset
- X = strike price
- r = interest rate
- t = time to maturity
- s = volatility of the asset
- N = standard normal distribution with mean = 0 and standard deviation = 1

Black-Scholes model considers the following conditions to be complete.

i) Underlying asset follows the Geometric Brownian motion. ii) Growth of the asset is constant and there is no dividend payment recorded. iii) There are no additional costs and spread in the market, thus no transaction cost and differences between lending and borrowing interest rate. iv) Arbitrage opportunities is not possible.

When trading in bonds or stocks incur transaction costs, composition is no longer used in practice and always produces lower-cost solutions (value of an option) than the actual performance. To avoid this problem, various types have been assigned this function. Most of these species produce an indirect number of Black - Scholes. Among them, the best that gives consistent results in the market is the illegal Black-Scholes formation given to the pioneering work by Barles and Soner.

The Black-Scholes-Merton (BSM) model looks at the prices acquired in finance (options). The original model acquires a single measuring asset (stock), the price of which is driven by the movement of the Brownian movement. In addition, it takes a risk-free investment in the bank account (bond).

In definition, in some financial derivatives, future cash flows and payments are unpredictable and can depend on complexity in changing the basics and decisions taken by the parties. The financial theory of statistics, which has been actively developed over the past few decades, offers solutions to this problem. The price model makes consideration for the future emergence of one or more bases and decision-making strategies of organizations where appropriate. Since this evolution is unknown today, the model makes only stochastic assumptions, taking into account the complete

set of emerging or future results. Estimates of future emergence may depend on certain parameters and/or other market data. The price model also describes how the price is based on a set of potential payments that are related to future implications. This is usually the kind of discount rate for potential outcomes. Depending on the complexity of the model and the price tool, the estimated measurement can be done with a simple clear formula or incorporating more complex numerical calculations. One has to distinguish between the model and its numerical performance.

The most well-known and widely used model is the Black-Scholes model. In this model, the price calculation of a simple European vanilla option for one less can be calculated with a closed-form solution, known as a Black-Scholes formula. The Black-Scholes model however is a theoretical framework that allows for the most complex metal prices. One may want to examine not only the price but also how the price will change in the event of a change. Price changes in relation to chronic changes are often referred to as emotions or "Greeks" (delta is the most common) while risk analysis describes price changes in terms of larger variability. One should keep in mind that a model is a set of assumptions in basic evolution in terms of parameters. It can be used on many other metals. There are different scenarios for option pricing models:

- Not only the local market of the underlying asset but also the vanilla options market is liquid enough. This is the case for most equity indicators (S&P500, DAX).
- The market is very liquid, but the vanilla options market is still emerging or it is not mature enough.
- The options are explicitly or implicitly written on a number of resources and are sensitive to the combined features of these assets, which are not affected at all.

In the first case, vanilla options can be used effectively to prevent risk. It is therefore important to capture the smile of choice in the right way. This is the purpose of smiling models. However, despite many efforts to build a suitable model, there is still no clear consensus on the market. The coexistence of many models leads naturally to the risks of the model. Although options price models are associated with volatility,

this is not always a major driver. For example, in equity prices, one of the biggest problems is predicting profits in a logical way. The same difficulty concerns the modeling of the combination which is the condition described in point three. Two notable innovations in recent years are:

- The emergence of multi-curved interest models.
- Better SABR ratings. The old SABR model is widely used, mainly to respond to interest rates smiles but until recently, it was accustomed to be working with unsatisfactory predictions.

Stochastic volatility (SV) types are a different way to deal with smiles. Unlike the family of LV models, they are parsimonious parametric models with parameters that have a clear financial or physical definition. Too bad we disassemble the right equipment: SV models will put heavy challenges on this smile. SV models show the constant variability of the temporal fluctuations. Note that this instability is a religion to be performed in practice, or to recover from local trajectories of the daily sample. Two preferred methods for estimating themselves from high-frequency data (found in equity references), or in quotes for variability variables. Note that in the equity indices where a very narrow grid of short-term options strikes is available, it can also be referred to in an unambiguous manner (under the assumption that the basics are no exaggerations) in option quotes.

This Double Heston model shows the effect of stochastic skew, and also allows it to deal differently with long and short smiles, thus providing the best balance of market data. The variety of curves in the Double Heston model is also much richer than the Heston model, where it has twice as many parameters as the Heston.

To address the first result, the Double Log-Normal model was designed by Gatherals. The third line of smiles provides direct arbitrage intervention / without price, or stated misconduct, in a low parametric manner. The first successful attempt in this way was made by Gatheral and Jacquier in 2012 with the SSVI model. SSVI equates well (well within the bid distribution) to equity indicators. It also suffers from some structural problems that should be removed from subsequent versions of this

model. Those models of the said flexibility have the potential to be used systematically as an arbitrage-free regulator before the normal modeling phase. They also offer a host of new risk management tools and powerful simulations of the proposed dynamic environments. Typically, this revised method was criticized in studies. The challenge is to provide a low-dimensional model, either directly in terms of call rates or in the specified circumstances. It should be emphasized that at this stage it is not known how to match the flexibility model of the stove with other models with adequate structures. This is the topic of practical research. Demonstrating this model in a market-like format is another topic of research. SSVI has so far been one of the most successful efforts in this regard.

Local Stochastic Volatility Models (LSV) models try to find the best of both worlds: good balance of vanilla quotes, and good dynamic properties. They can be seen as a local disruption of stochastic volatility models, or as a stochastic volatility perturbation of a variable area model. The first point of view is usually the one that is right for performance. Interestingly, LSV is often measured by an integrated mathematical/historical process. LSV types are widely used in FX markets, where liquid price options are available. One logically assumes that the pure LV or pure SV model measured in vanillas will be systematically or below the price of OTM options, and the value of the LSV is much closer than the market price. The surprising fact is that there are a few textbooks on LSV models and there are serious life issues, differences, and numerical problems. This is one of the many places where the practice of the market is in front of scholars. This also means that most potential problems will arise in another category.

CHAPTER III. QUANTUM MECHANICS AND NEURAL NETWORK VALUATION

3.1. Introduction to quantum mechanism

The branch of physics learning and dealing with very small particles or waves is called Quantum mechanics.

It came to very strange conclusions which have many differences compared to classic view about the physical world. Classically, many of the equations describe how things move at everyday sizes and speeds, and their application. Matter appears to be in a certain place at a specific period of time in this mechanics. But, in quantum mechanics, it is not certain that an object certainly exists in a certain place at a given time. They have a probability of being at point A, and another chance at point B, C, D, etc.

Three revolutionary principles

Quantum mechanics (QM) was developed over many decades, starting as a collection of conflicting mathematical interpretations of experiments that could not be explained by ancient mechanical calculations. It began in the early 20th century, about the same time as Albert Einstein published his theory of relativism, a different mathematical variation in physics that describes the movement of objects at high speeds. Unlike affiliation, however, the origins of QM cannot be calculated from a single scientist. Instead, many scientists contributed to a three-pronged approach to evolution that gained acceptance and confirmation of gradual experiments between 1900 and 1930.

Quantized properties: Certain features, such as position, speed, and color, can sometimes only appear in certain values, set values, such as "dial" dialing from number to number. This challenged the basic thinking of classical mechanics, who argued that such structures should exist in a smooth, continuous environment. To explain the concept that some structures "click" like dialing with certain settings, scientists coined the term "quantized”.

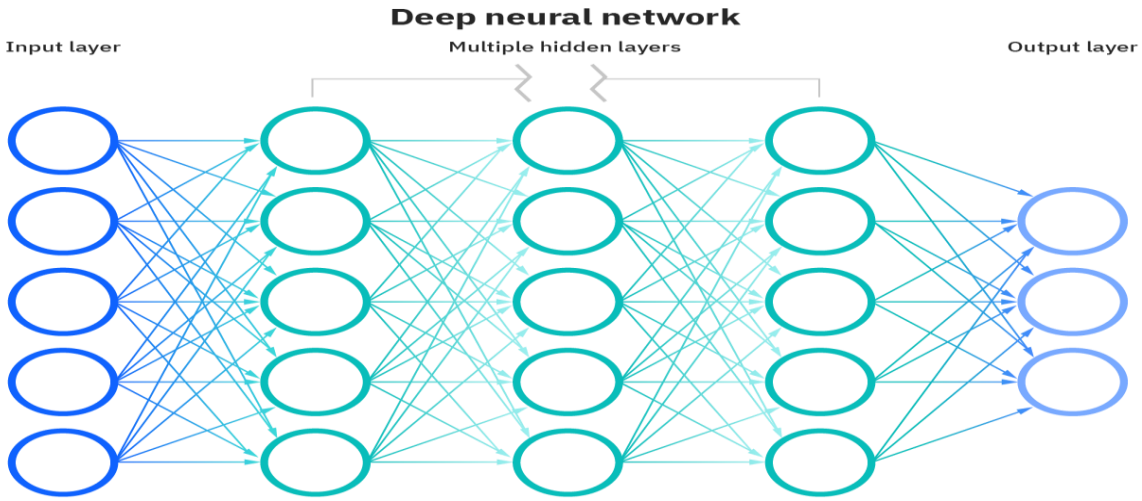
Particles of light: Light can act as both wave and a particle. Initially, it is criticized that according to the 200 years of experiment it behaves as a wave. It is described to be acting as ripples on a lake when something sinks. Light as a photon itself is a particle but these photons behave like a wave when moving.

Waves of the matter: Matter is able to act as a wave. Past experiments which classic physics-based on, showed that matter exists as particles. Quantum mechanics counter this argument by presenting the behavior of some particles as a wave.

3.2. Neural network

The network or interconnection of neurons is called a neural network in biology. It is called an artificial neural network when these neurons are artificial. Hence, a neural network can be biological and made up of real biological neurons, or it can be artificial and made up of nodes and used to solve artificial intelligence (AI) problems. The linkage between these neurons is built as weights. Neural networks are used to make decision-making tools, non-linear data models, etc. non-linear data modeling or decision-making tools. They can find the patterns within inputs and outputs and build complex relationships.

Figure 2: Artificial neural network plot



Source: https://www.ibm.com/cloud/learn/neural-networks

These artificial networks can be used to create predictive models, powerful controls, and applications where they can be trained in data. Self-study from

experience is possible within networks, which can conclude a set of complex and seemingly unrelated information.

A neural network (NN), in the form of artificial neurons, is called an artificial neural network (ANN) or, an interconnected group of natural or artificial neurons using a mathematical or computer model to process a data-based communication pathway. In many cases, ANN is a dynamic system that changes its structure based on external or internal information flowing through a network.

With active words neural network models of incompatible mathematical data or decision-making tools. They can be used to learn the very complex relationships and patterns between inputs and outputs and discover the direct or indirect connection.

The neural implant network consists of a network of simple processing materials (artificial neurons) that can show the complex function of the earth, determined by the interaction between the processing element and the parameters of the object. Artificial neurons were first introduced in 1943 by Warren McCulloch, a neurophysiologist, and Walter Pitts, a technology specialist, who first collaborated at the University of Chicago. One of the oldest forms of neural implant network is the Hopfield duplicate network.

The concept of the neural network seems to have been first introduced by Alan Turing in his 1948 Intelligent Machinery paper when he called them "B-type random machines".

The use of artificial network models depends on whether they can be used to install functions in viewing and reuse. Neural networks can be controlled and can be used to read input presentations that capture important features of the input distribution, and more recently, in-depth learning algorithms can fully learn the distribution function of visual data.

3.3. Connecting quantum mechanics to finance and neural network valuation

One of the four well-known papers Einstein wrote in 1905 was on the subject of the movement of very small particles and its randomness. This phenomenon is known by the name of Brownian motion and is explained through the theory of random walk.

Surprisingly, the first time random walk was introduced was not in the paper of Einstein's, but a thesis of a French student in the study of finance. Interestingly enough, the first formalization of random walk was not in Einstein's paper, in the study of finance. The subject of French graduate student the problem evolution of security, such as a stock of listed in a stock market, or government or private bond. In order to drive the future value of securities, one should understand how it evolves.

Since then many scientists have worked on the relationship between quantum mechanics and finance, most of them noted the remarkable connection between the mathematical modeling in finance theory of random paths.

The neural network modeling is chosen to value derivatives because of its similarity with some of the perceptions in random path. Research considers the fair value of financial derivatives to be under the following phenomena which are also drivers in quantum mechanics which explain the movement of very small particles or nothingness itself.

- Entanglement. It describes any entities being affected by particles very far away, and change simultaneously or through chain reactions. These changes usually occur not in a direct, but indirect and non-linear relationship. In today's world derivatives are getting affected by more and more variables and it creates entropy. Chaos theory is the theory proposing this relationship. Similarly, the neural network is a non-linear model, and input is not directly linked to the output like in most of the regression models, but input goes through multiple steps in hidden layers before making it to the predicted future value.
- Quantum foam. It states that empty space affects microscopic entities and eventually the whole universe itself. As proceeding closer to the future, new variables appear affecting the financial world and increasing disorder and entropy. While calculating the fair value of financial derivatives new non-existent variables should be added to derive value. A neural network links each artificial neuron with a bias that is similar to the deviation. And these bias nodes which are added in each hidden layer step helps to explain variables that are not included as inputs.

- Superposition. As illustrated by Schrödinger, any quantum entity can be in 2 states at once, like dead or alive. Deriving from this phenomenon, derivatives will be stated both above and below the current price of the underlying asset. Each state can be given respective probabilities based on the future value obtained.

Neural network transformation and pilot model. The data is divided into training and test setup to test unique test setup by using the model built on the train set. The training set is used to determine the relationship between dependent and independent variables while the test set evaluates the performance of the model. I use 60% of the data as a training setup. The provision of data on training and setting tests is done using random samples. The random sample is performed on R using the sample function (). Set.seed () is used to produce the same random sample at all times and to maintain consistency. Index variable will be run while fitting the neural network to create training and testing data sets.

Picture 1: Creating train and test data

```
# Random sampling
samplesize = 0.60 * nrow(data)
set.seed(100)
index = sample( seq_len ( nrow ( data ) ), size = samplesize )

# Create training and test set
datatrain = data[ index, ]
datatest = data[ -index, ]
```

Source: Author's own calculation

The process to build a neural network can start after adjustments using the created sets. Neuralnet library available within R was used to build the network. The first step is to measure the breast database. Data measurement is important because otherwise the variable can have a significant impact on the predictive variable only because of its scale. Unrestricted use can lead to irrational consequences. Typical data measurement techniques are min-max standard, Z-score standard, median, and tan-h. The min-max standard converts the data to the same distance, thus removing the measurement effect from all variables. Unlike the Z-score normalization and median method, the min-max method maintains the initial distribution of the variable. That is

why standard min-max measurement data was selected.

Picture 2: Creating scaled data for neural network

```
# Create training and test set
datatrain = data[ index, ]
datatest = data[ -index, ]

## Scale data for neural network

max = apply(data , 2 , max)
min = apply(data, 2 , min)
scaled = as.data.frame(scale(data, center = min, scale = max - min))
```

Source: Author's own calculation

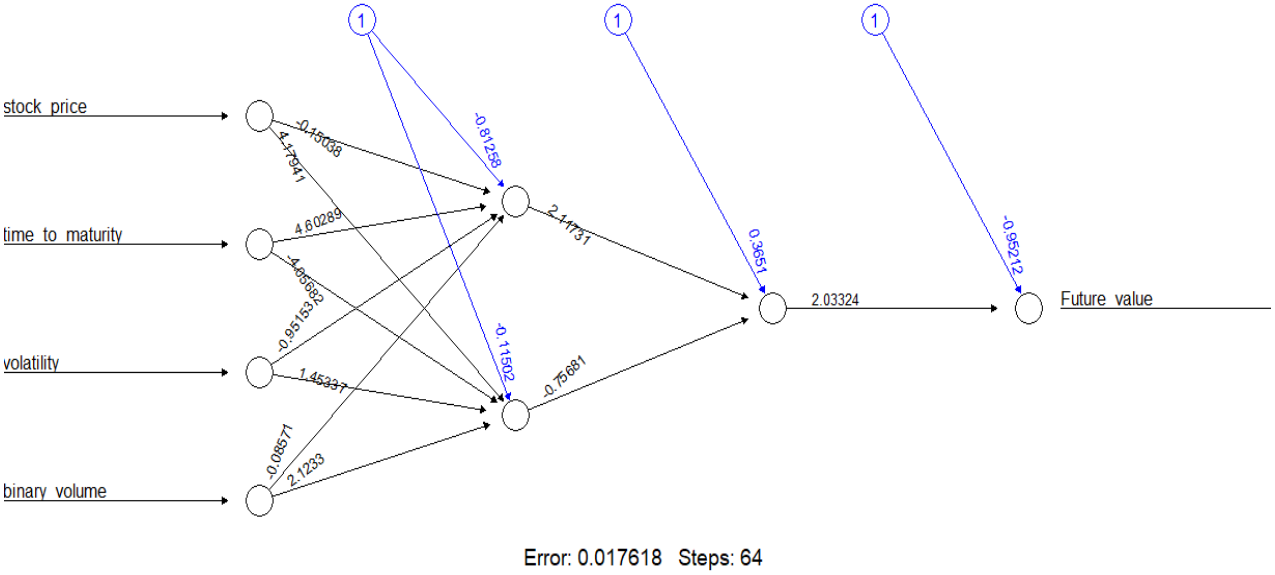
The data turned into a scaled set for the neural network. Neural network is going to be visualized using weights for each variable.

Picture 3: Building pilot neural network model

```
## Fit neural network

# install and load library
library(neuralnet)
library(dplyr)

# creating training and test set
trainNN = scaled[index , ]
testNN = scaled[-index , ]

# fit neural network
set.seed(2)
NN = neuralnet(Future_value ~ stock_price + time_to_maturity + volatility + binary_volume,
               trainNN, hidden = c(2,1) , linear.output = T )

# plot neural network
plot(NN)
```

Source: Author's own calculation

Figure 3: Pilot neural network model



Source: Author's own calculation

Figure 3 visualizes the computed test neural network initially built. The model has 2 to 1 hidden layer. The black lines are the relationships between nodes in accordance with weights. In order to calculate weights, the neural network uses the back-propagation algorithm. The blue line shows us the bias term which is similar to deviation.

The Neural network consisting of 4 input variables was built to link the neural network and drive the future value of the options or stock price. 2 steps hidden layers were built to reinforce the neural network. The first hidden layer consisted of 2 nodes and the last layer 1 node. As result, an error of only 0.0176 was observed in 64 steps, which is acceptable.

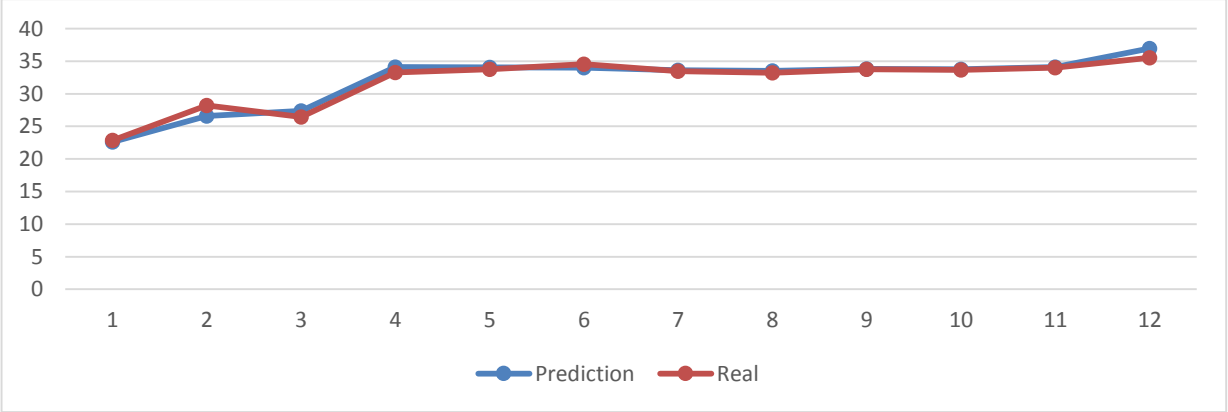
Picture 4: Predicting future value and testing statistical significance

```
40
41  ## Prediction using neural network
42  predict_testNN =neuralnet::compute(NN, testNN[,c(1:5)])
43  predict_testNN = (predict_testNN$net.result * (max(Future_value) - min(Future_value))) + min(Future_value)
44
45  plot(datatest$Future_value, predict_testNN, col='blue', pch=16, ylab = "NN future value", xlab = "Real future value"
46
47  abline(0,1, untf=T)
48
49  # Calculate Root Mean Square Error (RMSE)
50  deviation = RMSE.NN = (sum((datatest$Future_value - predict_testNN)^2) / nrow(datatest)) ^ 0.5
51  deviation
52  Data_regress = data.frame(datatest$Future_value,predict_testNN,datatest$stock_price,datatest$time_to_maturity)
53  regress = lm(datatest$Future_value~predict_testNN)
54  summary(regress)
55
56
```

Source: Author's own calculation

The prediction is made with codes inserted in above picture. Codes used to obtain deviation results and regression to measure significance and credibility is mentioned among the codes as well.

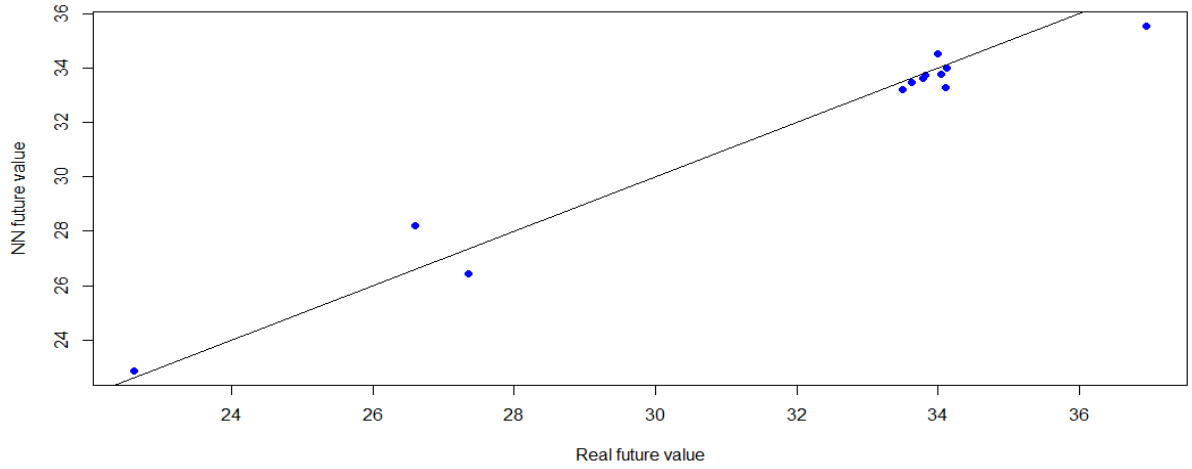
Figure 4: Comparison between predicted and real future value of pilot model



Source: Author's own calculation

After training the data, prediction is made using the test data. Prediction and real factual data consisting of 12 stock options in different time scales to mature is visualized (figure 8). Root Mean Square Error of the results is 0.75. This result is acceptable, and as it is observable from figure 2, the deviation between predicted and real result is quite narrow. The Standard deviation is only 2.755%.

Figure 5: Plot between predicted and real future value of option stock price (pilot model)

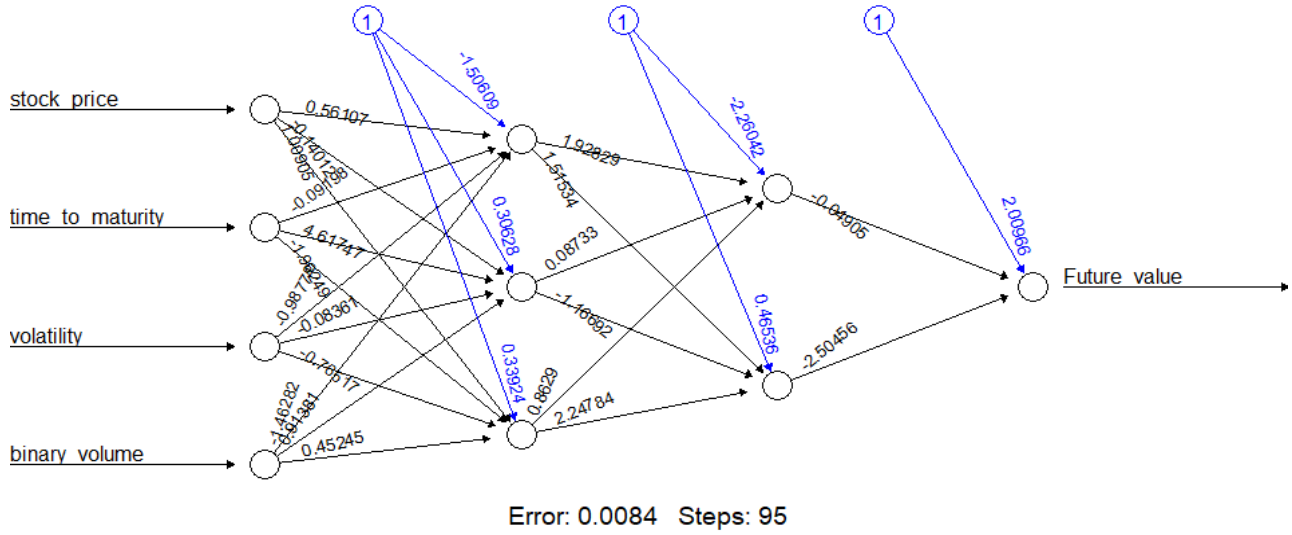


Source: Author's own calculation

The adjusted R square between prediction and real value is 96.4% with a p-value of 6.749*10-9

Final neural network model. The Neural network consisting of 4 input variables was built to link the neural network and drive the future value of the options or stock price. The prediction is made using the test data (40 % of the data) which was not used in the train set. 2 steps hidden layers were built to reinforce the neural network. The first hidden layer consisted of 3 nodes and the last layer 2 nodes. As result, an error of only 0.0084 was observed in 95 steps, which is acceptable.

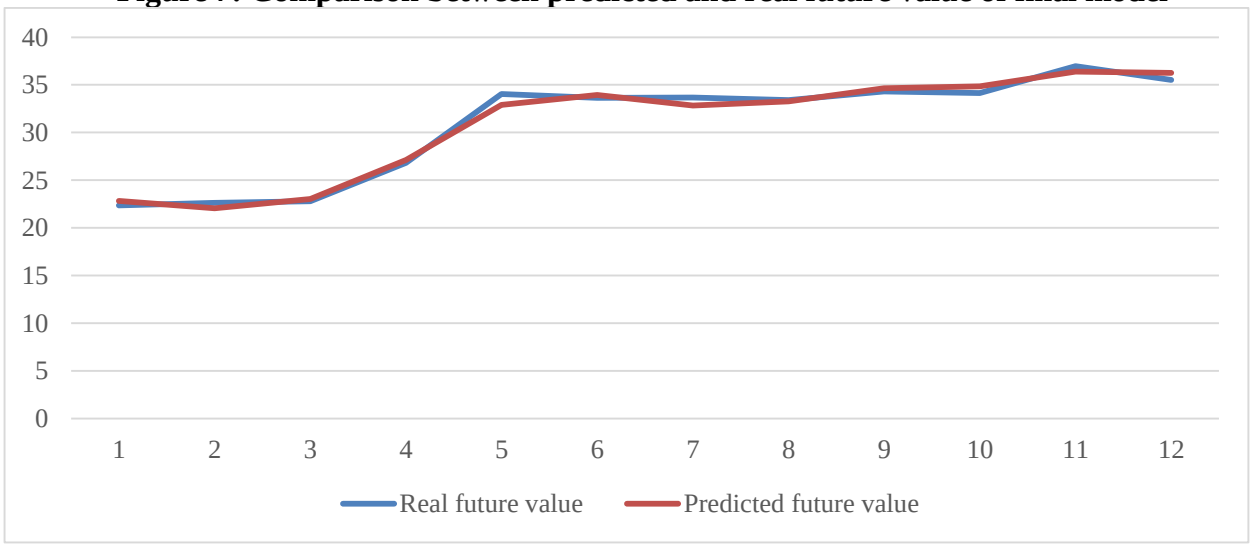
Figure 6: Final neural network model



Source: Author's own calculation

After training the data prediction is made using the test data by predicting 12 stock option in different time scales to mature. Root Mean Square Error of the results is 0.59. This result is acceptable, and as it is observable from figure 2, the deviation between predicted and real result is quite narrow. The Standard deviation is only 1.96%.

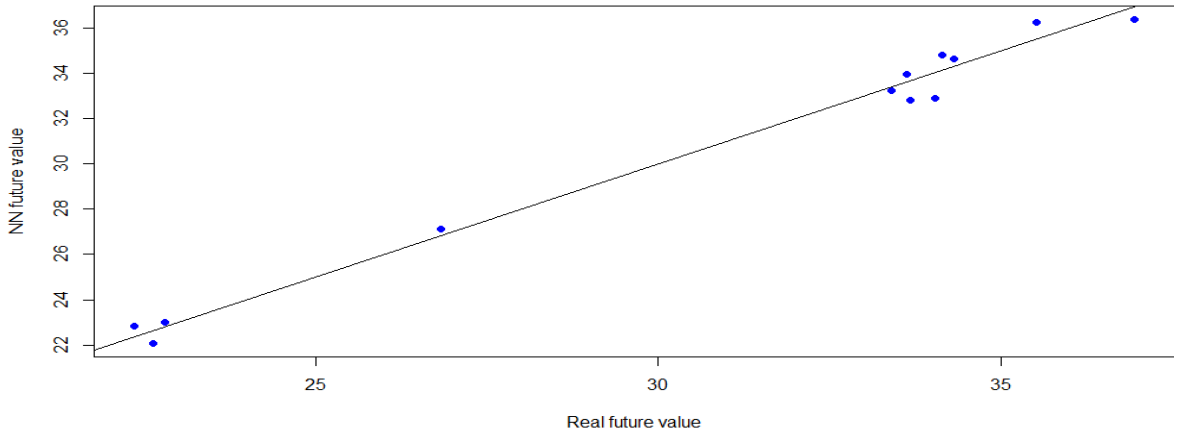
Figure 7: Comparison between predicted and real future value of final model



Source: Author's own calculation

The adjusted R square between prediction and real value is 98.6% with a p-value of 7.795*10-11

Figure 8: Plot between predicted and real future value of option stock price (final model)



Source: Author's own calculation

The future value is calculated using a neural network. Future value does not mean fair value. Thus, it has to be adjusted.

- Change in present value is calculated by deducting expected future value from the current stock price. The expected future value is calculated by dividing the expected future value by the adjusted rate of the discount rate, which is calculated through the Damodaran adjusted Capital Asset Pricing Model (CAPM).

$$\Delta PVs = PVs - \frac{EFVs}{rt}$$

Here,

ΔPVs = Change in the present value of the stock price

PVs = Present value of the stock price at the time of trading

EFVs = Expected future value derived from neural network

rt = Discount rate for the time given at the time to maturity of the option price

- Change in present value is multiplied by the probability of it happening to adjust the value with to probability because if a stock has a higher chance of going up, its intrinsic value should be higher. Probability is calculated by probability density function in comparison to past data

$$P(\Delta PVs) = \Delta PVs \times PFV$$

Here,

P(ΔPVs) = Probability adjusted intrinsic value

ΔPVs = Change in present value of the stock price

PFV = Probability for the range from given future value to infinity

- Deducting the present value of dividend payments from the probability adjusted intrinsic value in case of the call option, and adding it to the present value for the put option due to a decrease in the stock price in the ex-dividend date gives us the final intrinsic value.

$$C = P(\Delta PVs) - \frac{D}{rt}$$

$$P = P(\Delta PVs) + \frac{D}{rt}$$

Here,

C = Call option final intrinsic value

P = Put option final intrinsic value

P(ΔPVs) = Probability adjusted intrinsic value

D = Dividend payment at the time of time to maturity

rt = Discount rate for the time given at the time to maturity of the option price

The discount rate (Table 1) is calculated by Damodaran adjusted Capital Asset Pricing Model (CAPM) which involves 6 variables into consideration, namely; Risk-free rate, Market return, Beta of the underlying stock, Country default spread (country of the underlying asset), Country risk premium (country of the underlying asset), Inflation rate (country of the underlying asset. These inputs have to be in the same time frame as the expiry date of the option. In the below case (table 1) example inputs are following the option with 3 months to maturity.

Table 1: Adjusted CAPM inputs, and source of inputs

Damodaran CAPM	**3.8%**	**Source**
91 day T-bill rate	2.0%	treasury.gov
10 year annualized market return	3.48%	Google finance
Beta	1.22	Finance.yahoo.com
Country default spread in country of underlying asset	0.00%	pages.stern.nyu.edu
Country risk premium in country of underlying asset	0.00%	pages.stern.nyu.edu
Inflation rate in country of underlying asset	0.16%	Federalreserve.gov

Source: Author's own calculation

Sample results

Table 2: Current and real stock prices, and predicted values obtained from neural network

Current stock price	Real Future value	Predicted future value	Probability for upward	Probability for downward
25.8	22.3	22.8	45.9%	54.1%
25.3	22.6	22.1	45.6%	54.4%
25.7	22.8	23.0	46.4%	53.6%

Source: Author's own calculation

Table 3: Time to maturity, Discount rate and 3-month dividend payment inputs for given sample

Time to maturity (months)	Discount rate	3-month dividend payment
3	3.8%	0.82
3	3.8%	0.82
3	3.8%	0.82

Source: Author's own calculation

Table 4: Final call and put price for respective options

Final call intrinsic value	Call option price	Final put intrinsic value	Put option price
0.96	26.8	2.85	23.0
1.04	26.3	2.97	22.3
0.83	26.5	2.67	23.0

Source: Author's own calculation

CONCLUSION AND RECOMMENDATIONS

Financial derivatives can be used for both hedging and speculative purposes. Under hedging terms, companies reduce the risk by obtaining the item at the price contracted months ago. This helps them to forecast and plan their resources more effectively. Most of the traders enter the derivatives for speculative purposes which is quite risky. Some companies which entered this market in speculative terms almost went bankrupt and recorded losses (Ramirez J., 2015).

The financial derivatives bear the systematic risk which makes traders not to be able to diversify them. The speculative capital, focuses on the volatility itself, describing them as their for-profit. It is, therefore, a bet on the likelihood that individual events and processes will interfere, if at all, in the long run. By assuming this view, the cost of speculation differs in both the material and the basic asset tracking.

The- Black Scholes method is one of the most used methods to value the options. But it has its disadvantages considering the following examples: 1) Growth of the asset is constant and there is no dividend payment recorded. 2) There are no additional costs and spread in the market, thus no transaction cost and differences between lending and borrowing interest rate. 3) Arbitrage opportunities are not possible.

The neural network modeling is chosen to value derivatives because of its similarity with some of the perceptions in random paths. Research considers the fair value of financial derivatives to be under the following phenomena which are also drivers in quantum mechanics which explain the movement of very small particles or nothingness itself.

- Entanglement. It describes any entities being affected by particles very far away, and change simultaneously or through chain reactions. These changes usually occur not in a direct, but indirect and non-linear relationship. In today's world derivatives are getting affected by more and more variables and it creates entropy. Chaos theory is the theory proposing this relationship. Similarly, the neural network is a non-linear model, and input is not directly linked to the

output like in most of the regression models, but input goes through multiple steps in hidden layers before making it to the predicted future value.

- Quantum foam. It states that empty space affects microscopic entities and eventually the whole universe itself. As proceeding closer to the future, new variables appear affecting the financial world and increasing disorder and entropy. While calculating the fair value of financial derivatives new non-existent variables should be added to derive value. A neural network links each artificial neuron with a bias that is similar to the deviation. And these bias nodes which are added in each hidden layer step helps to explain variables that are not included as inputs.
- Superposition. As illustrated by Schrödinger, any quantum entity can be in 2 states at once, like dead or alive. Deriving from this phenomenon, derivatives will be stated both above and below the current price of the underlying asset. Each state can be given respective probabilities based on the future value obtained.

Phenomena followed in quantum mechanics and the random path is related to the neural network performance, and in terms of statistical confidence, a neural network is an effective tool for predicting the future value as derived from the sample data (RMSE=0.59).

The advantages of the new model over its old existing counterparts are its predictability and ability to turn future value into present value. Adjustments made afterward including discount rate which is more sophisticated than the only risk-free rate which is used in other models, dividend adjustment which is neglected in the original Black-Scholes model and probability involvement in valuation are new compared to some of the existing valuation methods, and open new rooms for further engagements and improvements to make better predictions.

For results to be more significant different researchers should do the suggested neural network valuation with different and larger data set to confirm the effectiveness of the method. It is estimated that there should indeed be a deviation between the results of the different researchers. That is why future adjustments will be needed to

shape the model into a desirable formation.

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Tables list

Figures list

Picture list