

Czech University of Life Sciences Prague

Faculty of Economics and Management

Department of Economics



Bachelor Thesis

Economic Analysis of Gold, Silver, and Platinum.

Nadezda KISELEVA

Supervisor: doc. Ing. Petr Procházka, Ph.D., MSc

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Faculty of Economics and Management

BACHELOR THESIS ASSIGNMENT

Nadezda Kiseleva

Economics and Management

Thesis title

Economic Analysis of Gold, Silver, and Platinum

Objectives of thesis

1. Evaluate the commodity market (Gold, Silver, Platinum)
2. Analyse gold, silver and platinum as specific assets for investment
3. Find out their advantages and disadvantages as an investment instrument with the help of comparison of their rate of profit.
4. Analyse opportunities to invest for each precious metal(gold, silver and platinum)

Methodology

1. Literature review: description of each precious metal(gold, silver and platinum), including information about demand, supply, historical and future price development and conditions, which affect the price, opportunities of trading and investment.
2. The analytical part includes analysis of the latest indicators to determine, how to invest in gold, silver and platinum and find out what is the best and most profitable precious metal to invest this year(2017).

The proposed extent of the thesis

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- Gotthelf, P. (2005). Precious Metals Trading. 1st ed. New York, NY: John Wiley & Sons.
- Persons, R. (1974). The investor's encyclopedia of gold, silver, and other precious metals. 1st ed. New York: Random House.
- Spurga, Ronald C. Commodity Fundamentals: How To Trade The Precious Metals, Energy, Grain, And Tropical Commodity Markets. 1st ed. Print.

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The Bachelor Thesis Supervisor

Ing. Petr Procházka, Ph.D., MSc

Supervising department

Department of Economics

Electronic approval: 13. 3. 2017

prof. Ing. Miroslav Svatoš, CSc.

Head of department

Electronic approval: 13. 3. 2017

Ing. Martin Pelikán, Ph.D.

Dean

Prague on 13. 03. 2017

Declaration

I declare that I have worked on my bachelor thesis titled "Economic Analysis of Gold, Silver, and Platinum." by myself and I have used only the sources mentioned at the end of the thesis. As the author of the bachelor thesis, I declare that the thesis does not break copyrights of any third person.

In Prague on 14.03.2017

Nadezda Kiseleva

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Ekonomická Analýza Zlata, Stříbra a Platiny.

Economic Analysis of Gold, Silver, and Platinum.

Souhrn

Vzácné kovy se objevují již od historie až po současnost. Navíc některé, jako například zlato, stříbro či platina, měly stejnou funkci po tisíciletí, jako mají dnes. Vyskytují se jak v různých průmyslech tak v investicích.

Teoretickou část jsem zaměřila na definici drahých kovů, jako je zlato, stříbro a platina. Jejich nabídka, poptávka po nich, segmentace, investiční příležitosti a historie byly popsány v této bakalářské práci.

Praktickou část jsem věnovala nahlížení na zlato, stříbro a platinu jako hodnotný nástroj pro investici, analýze cen zlata, stříbra a platiny mezi lety 2007-2017, nalezení jejich výhod a nevýhod a výpočtu zisku z investic v daném období.

Výsledkem je mé zjištění, že zlato je nejlepší drahý kov k investici v současnosti (nejvýnosnější), a to díky různým faktorům, například ekonomická nestabilita ve světě, zvyšující se poptávka po něm, například v klenotnictví či elektronice, kde se zlato pořizuje jako pojistka proti inflaci..

Klíčová slova: vzácné kovy, zlato, stříbro, platina, investice.

Summary

Precious metals have been around for a long time during history and nowadays. Moreover, some of them, such as gold, silver and platinum are accomplished the same function nowadays as they have been for thousands of years. They are involved in various industries and investment.

In the theoretical part, I focused on the definition of precious metals, such as gold, silver and platinum. Their supply, demand, segmentation, investment opportunities and history were described in this bachelor thesis.

In practical part, I observed gold, silver and platinum as a type of effective instrument for investment, analysing prices of gold, silver and platinum during the 2007-2017 years, finding their advantages and disadvantages, and calculating return on investment values during this period.

As a result, I figured out that gold is the best precious metal to invest nowadays (most profitable), due to particular factors, such as economic uncertainty in the world, growing demand for consumer goods, such as jewellery and electronics, desire to purchase gold as a hedge against inflation.

Key words: precious metals, gold, silver, platinum, investment.

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List of abbreviations

- **EO** Ethylene Oxide
- **ETF** Exchange Traded Funds
- **ETFs** Exchange – Traded Funds
- **EUR** Euro
- **GBP** British Pound
- **GLD** Gold
- **IOSCO** International Organization of Securities Commissions
- **LBMA** London Bullion Market Association
- **LME** London Metal Exchange
- **LPPFCL** London Platinum and Palladium Fixing Company Limited
- **PALL** Palladium
- **PAMP** Produits Artistiques de Métaux Précieux
- **PGM** Platinum group metals
- **PPLT** Platinum
- **ROI** Return on Investment
- **SLV** Silver
- **USD** United States Dollar

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1. Introduction

Precious metals are the type of metals that are considered to be limited or have a high economic value. The higher approximate values of these metals depend on various factors including their scarcity, usage in industrial processes and as investment vehicles.

Gold, platinum, and silver have historically been admired and valued for their beauty and uniqueness. These metals are widely used in the industrial sector of the economy, and they are better known for their usage in jewellery, fine jewellery, art and coining.

The demand for precious metals is not only driven by their practical use in a particular industry but also it depends on their function as an asset that can be saved, exchanged, retained and invested with the expectation to get a return in the future. The most attractive precious metals among investors are gold, silver and platinum.

The aim of this thesis "Economic analysis of gold, silver and platinum" to determine the optimum use of given precious metals, including their comparison in achieving specific objectives.

These objectives are:

- Analyse gold, silver and platinum as specific assets for investment
- Find out their advantages and disadvantages as an investment instrument with the help of comparison of their rate of profit.
- Analyse opportunities to invest for each precious metal(gold, silver and platinum)
- Based on findings and research determine the most profitable precious metal among gold, silver and platinum for investment nowadays and make recommendations for investors based on these research.

The first part of the work (theoretical part) deals with the description of each precious metal, including information about its demand, supply, historical and future price development and conditions, which affect its price, opportunities of trading and investment.

The second part includes analysis of the latest indicators to determine, how to invest in gold, silver and platinum and find out what is the best and most profitable precious metal to invest this year. Recommendations for potential investors will be formulated according to the rate of return of each metal.

2. Objectives and Methodology

2.1 Objectives

Objectives of the thesis are:

1. Analyse gold, silver and platinum as specific assets for investment;
2. Find out their advantages and disadvantages as an investment instrument with the help of comparison of their rate of profit;
3. Analyse opportunities to invest for each precious metal(gold, silver and platinum);
4. Based on findings and research determine the most profitable precious metal among gold, silver and platinum for investment nowadays and make recommendations for investors based on these research.

2.2 Methodology

The first part of the work (theoretical part) deals with the description of each precious metal, including information about its demand, supply, historical and future price development and conditions, which affect its price, opportunities of trading and investment.

The second part includes analysis of the latest indicators to determine, how to invest in gold, silver and platinum and find out what is the best and most profitable precious metal to invest this year. Recommendations for potential investors will be formulated according to the rate of return of each metal.

3. Theoretical Part

3.1 Precious metals

Precious metals are metallic elements, which are rare and have high economic value. They are naturally obtained from earth extracts, also characterised by high lustre. Precious metals are primarily used in industry as raw materials and for the purpose of investment. Gold, silver and platinum are considered to be most precious metals. Platinum group metals include ruthenium, iridium, platinum, osmium, palladium, and rhodium.

3.1.1. Segmentation of precious metals

Segmentation of precious metals market based on a type of metal: gold, silver, platinum, and others. Gold is considered to be dominating metal segment across the world. Silver is in the second place in a global market.

Main segments for precious metals:

Gold

- Jewelry
- Electrical products
- Dentistry
- Financial asset

Silver

- Jewelry
- Industrial and electronic
- Photography
- Coinage
- Medical
- Financial asset

Platinum

- Autocatalyst
- Petroleum and plastics
- Jewelry
- Dentistry and medicine

- Financial asset¹

Geographical segmentation of global precious metals market includes North and Latin America, Europe, Asia-Pacific, and the Middle East & Africa. These regions may provide and support the demand for precious metals in the market.²

3.1.2. Precious metals in economy

Long before the currency was introduced into the world economy, people relied on bartering to obtain the things to satisfy their needs. Civilised producers and consumers traded goods and services, but the trade did get troublesome.

To make commerce a little easier, buyers and sellers decided that they should use something as a currency, and that currency should be convenient and compact and widely accepted all over the world as a unit of transaction. The chosen currency needed to be something that performed the role of money. The solution was found - precious metals - entities that have been treasured for their beauty and rarity. Gold, silver and platinum came to be recognised as precious, valuable, across the world dating back to the ancient times and nowadays .

For centuries, certain precious metals, such as gold, silver and platinum have been considered as a store of a valuable resource, as the main exchange attribute, and as a central unit of account. In periods of economic instability, crises or financial market displacement, investors have sometimes increased high-risk portfolio to precious metals. From a long-term perspective, precious metals have commonly been considered a secure fence against inflation in the general price level.

Precious metals have fundamental supply-and-demand characteristics. Precious metals have a tendency to be considered as a class of assets, which has diversification properties that can

¹ Darst, David M. Portfolio Investment Opportunities In Precious Metals. 1st ed. Hoboken, New Jersey: Wiley, 2013. Print.

² "Precious Metals Market Is Segmented Based On Type As Gold, Silver, Platinum, And Others - Openpr". *Openpr.com*. N.p., 2016. Web. 7 Dec. 2016.

develop the risk-reward parameters of an investment portfolio. This trend happens because of precious metals' low correlations of returns with the majority of assets.³

3.1.3. Precious metals markets

Prices of precious metal depend on both long-term and short-term factors. Platinum, gold and silver supply, for the most part, depends on the quantity demanded by industrial users. Demand, alternatively, has a direct relationship with the well-being of the economy. Taking into consideration the long-term factors, prices of precious metals will go up if industrial activity increases, and go down if industrial activity decreases.

In a period of economic instability, investors try to speculate with gold and silver instead of bond and equity markets; their aim is to avoid risk or minimise it.⁴

For example, the precious metals such as silver and gold showed the strongest stability of any other assets during the Global Financial Crisis also known as the 2008 Financial Crisis, by many financial experts it is considered to have been the worst financial crisis since the Great Depression, which was in the 1930s.⁵

3.1.4. Investment in precious metals

The role of investment in precious metals in the financial market is measured by analysis of data, which is updated daily. These financial data reports that gold, silver and platinum have some hedging probability and can provide diversification within broad investment portfolios. These portfolios perform much better than standard equity portfolios.

Investing in precious metals has been very attractive possibility to get a profit though thousands of years. Gold, silver and platinum are three primary metals to invest. Their

³ Mladjenovic, Paul. *Precious Metals Investing For Dummies*. 1st ed. Hoboken, N.J.: John Wiley & Sons, 2013. Print.

⁴ Hillier, David, Paul Draper, and Robert Faff. "Do Precious Metals Shine? An Investment Perspective". *Financial Analysts Journal* 62.2 (2006): 98-106. Web. 16 Nov. 2016.

⁵ Eigner, Peter and Thomas S. Umlauf. "The Great Depression(S) Of 1929-1933 And 2007-2009? Parallels, Differences And Policy Lessons". *SSRN Electronic Journal* n. pag. Web. 9 Dec. 2016.

demand has increased all over the world, and as a result, their price has risen over the past several years.

We should not associate precious metals only with coining and jewellery because they also have a contribution to the industry and financial sector. For instance, gold is a primary element in the electronic devices industry; platinum can be found in medical equipment and computers.⁶

As for financial sector, investment in precious metals means stability. There are a large number of reasons why precious metals like gold, silver and platinum remain stable, secure and while other items are quite unstable. Firstly, precious metals are valuable, meaning that they contain something people find value in. No matter what is the economic condition in a certain period, people will always find value in precious metals and will buy them.⁷

Ways to buy precious metals:

- 1) Mutual funds and stocks holding shares in mining companies;
- 2) Exchange Traded Funds (ETF) that hold bullion:
 - a) Gold SPDR (GLD)
 - b) Platinum (PPLT)
 - c) Palladium (PALL)
 - d) Silver (SLV);
- 3) Antique coins ;
- 4) Newly minted coins:
 - a) Gold: American Eagle, Canadian Maple Leaf, Vienna Philharmonic, South African Krugerrand, British Sovereign, Mexican Gold 50 Pesos, U.S. Mint 24K Gold Buffalo;

⁶ Sanibel, Michael. "Investing In Precious Metals". *Forbes.com*. N.p., 2010. Web. 17 Sept. 2016.

⁷ "Why Should I Buy Precious Metals Like Gold And Silver Bullion?". *Providentmetals.com*. Web. 12 Dec. 2016.

- b) Platinum: American Eagle, Canadian Maple Leaf
 - c) Silver: Canadian Silver Maple Leaf, Austrian Vienna Philharmonic, Silver American Eagle, Austrian Vienna Philharmonic;
- 5) Bullion bars are produced by some government mints, as well as private companies such as Johnson Matthey, Sunshine Minting, Wall Street Mint, Credit Suisse, Engelhard, Produits Artistiques de Métaux Précieux (PAMP) and Pan American Silver.⁸

3.2 Gold

Gold is one of the most flexible, adaptable, useful, non-destructive, shining, and beautiful of precious metals created by heat, air and moisture. This unique set of qualities has made gold the most valuable metal for most of human history in almost every civilisation. Hundreds of papers have been written on gold as an investment and money, a store and source of value.

It is almost impossible to “destroy” gold because the vast majority of all this metal ever mined still exists. Gold is involved in the production of jewellery, coins, medals, technical equipment; some of it is saved up; and some are situated in government hands. Saving of gold or in other words Hoarding is common practice in many countries due to the fact has an ultimate standard of value in times of economic difficulties, such as inflation, depression, unrest.⁹

3.2.1. History of gold

The first proof of gold dates back to the year 3,600 BC. Individuals were making gold coins by 600 BC.

People have always robbed gold from other nations. The Vikings marauded monasteries in Europe. The Incas and Aztecs also had gold - until they were vanquished by the Spanish.

⁸ Sanibel, Michael. "Investing In Precious Metals". *Forbes.com*. N.p., 2010. Web. 17 Sept. 2016.

⁹ O'Connor, Fergal A. et al. "The Financial Economics Of Gold — A Survey". *International Review of Financial Analysis* 41 (2015): 186-205. Web. 7 Oct. 2016.

The New World gave Spain massive amounts of treasure. In the 16th century, 150,000 kilogrammes of gold and 7.4 million kilogrammes of silver were shipped to Spain.

People have tried to speculate gold from different countries. The Vikings plundered religious communities in Europe of jewellery made of gold. Until the Aztecs and the Incas were conquered by the Spanish, they also had gold. The New World gave Spain enormous amount of treasure. In the 16th century, 7.4 million kilogrammes of silver and 150,000 kilogrammes of gold and 7.4 million kilogrammes of silver were sent to Spain.

Gold rushes took place in the history of precious metals. If somebody found gold, a large number of people ran to the zone trying to make a fortune. In 1695, gold was discovered in Brazil. Another source of gold was found in 1719. This fact drove many individuals to settle down in Brazil. James Marshall sought out gold in California In 1848. News about this finding achieved New York in December 1848. As a result, thousands of people went to California. Other gold rushes occurred in the USA when gold was found in Idaho in 1860, Colorado in 1858, in South Dakota in 1874, and in Montana in 1862.

Gold was discovered in Australia. In 1871, gold was found close to Darwin and thus the settlement flourished. In 1892, the number of inhabitants in Western Australia increased, because of the gold rush. In the meantime, gold was found in South Africa in 1885. In 1896, gold was discovered in the Yukon, Canada.¹⁰

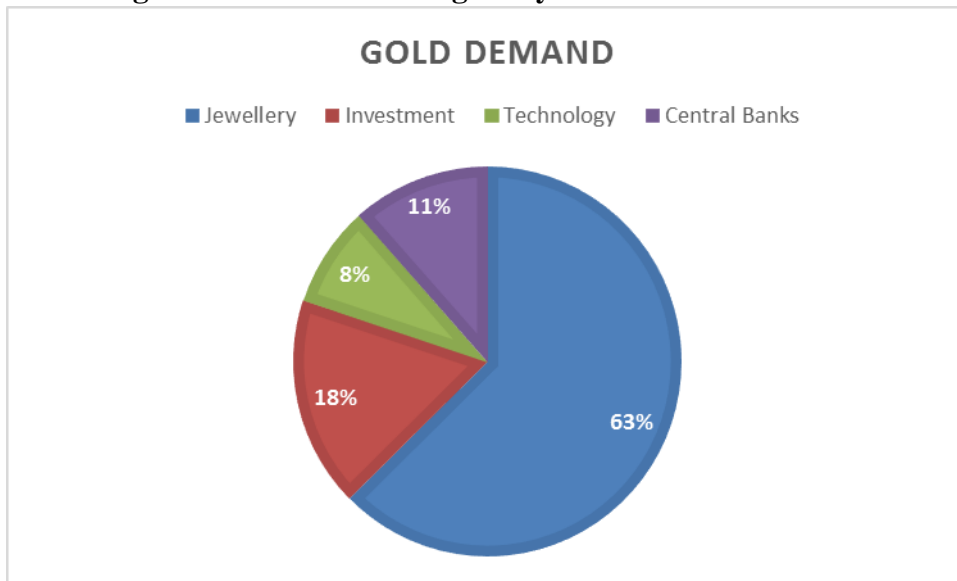
3.2.2. Gold demand

Gold demand-the total consumption of jewellery (63%), investment(18%), technology manufacturer(8%) and net purchases by central banks (11%).¹¹ **(Figure No. 1)**

¹⁰ Del Mar, Alexander. *A History Of The Precious Metals*. 1st ed. Provo: Reprinted publ., 2014. Print.

¹¹ "Interactive Gold Market Charting | World Gold Council". *Gold.org*. N.p., 2016. Web. 21 Sept. 2016.

Figure No. 1: Demand of gold by sector



Source: Own figure based on: "Interactive Gold Market Charting | World Gold Council". *Gold.org*. N.p., 2016. Web. 21 Sept. 2016.-

On the free world market prices and price change of gold are not accidental, they are determined by powerful economic and psychological forces that continuously and slowly change. These powerful forces must be identified and evaluated regularly, to predict price trends efficiently.

There are two main factors, influencing the price, they are supply and demand. The demand for gold depends on the aggregate consumption of it.

The categories of demand for gold are:

- Assets used for investment and hoarding
- Manufactured products taking a broad range of forms.¹²

The table below represents the gold demand for each category and total physical demand in 2006-2015.

¹² "Gold Demand In A Global Market | World Gold Council". *Gold.org*. N.p., 2016. Web. 21 Sept. 2016.

Table No. 1: Demand of gold (200-2015)

Demand	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Jewellery	2,334	2,458	2,338	1,849	2,064	2,064	2,036	2,470	2,242	2,166
Industrial Fabrication	482	489	475	423	476	468	425	418	399	361
...of which Electronics	334	341	331	291	342	339	303	296	285	253
...of which Dental & Medical	61	58	56	53	48	43	39	36	34	32
...of which Other Industrial	87	89	89	79	86	86	84	85	79	76
Net Official Sector	-365	-484	-235	-34	77	457	544	409	466	483
Retail Investment	429	437	924	844	1,231	1,572	1,356	1,790	1,101	1,115
...of which Bars	237	237	667	561	944	1,245	1,050	1,408	851	851
...of which Coins	192	200	257	283	287	326	305	382	251	263
Physical Demand	2,880	2,899	3,501	3,082	3,848	4,560	4,361	5,087	4,207	4,124

Source: O'Connell, Rhona, William Tankard, and Kameron Alexander. *GFMS Gold Survey*. London: Thomson Reuters, 2016. Print.

The example of manufactured product is jewellery, which is sometimes bought more for investment than adornment. Gold is also a critical element in many industrial processes, primarily in the field of electronics. Gold is additionally utilised as a part of medicine, in dentistry, and in the intelligent glass. Organic chemists utilise gold to bond with compound materials in the process of creating drugs, and genetic specialists utilising gold to investigate and study the genetic material of cells.

Gold jewellery is considered as an investment in different parts of the world, especially in Asia and the Middle East. In this manner, in these districts, demand for gold jewellery is not very price sensitive and can even rise by cost growth.

Physical gold demand is mostly based on jewellery, around 70 percent demand for manufacture, around 23 percent for industrial users and around 7 percent for dental usage. Various elements without a doubt have an impact on gold demand. Substitutions of different metals, if they are less costly, will be used in a few spheres if buyers are not satisfied with high gold costs. War or the threat of war usually, creates the gold demand.

In any case, gold demand ought to depend on a financial situation in particular country. For instance, wide variances in foreign exchange rates drive gold demand by blending doubt of paper currencies. Uncontrolled swelling, sustained by higher oil costs or a developing equalisation of instalment shortfalls would increase the gold demand. Alternately, monetary situation improvement would decrease the demand for gold.

The potential effect that gold contributing, estimating, and accumulating can have on the techniques for measuring the demand. To accentuate opposite relations between trends in gold and the stock market, it is possible to compare their trends. The justification for this approach is that gold is a definitive support. In times of recession, depression, or developing inflation demand for gold is high, and it becomes lower in times of relative success.

Another way to deal with measuring gold demand is to treat general product price trends as markers of gold demand trends. The foresight is that a significant upturn in product markets will empower fears of inflation what's more, the demand for gold will be higher.

Overall, research affirms that demand for gold is for sure impacted by fiscal and passionate contemplations, when fear of inflation is the best motivation.¹³

3.2.3. Gold supply

Gold production is spread everywhere throughout the world with China being the biggest supplier at 15% and Asia overall produces 22% of the world's aggregate production. Central and South America represent 17% of North America - 15%. Africa contribute 20% and the former Soviet Union C.I.S region 14%. Incredibly gold reusing represents 33% of the aggregate production.

In 2012, China turned into the greatest producer of gold on the planet. In 1990, the Chinese Government changed laws making it less demanding to purchase gold and demand was booming, additionally investment in bars and coins as the economy developed went from 12 tonnes in 2004 to 397 tonnes in 2013.

There was additionally another reason why the production rose to cope with the demand, and this was an adjustment in living condition since 1980 an expansion of 20% of the number of inhabitants in China lived in urban areas. Wealth per capita expanded and as a result, the demand increased.

¹³ Spurga, Ronald C. *Commodity Fundamentals: How To Trade The Precious Metals, Energy, Grain, And Tropical Commodity Markets*. 1st ed. Print.

South Africa can be an example how gold production may decay. In 1990 South Africa produced near 350 tonnes of gold, by 2015 it had decreased to 50 tonnes. The reduction of gold holdings in the country was one of the reasons for this decay. The gold mines needed to work harder to produce the valuable mineral and the expenses for mining regarding wages and utilities climbed forcefully. There was a disregard from the government in investment. Private partnerships and corporations needed to discover top types of innovation to find gold deposits, in this manner production declined quickly.¹⁴

The yearly aggregate supply of gold has average around 4,000t in the recent 10 years. (**Table No. 2**)¹⁵

Table No. 2: Supply of gold (2006-2015)

(tonnes)	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Supply										
Mine production	2,497	2,498	2,427	2,608	2,734	2,829	2,850	3,042	3,131	3,158
Scrap	1,189	1,029	1,387	1,764	1,744	1,705	1,701	1,303	1,158	1,173
Net Hedging Supply	-434	-432	-357	-234	-106	18	-40	-39	104	-24
Total Supply	3,252	3,095	3,457	4,138	4,372	4,552	4,511	4,306	4,394	4,306

Source: O'Connell, Rhona, William Tankard, and Kameron Alexander. *GFMS Gold Survey*. London: Thomson Reuters, 2016. Print.

3.2.4. Gold production

While many will know that gold is sourced from the earth through the process of mining, this is not the only method in which gold is provided to the market. The sum of mine creation and net maker supporting is the total mine supply. It represents 66% of aggregate supply. Reused gold is the remaining third.

Mine production

There are various sources of mine production. People in hard hats, working underground, often appears in mind when we think about gold mining. However, mining the ore is just one stage in a long and complicated process. Long before any gold can be extracted, significant exploration and development need to take place, both to find out, as strictly as

¹⁴ "Top Gold Producing Countries In The World". *WorldAtlas*. N.p., 2017. Web. 1 Mar. 2017.

¹⁵ O'Connell, Rhona, William Tankard, and Kameron Alexander. *GFMS Gold Survey*. London: Thomson Reuters, 2016. Print.

possible, the size of the deposit as well as how to extract the ore efficiently, safely and responsibly. On average, it takes between 10-20 years before a mine is even ready to produce material that can be refined.

Exploration

Investigating of gold is a complicated procedure. It requires a lot of time, financial assets and competence in a few disciplines, for example, chemistry, topography, geology, and engineering. Still, after all that, the probability for a mine advancement is low. Just around 10% of extensive gold deposits contain enough gold to mine.

Development

The stage of development includes the preparation and creation of the mining project. Mining organisations must acquire proper permits and licenses before they can start to construct. This procedure will take quite a long time, despite the fact that this process can depend on particular factors, for example, location, regulations and ore preparing needs. Development may not be bound to the mine itself. Mining companies create and develop local foundation and facilities to support both operational requirements, and employee welfare.

Operation

When development is finished, the mining project will start to operate. This act includes removing metal-rich ore from the deposit. Metal that has been extracted will require additionally preparing at a refinery to recover the gold (and other significant minerals). Mining companies will utilise stringent controls to guarantee high standards of wellbeing and security, and additionally minimising environmental effects.

Decommissioning & Closure

After a mine has stopped operations, because the ore is exhausted and remaining deposit becomes unprofitable, then work focuses on withdrawing (someone or something) from servicing (decommissioning) and reclamation. What's more, the closure of a mine is an intricate process. A mining organisation will likewise be required to protect the mine site long after the mine site has been closed to guarantee that the restoration of the land is adequate.

Producer hedging

Sometimes when gold producers should secure a future cost for their gold – for example, they can ensure a proper return to their present costs of production. In the short-term period, the gold sold into the market adds to supply. Mining organisations can offer metal ahead of their production plans because in the short-term period the gold marketed adds to supply.¹⁶

Recycled gold

Gold sourced from manufactured items that have been sold or made to be purchased, which is converted into bullion. This particularly about the gold, which is sold for cash. It does exclude gold exchanged for other gold items (for instance, by customers at jewellery stores) or process scrap (working gold that never turns out to be a piece of a created item but returns as scrap to a refiner). Around 90% – reused or recycled gold is considered to be the high-value gold (jewellery) and the rest of gold renewed from industrial waste, including computers, cell phones.

Gold is recoverable from a significant portion of its usages and can be liquefied, and recycled. Reused gold has a vital influence on the gold market. While production of a gold mine is moderately inelastic, the gold recycling industry gives a constant supply of gold when it is required, to stabilise the price of gold.¹⁷

3.2.5. Investment in gold and trading

There are two major categories of private investment in gold:

- 1) The physical ownership of gold, including purchasing gold bullion for speculation or investment, which happens mainly in Europe, or small bars of gold, which is popular in the Middle East and Asia.
- 2) Paper transactions, which are limited to gold mine securities and futures markets.

¹⁶ "Gold Supply - Mining & Recycling | World Gold Council". *Gold.org*. Web. 19 Sept. 2016.

¹⁷ Hewitt, Alistair. "The Ups And Downs Of Gold Recycling | World Gold Council". *Gold.org*. N.p., 2015. Web. 18 Sept. 2016.

Futures gold contract is a legitimately restricting instrument to purchase or offer an assigned amount of gold at a particular time in the future, at a price established today. To reach an agreement, a purchaser or seller is required by the brokerage firm to give a security deposit mostly called margin, which regularly is under 10 percent of the agreement's value. These security deposits control a lot of money at a small cost.

If the brokers receive a symbolic commission fee, they should perform all purchases and sales of future contracts. The method of opening an account and entering a request is very simple. It is not any harder to purchase or sell gold futures contracts than to buy or sell securities.

A trader has two alternatives once has taken a position in the market by purchasing or offering at least one contract:

- 1) Keep up the place until the agreement matures and after that obtain or make delivery;
- 2) Counteract the contract before maturity by assuming a position equivalent and inverse to the original trade. If a merchant initially got one gold contract, he (or she) could exchange or counteract by offering that agreement.

If he initially sold an agreement, he could counterbalance by getting it back. In both cases, his exchange must be made for a similar transfer month and on the same trade as the first contract. About 97% of all obligations are counterbalanced in this way, as opposed to delivery.

The motives for active participation in the market are obviously different. Hedgers utilise the market primarily as an instrument for marketing and to protect price for inventory of gold, which they sell or buy in the future, but they establish this price today. A hedger - is somebody who is engaged in the physical creation, preparing or advertising of a real commodity, in this case, gold.

Gold futures are used by hedges as financial management instrument. Appropriate utilisation of the market can help him to hold the balance in income liberating capital, diminishing acquisition costs, guaranteeing contract commitments, and giving flexibility in the timing of buys and sales.

There is a big difference between hedgers and speculators. Hedgers in the gold market may incorporate smelters, mines, gold storage, gold fabricators, and users in the industrial sector, who utilize fabricated gold. A speculator does not have any relationship with a physical commodity. His responsibility is to observe price changes only. He is inspired by the potential for making a profit from unpredictability in prices of the product. He utilises his risk capital to purchase futures when he believes they will increase in price and sell them when they decrease. His participation in the market gives hedgers an opportunity to trade at a low cost. Both the speculator's and hedger's performances are fundamental and essential for each other and for the productive work of a futures market.

If the futures market does not maintain any economic function for the hedger, there is no need for it to exist. As a result, there is no one to accept the risk of the hedger. Therefore, market will not exist. Together, they give the required liquidity to easy entry and egress from the futures markets. Speculators, invest their resources into the market planning to get a profit from this investment. Their purpose is to be in a favourable or superior position take advantage of price fluctuation. These changes depend on inflation rate, political situation in the world, value of paper money disintegration an interruption or decomposition of Middle East oil supplies to importing countries.¹⁸

3.3 Silver

Silver is an exceptionally flexible, pliable chemical element. Elastic, white, and shiny, silver has the most astonishing electrical conductivity of any precious metal and the highest thermal conductivity of any metal. Silver has for some time been esteemed as a valuable metal, utilised as a part of coins, jewellery, art, photography, and sifferent industries.

Silver is the white metal, attractive for its utilisation in coins and jewellery, but nowadays, silver is mostly used in industry. For instance, in mobile phones or panels designed to absorb the sun's rays as a source of energy.

Silver is a valuable precious metal, and it is considered to be a high-quality metal for the reason that it resists erosion and oxidation; however it is inferior to gold.

¹⁸ Spurga, Ronald C. *Commodity Fundamentals: How To Trade The Precious Metals, Energy, Grain, And Tropical Commodity Markets*. 1st ed. Print.

Silver is a perfect material for electrical applications because it is the best electrical conductor of a large number of metals. It is very usable on pharmacy, due to its clean and non-toxic characteristics.

Its high gloss and reflectivity make it ideal for jewellery and mirrors. Its ductility, which permits it to be straightened into sheets and permits it to be drawn into thin, elastic wire, these qualities make silver suitable for different industrial applications.

Since it is more abounding, silver is considerably less expensive than gold. Silver can be transformed into glue, ground into powder, shaved into pieces, remade into salt, levelled into printable sheets, installed into wires or even utilised as a catalyzer. These qualities guarantee that silver will keep on shining in the mechanical field, but it remains to be an image of riches and status because of its long history in jewellery and coinage.

There are other segments, where silver is used:

- Energy
- Brazing and Soldering
- Chemical Production
- Coins and Investments
- Jewellery and Silverware
- Photography
- Medicine¹⁹

3.3.1. History

It is considered the truth that the mining of silver began around 5000 years ago where now Turkey is situated. Early civilisations in the Middle East and Greece utilised silver for trade. What's more, it helped these cultures to prosper. The other significant point of interest in the utilisation of silver came when the first Spanish triumphs achieved the Americas, then known as the New World. What is currently North and South America was mined widely,

¹⁹ Claire Ferré, Emily. "Uses Of Silver In Electronics, Coins, Jewelry, Medicine". *Geology.com*. Web. 18 Oct. 2016.

and silver had an immense influence in this. Peru, Mexico and Bolivia turned into the global powerhouses for the production and exchange of silver.

The presentation of new mining and drilling methods have made the production rise significantly further. The expansion began during the Second World War, however. This event happened because the lack of copper made people find other alternatives.

Also, silver is the metal that they chose. This was the first occasion when silver had been utilised widely for various industrial purposes.²⁰

3.3.2. Silver demand

Silver jewellery production was expanding during last three years the highest value was 226.5 Moz. This expansion (16 percent rise) was achieved to a great extent accomplished by both India and Thailand, while North America had only a 5 percent yearly increase. This progress was partly offset by a considerable decrease in Chinese jewellery production. Total production of silverware estimated 62.9 Moz -the 3rd successful annual rise.

Industrial applications are the largest part of physical silver demand, which represented 50 percent of aggregate physical silver demand last year, totally 588.7 Moz, which was 4 percent lower. This decline was generally because of lower industrial demand in developing countries and a world economy. The United States and Japan are the second and third biggest countries of industrial demand, respectively. Last year use of silver in electronics reduced by 10 percent to 246.7 Moz, because of slower economic progress in developing countries.

There were a few peaks inside the industrial segment. Demand for silver rose to 23 percent in 2015, 77.6 Moz were used for photovoltaic applications. Denoting the second successful year in this area of production, determined by extensive development in Chinese solar panel establishments. Silver demand for ethylene oxide (EO) increase an incredible 103 percent to 10.2 Moz. GFMS calculates that 137.5 Moz of silver existed in EO plants all over the world in 2015, equal to 16 percent of a year ago's silver mine production.

²⁰ Del Mar, Alexander. *A History Of The Precious Metals*. 1st ed. Provo: Reprinted publ., 2014. Print.

Silver's utilisation in brazing and soldering decline by 5.0 Moz and demand for photography by 4 percent a year ago. The speed of decrease in photography goes down significantly, to its minimum rate since 2004, as digital innovation in the photography industry approaches maturity.²¹

3.3.3. Silver supply

Silver is the most plentiful of the metals. Its world production in 2003 of 883.1 million ounces was slightly more than 2004's 879.2 million ounces.²²

Because it is tough to find silver isolated in ores, it is mined as a by-product metal with lead, copper, or zinc. The supply and cost of raw silver are affected by the demand for by-product metals. There is one more important source of silver - the amelioration of silver waste, particularly from the photographic industry. Other different sources contain both foreign and domestic assets by people and governments. To use silver as an industrial or precious metal, it has to go through difficult preparation procedures.

Silver from metal that is free of other mineral contaminants experiences a cyanide process created in the 19th century in which crushed into pieces silver ore is added to lime to make an alkali. A solute of sodium cyanide and water is then added to this mix, and different chemical reactions occur to filter off the silver from the solute.

The production rate of silver depends on various factors, such as usage of this metal in industry, the production rate of by-product metals, new potential ways to use silver in such spheres as medicine, for instance.²³

It is crucial to know which country has the most silver is essential for various reasons. The most important thing, by knowing the geographical segmentation of silver, investors can analyse their opportunities. For instance, if an investor knows that a particular country has

²¹ "Silver Demand | The Silver Institute". *Silverinstitute.org*. N.p., 2016. Web. 18 Oct. 2016.

²² Spurga, Ronald C. *Commodity Fundamentals: How To Trade The Precious Metals, Energy, Grain, And Tropical Commodity Markets*. 1st ed. Print.

²³ Darst, David M. *Portfolio Investment Opportunities In Precious Metals*. 1st ed. Hoboken, New Jersey: Wiley, 2013. Print.

a powerful silver maker, they should think about putting their investments into silver organisations working in that country.

An investor will have a little luckiness if he or she follow this strategy. A valid example: Mexico was the world's biggest silver maker in 2016, this country has a mining-friendly condition, many silver organisations or companies consider that it is possible to explore and mine in this nation successfully.

These are other countries, where indicators in silver mining are high:

- Mexico

Mine production: 5,600 MT

- Peru

Mine production: 4,100 MT

- China

Mine production: 3,600 MT

- Chile

Mine production: 1,500 MT

- Australia

Mine production: 1,400 MT

- Poland

Mine production: 1,400 MT

- Russia

Mine production: 1,400 MT

- Bolivia

Mine production: 1,300 MT

- United States

Mine production 1,100 MT²⁴

3.3.4. Investment in silver

Trading in silver means that you are concerned about demand and supply movements in the world. If there is an open interest and significant trading volume, silver trading is allowed to be done.

Obviously, to make your trading successful, you need to observe the price history of silver. The historical background of silver recommends that costs have a tendency to stay in thin groups for a long time and intermittently break out in sudden.

A market is a place where investors have lost and made fortunes. If you wish to be a speculator in this sphere, it might be reasonable to utilise stop-losses and additionally to support your position through alternatives or some other instrument to abstain from getting on the wrong side of one of those sudden silver value surges.²⁵

There are the number of options to add silver to the investment portfolio:

- Bullion: Silver in the shape of bars that are at least 99.9 % pure.
- Official Coins: Government mints issue silver coins.
- Medallions: A round piece of silver similar to coin but not considered legal tender. Governments or private mints may issue medallions.
- Certificates or Storage Accounts: Silver is stored, but the investor can possess within a few days if desired.
- Accumulation Plans: This approach allows investors to aggregate silver on a regular basis, like dollar cost averaging. The investor does not hold the physical silver.
- Futures and Forward Contracts: An arrangement made on a trade to take or make delivery of silver at a set date later on.

²⁴ Barrera, Priscila. "Top Silver Production By Country | Investing News". *Investing News Network*. N.p., 2017. Web. 1 Mar. 2017.

²⁵ Darst, David M. *Portfolio Investment Opportunities In Precious Metals*. 1st ed. Hoboken, New Jersey: Wiley, 2013. Print.

- Options: The right, not the obligation, to purchase or sell silver on a stated date in the future.
- Exchange Traded Fund: Equities linked to silver, for example, the physical metal, producers or refiners, etc.
- Mutual Funds: An open-ended fund with a basket of silver-related assets that are priced one time per day.

After you and your financial consultant have chosen that purchasing silver is a good strategy for your portfolio, you ought to pick the silver investment vehicle that is suitable per your choices.

In any investment, you ought to judge the benefits of your silver speculations as they relate to your investment needs. These are advantages and disadvantages of 3 types of investment, which were listed above.

Exchange – Traded Funds (ETFs)

Advantages:

For investors who look for the introduction to the physical silver market, but who do not want to pay direct insurance, assay, and capacity costs, ETFs offer an option. They have significant exchange listings and trade like equities. Investors can purchase shares in a trust that possesses the silver bullion.

Disadvantages:

The ETFs are made to reverse the cost of the silver, the market price and the price of silver can be unpredictable on any trading day.

Silver Bullion Bars of Approved Refiners

Advantages:

- Least expensive type of investment
- Convertible into cash
- Internationally negotiable

Disadvantages:

- Must be stored securely
- Yields no interest

Silver Mining Stocks

Advantages:

- Offers opportunities for capital appreciation
- Dependent on the company's management and strength of its operation
- Can yield a dividend

Disadvantages:

- May require greater investment than small physical bullion buying
- May require a knowledge of equity market.²⁶

3.4 Platinum

Platinum is a white, silver metal, it is the heaviest of the precious metals, weighing twice as much as gold. It is thick, malleable and impenetrable to erosion. Platinum is very expensive uncommon metal, and it has a high melting point. These qualities, also with its chemical stability, make platinum and platinum group metals very useful in wide variety of industries.²⁷

Platinum is a perfect choice for the crafting of fine jewellery, because of its colour, which combines well with gold, and its resistance to dimness and usage.²⁸

3.4.1. History

Platinum is considered to be a new type of precious metal. This precious metal was first mentioned about 500 years ago in the 16th century. The Spanish tended to consider platinum to be a poor interpretation of gold, but they got the wrong opinion. In the 18th century, Charles Wood discovered a fragment of platinum in Jamaica. Before this occasion, any

²⁶ "Investment Options | The Silver Institute". *Silverinstitute.org*. Web. 1 Dec. 2017.

²⁷ "Applications - PMM". *Platinum.matthey.com*. Web. 1 Dec. 2016.

²⁸ "Why Is Platinum So Expensive?". *International Precious Metals*. Web. 5 Nov. 2016.

testing and research wasn't done. William Brownrigg then introduced his discoveries to Royal Society.²⁹

3.4.2. Platinum demand

Platinum is one of the unique metals on the planet with unique physical qualities, making it highly esteemed over various demand segments.

There are four main segments of platinum demand:

1) AUTOMOTIVE

Platinum is a fundamental component of reducing vehicle emission now and in the long term.

Platinum demand from auto catalysts is equal to 37-42% of aggregate demand in the recent five years. Platinum's excellent conductive and catalytic properties in fuel transform hydrogen and air into water pricing power for electric autos.

2) INDUSTRIAL

Platinum's usage in industrial sector represents between 18–24% of aggregate demand in the recent five years.

This precious metal is necessary for vessels that hold and shape glass for liquid crystal displays and other different applications

Platinum is included in hard disks production for tablets and servers supporting storage.

Platinum additionally supports various electronic applications in autos.

3) JEWELLERY

Global demand for jewellery has been between 31–38% of the aggregate platinum demand during the recent five years and it is the most rapid developing category of demand.

Platinum accomplished worldwide status and strong relationship with love.

As for geographical segmentation, China is the world's biggest market for platinum

²⁹ Del Mar, Alexander. *A History Of The Precious Metals*. 1st ed. Provo: Reprinted publ., 2014. Print.

jewellery - 65% of yearly demand.

India is a driver of development (10-x development in 7 years) including a rise of men's jewellery production.

In the US and Japan, platinum is the most popular precious metal for engagement rings for grooms and brides.

4) INVESTMENT

Investment contains about 2-11% of total platinum demand if we exclude decreases and increases in above ground stocks. This segment is considered to be the most valuable.³⁰

3.4.3. Platinum supply

There are six metals of the platinum group (PGM). They exist in nature in close relationship with each other and with copper and nickel. They are among the rarest of the Earth's components. There are few known deposits, for instance, in South Africa and Russia they are the largest. There are less than ten critical PGM mining companies on the planet. Platinum and palladium have the immense economic significance and are found in the largest amounts. The other four metals - ruthenium, rhodium, iridium and osmium - are created as co-products of palladium and platinum.³¹

There are platinum mines around the world, but most of the world's concentration of this metal is in

- South Africa
- Russia
- North America
- Zimbabwe
- South Africa

The biggest platinum occurrence on the planet are found in the Bushveld Complex in South Africa and, in the Norilsk Complex in Russia. The platinum group metals in the Bushveld

³⁰ "World Platinum Investment Council - Supply & Demand - Demand Drivers". *Platinuminvestment.com*. Web. 4 Nov. 2016.

³¹ "Production - PMM". *Platinum.matthey.com*. Web. 6 Nov. 2016.

are for the most part dominated by platinum. The Norilsk deposit is controlled by palladium and is associated with high centralizations of nickel and copper. There are just two "stand-alone" platinum group metals mines in North America – the Stillwater Complex in Montana and Lac des Iles close to Thunder Bay, Ontario.

However, there is no platinum mine in North America. Nowadays South Africa produces 77% of the world's platinum. The supply of platinum equals to 13%, 6% and 4% of the market in Russia, North America and Zimbabwe respectively.

During the last five years, the demand for platinum has outrun the supply, as a result of this phenomenon price grew up. The arranged extension and development of a few mines in South Africa and Zimbabwe will scarcely meet demand in the coming years. Because of political conflicts and economic instability in some of these areas, together with expanded mining costs, there is a possibility that the expected production rates may not be met.³²

3.4.4. Investment in platinum and trading

Platinum is a substantial asset, which imparts to different valuable metal ventures the alluring physical properties of being to a great extent constant and unchangeable. Like gold and silver, platinum and palladium are worthy as a method for trade by the excellence of their universally institutionalised shape and virtue.³³

It has been said that among valuable metals, platinum is the most costly and uncommon. Besides that, it likewise has an assortment of uses: technology, catalytic converters, research facility hardware, electrical contacts and anodes, thermometers, dentistry gear, adornments, and cars to give some examples.

Financial specialists are beginning to look increasingly at platinum and palladium as a speculation opportunity as gold consolidates, which were additionally purportedly contributing variables to the rising prices.

³² "All About Platinum | Northern Shield Resources Inc.". *Northern-shield.com*. Web. 14 Nov. 2016.

³³ "Investment - PMM". *Platinum.matthey.com*. Web. 15 Nov. 2016.

It likewise suggested that platinum is a persisting precious metal that is supported by both short and long-term demand drivers, significant deficiencies and venture characteristics.

In other words, platinum is a safe investment long term because of its extensive variety of uses—as a valuable metal and as a mechanical meal—but is driven intensely by free market activity.

The precious metals venture market is something that many individuals still haven't taken ad-vantage of, and people who have commonly incline towards putting resources into gold and silver. There is a broad range of approaches to putting resources into gold and silver, and both metals have dependably been thought to be high in esteem. Gold and silver are the most popular metals to put resources into; many individuals are starting to focus on platinum and now consider it a significant venture. In case you are new to put resources into precious metals or are hoping to increase your portfolio, here is the reason you ought to consider putting in-vestments into platinum.³⁴

Despite the fact that some of the financial specialists regularly ignore platinum, there are a few motivations to put investments into this metal, including:

- A limited source of supply: However, more platinum is being found all over the world, it is still a rare metal. Around 90 % of the world, platinum supply originates from South Africa and Russia, and there is uncertainty about the future.
- Growing request: There is a developing interest for platinum in both the mechanical and speculation circles. Platinum is a major mechanical item and is utilised worldwide to make around 20 % of all customer products. New uses for platinum are being found all the time because of its imperviousness to corrosion, electrical conductivity, and high temperatures. Moreover, the speculation interest for platinum has likewise been expanding. In the previous time, there has been an expanded purchasing of platinum by investment and mutual funds, private investors, and pension funds.

³⁴ Aspa, Jocelyn. "Should You Invest In Platinum? | Investing News Network". *Investing News Network*. N.p., 2016. Web. 23 Dec. 2016.

An ideal approach to putting resources into platinum is to possess the metal physically. Despite the fact that there are fewer platinum items accessible than gold or silver, there are still various things you can put resources. Platinum bars are a typical investment. Coins are another common type of bullion, and a government mint, for example, the Royal Canadian Mint or the United States Mint produces these coins. A few types of platinum bullion coins incorporate Platinum American Eagles, Australian Koala Coins, Platinum Canadian Maple Leafs, and Platinum Chinese Pandas.

Platinum is not as well known as gold and silver but is still an incredible investment metal. It is irregularity, collectability, and esteem makes it an excellent expansion to any financial specialist's portfolio.³⁵

4. Practical Part

4.1 Precious metals - good investment asset

Precious metals are thought to be a decent decision for long-term investment. The expression "valuable metals" more often than not invokes associated with gold and silver. However, the classification likewise includes platinum. These metals are uncommon, financially significant, and considered to be a hedge against inflation and unpredictability, which is the reason precious metal stocks took off in 2016 - a year full of eccentric events. 2017 may be the same, so it is a smart idea to consider precious metals as a good investment asset.

But what is the most attractive precious metal for investors to trade in 2017? To find out the answer to this question, first of all, it is important to know the dynamics of prices for gold, silver and platinum during given period (2007-2017).

Each business day, the precious metals' prices (gold, silver, platinum) are settled by the London Bullion Market Association (abridged: LBMA), which are universally distributed benchmarks prices. Those prices are utilised to bargain in substantial amounts or to

³⁵ Joyce, Mike. "The Case For Platinum: 3 Reasons To Invest In Platinum". *Gulfcoastcoin.com*. N.p., 2015. Web. 7 Nov. 2016.

accomplish the average cost of precious metals. The LBMA precious metals settling prices are utilised to permit the purchasers and sellers to exchange and trade at fair market price.³⁶

4.1.1. Gold price

Gold is utilised as a standard of value for currencies everywhere throughout the world. The cost of gold is expressed as a currency value, frequently in U.S. dollars, and the cost of gold can vary, depending on economic conditions.

Table No. 3 shows the price of gold (2007-2017 year) taken from The London Gold Fixing (or Gold Fix) that used to be held on the placement of Nathan Mayer Rothschild & Sons by the participants of The London Gold Market Fixing Ltd. Nevertheless, the benchmark is still determined twice every business day of the LBMA - the special cases are Christmas Eve and New Year's Eve when there is just a single fixing which is in the morning. It is designed to settle a price for settling contracts between individuals from the London bullion market. However, the gold settling casually gives a perceived rate that is utilised as a benchmark for valuing the majority of gold items and derivatives all through the world's business sectors. The gold fix is presented in the United States dollar (USD), the Euro (EUR) and the Pound sterling (GBP), day by day at 10.30am and 3 pm, by London time.³⁷

³⁶ "Pricing And Statistics". *Lbma.org.uk*. Web. 20 Nov. 2016.

³⁷ "The London Gold Fix | Guide & Information From Bullionvault". *Bullionvault.com*. Web. 20 Oct. 2016.

Table No. 3: Gold price (2007-2017) in US dollar

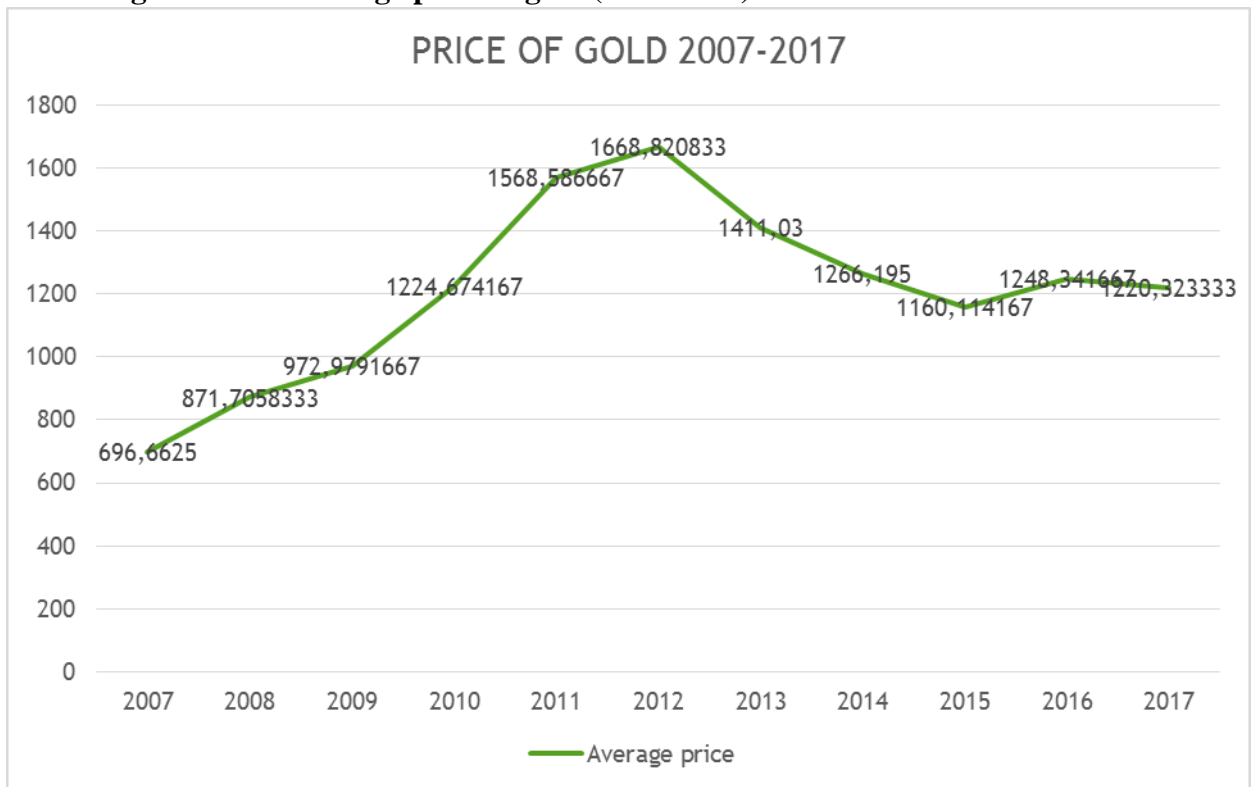
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
January	631,17	889,6	858,69	1117,96	1356,4	1656,12	1670,95	1244,8	1251,85	1097,37	1192,62
February	664,75	922,3	943,16	1095,41	1372,72	1742,62	1627,59	1300,97	1227,19	1199,91	1234,36
March	654,9	968,43	924,27	1113,34	1424,01	1673,77	1592,86	1336,08	1178,63	1246,34	1233,99
April	679,37	909,7	890,2	1148,69	1473,81	1650,07	1485,08	1299	1197,91	1242,26	
May	666,86	888,66	928,64	1205,43	1510,44	1585,5	1413,5	1287,53	1199,05	1259,4	
June	655,49	889,49	945,67	1232,92	1528,66	1596,7	1342,36	1279,1	1181,5	1276,4	
July	665,3	939,77	934,23	1192,97	1572,81	1593,91	1286,72	1310,97	1130,04	1337,33	
August	665,41	839,02	949,38	1215,81	1755,81	1626,03	1347,1	1296,99	1117,47	1341,09	
September	712,65	829,93	996,59	1271,1	1771,88	1744,45	1348,8	1238,82	1124,53	1326,03	
October	754,6	806,62	1043,16	1342,02	1665,21	1747,01	1316,18	1222,49	1159,25	1266,59	
November	806,25	760,86	1127,04	1369,89	1738,98	1721,14	1275,82	1176,3	1085,7	1235,98	
December	803,2	816,09	1134,72	1390,55	1652,31	1688,53	1225,4	1201,29	1068,25	1151,4	
Average price	696,663	871,706	972,979	1224,67	1568,59	1668,82	1411,03	1266,2	1160,11	1248,34	1220,32

Source: Own table based on: "Historical Gold Charts And Data - London Fix". Kitco.com. N.p., 2017. Web. 4 Mar. 2017.

Investors of all levels of experience are pulled into gold as a strong, unmistakable and long-term store of value that has moved freely and independently of other different assets during its long history.

The table mentioned above, and the **Figure No. 2**, which is constructed according to the numbers in this table, shows the dynamics of prices of gold on the world market.

Figure No. 2: Average price of gold (2007-2017)



Source: Own table based on: "Historical Gold Charts And Data - London Fix". Kitco.com. N.p., 2017. Web. 4 Mar. 2017.

From the beginning, it is obvious that after 2007-2008, when the global financial crisis occurred, the situation has stabilised and gold prices fell slightly. But the decision on the adoption of anti-crisis measures, the destabilisation of the European Union, events in the Middle East has provoked a new upsurge. Gold prices have a tendency to rise when people do not have a trust in governments or financial markets; it is called a crisis commodity. Events, which occur in the world regularly, affect the price of gold, because gold is seen as a source of security in the midst of financial or geopolitical tumult.

A common reason for increasing prices of gold from 2008 to 2012 is the desire of investors to hold gold as a fence against inflation and currency devaluation. Currency values change, but gold values, as far as what an ounce of gold can purchase, may remain steadier in the long-term. Gold holds a value outside of politics is esteemed the world over—gold is very attractive as a low-risk investment comparing to other floundering currencies. Investors may have a feeling to purchase gold when they think that the value of their money will decay.

The price of gold strongly depends on the dollar. These assets have a quite clear backwards relationship; when the dollar is increasing, gold is weaker, and the other way around. For

instance, in 2014, “the U.S. dollar index increased by 2 points”³⁸ and this mollified the market for those selling gold. Then again, people purchasing gold may see a strong dollar as a purchasing opportunity, and that could give some price support.

4.1.2. Silver price

Silver is considered to be less rare than gold, it has played a critical and influential role in affecting currencies and has moved in tandem with gold prices, in other words, trends of rising and fall of silver prices are very similar to gold trends’ direction, and therefore the reasons that caused these fluctuations are practically the same.

Table No. 4 shows average annual prices for silver in period 2007-2017 fixed by The London Silver Fix, which had been an enormous benchmark for almost 117 years. This new procedure for setting up the new LBMA Silver Price will keep up continuity with the prior silver fixing process for market members while likewise expanding transparency through an electronic platform. It keeps on being London-based and offers an entirely IOSCO-compliant answer for the London bullion marketplace. The previous benchmarking process has been followed with a specific end goal to limit any possible disruptions and enable a consistent transaction for the market.

The set is configured day by day in US dollars per ounce at 12:00 London time and is shown on the LBMA's site with a 15-minute delay.³⁹

³⁸ "United States Dollar | 1967-2017 | Data | Chart | Calendar | Forecast". *Tradingeconomics.com*. Web. 19 Feb. 2017.

³⁹ "LBMA Silver Price". *Lbma.org.uk*. Web. 20 Nov. 2016.

Table No. 4: Silver price (2007-2017) in US dollar

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
January	12,8389	15,9611	11,2914	17,787	28,4025	30,7686	31,1123	19,9064	17,0981	14,0158	16,8076
February	13,91	17,569	13,4125	15,873	30,7785	34,1405	30,3288	20,8278	16,8425	15,0395	17,8742
March	13,1843	19,5055	13,1168	17,1061	35,8135	32,9532	28,7985	20,7357	16,2223	15,4205	18,0325
April	13,7384	17,5	12,5148	18,0995	41,9656	31,5524	25,1986	19,7095	16,319	16,2586	
May	13,1464	17,0515	14,0289	18,4184	36,75	28,6659	23,0119	19,3603	16,8005	16,8887	
June	13,1443	16,969	14,6541	18,4548	35,795	28,0471	21,109	19,781	16,0964	17,1811	
July	12,9093	18,0339	13,3617	17,9605	37,917	27,,4318	19,7102	20,9246	15,0722	19,9286	
August	12,3632	14,6857	14,3475	18,3571	40,2962	28,6968	21,8383	19,8005	14,9375	19,6402	
September	12,8335	12,373	16,3895	20,5484	38,1545	33,6085	22,5638	18,4914	14,7182	19,2848	
October	16,6704	10,4413	17,2361	23,3933	31,9748	33,1874	21,917	17,19	15,7068	17,7371	
November	14,7016	9,8652	17,8099	26,5409	33,08183	32,7732	20,7576	15,973	14,5067	17,4155	
December	14,2992	10,2852	17,6729	29,349	30,4115	31,9632	19,609	16,24	14,0538	16,3785	
Average price	13,645	15,02	14,653	20,1573	35,1117	31,487	23,8296	19,0784	15,6978	17,0991	17,5714

Source: Own table based on: "Historical Silver Data And Charts - London Fix". Kitco.com. N.p., 2017. Web. 4 Mar. 2017.

In spite of the fact that the silver price is not as unstable as a few metals and stocks, it does differ, and some factors cause the price to either increment or reduction.

At the beginning of the graph (**Figure No. 5**), which indicates silver price change, according to the **Table No. 4**, we can see the steep rise in a price of silver (the year 2009). This increase of silver bullion products price depends on the economic situation in the world because it is a driving force for the rising spot price or per ounce of silver. Also, there can be one more factor, which affected the silver price, was the weakness and instability of dollar after the global financial crisis.

Figure No. 3: Average price of silver (2007-2017)



Source: Own figure based on: "Historical Silver Data And Charts - London Fix". Kitco.com. N.p., 2017. Web. 4 Mar. 2017.

Silver is one of the most adaptable metals accessible and its price have been affordable. Utilised as both an industrial metal, it also plays the significant role in the commodities market. Predicting its price and trading it is a venturesome process of balancing between what buyers require and what the cash market requests.

As for the period 2005-2017, we can observe that the price is deliberately increasing after a sharp drop in 2011-2014. This movement is explained by the fact that silver is of lower investment esteem and demand than gold, but industrial and individual demand for silver are creating higher prices. Demand for silver in industry, for use in smartphones, PCs, and digital TVs is expanding. Silver is exceptionally conductive and is utilised broadly in the electricity markets. This factor influences the price of silver and silver coin to liquefy qualities will likewise raise. If we take "China as an illustrative example, we can see that this country is the world's biggest silver purchaser"⁴⁰ and as its population growth has a significant impact on the increasing demand for silver.

⁴⁰ Cammarosano, Louis. "China Boosts Silver Production For Industrial And Domestic Use - Smaulgl'd". Smaulgl'd. Web. 10 Jan. 2017.

Demand and supply are market indicators of the cost of silver. If individuals and organisations are effectively purchasing silver bars and bullion coins, the market price will increase. Today's observed statistic (from the **Table No. 4**) demonstrate that an increasing number of investors are stockpiling silver.

4.1.3. Platinum price

Platinum is relatively rare metal even among the precious metals.

All initial numbers, used in the analysis of platinum (**Table No. 5**), as an asset for investment were taken from new LBMA Platinum and Palladium Prices database.

Since 1 December 2014, the London Metal Exchange (LME) has autonomously controlled the new LBMA Platinum and Palladium Prices. These new benchmarks supplanted the PGM Fixes, managed by the London Platinum and Palladium Fixing Company Limited (LPPFCL). This took after an approach from the LPPFCL to the LBMA to take responsibility for the historical and future intellectual property of what are nowadays called The LBMA Platinum Price and the LBMA Palladium Price.

Table No.5: Platinum price (2007-2017) in US dollar

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
January	1148,41	1585,77	949,76	1562,75	1786,95	1506,24	1643,98	1423,18	1243,48	854,1	971,76
February	1204,55	1999,67	1035,7	1520,35	1825,9	1657,76	1674,55	1410,5	1197,6	920,24	1007,35
March	1218,82	2046,47	1081,18	1599,43	1770,17	1655,41	1583,3	1451,62	1138,64	968,43	1001
April	1278,21	1988,33	1162,5	1715,55	1794,28	1585,16	1489,12	1431,5	1150,1	994,19	
May	1301,33	2048,63	1130,37	1622,58	1784,15	1468	1474,9	1456,43	1141,72	1033,7	
June	1286,24	2038,24	1217,86	1553,23	1768,5	1447,74	1430,22	1452,76	1088,77	984,14	
July	1303,11	1904,43	1162,26	1525,59	1759,76	1425,82	1401,48	1492,65	1014,09	1086,48	
August	1265,57	1488,47	1244,6	1541,1	1804,23	1449,45	1494,1	1447,85	983,15	1123,77	
September	1307,65	1223,18	1288,7	1591,75	1748,11	1623,65	1456,86	1362,36	965,36	1045,96	
October	1410,96	912,57	1332,77	1688,69	1535,19	1635,83	1412,36	1259,76	980,19	969,14	
November	1448,73	840,3	1400,52	1692,77	1596,98	1576,36	1420,1	1208,85	883,52	963	
December	1484,94	834,84	1442,32	1707,74	1466,94	1591,29	1358,72	1217,32	858,53	920,5	
Average price	1304,88	1575,91	1204,05	1610,13	1720,1	1551,89	1486,64	1384,57	1053,76	988,638	993,37

Source: Own table based on: "Historical Platinum Charts And Data - London Fix". Kitco.com. N.p., 2017. Web. 4 Mar. 2017.

The costs keep on being set twice every day at 09:45 and 14:00 (London BST) in US dollars per 0.9995 fine ounces. Sterling and Euro prices are also accessible.⁴¹

When is it the right time to invest in platinum? To answer this question, the dynamics of prices for palladium should be analysed not only from growth or decline in prices but also from the factors that caused the fluctuations.

The answer to this question is “yes”, and it has the explanation. First, platinum, as well as gold and silver, is a tangible asset. Second, investment in platinum allows you to diversify your investment portfolio of precious metals.

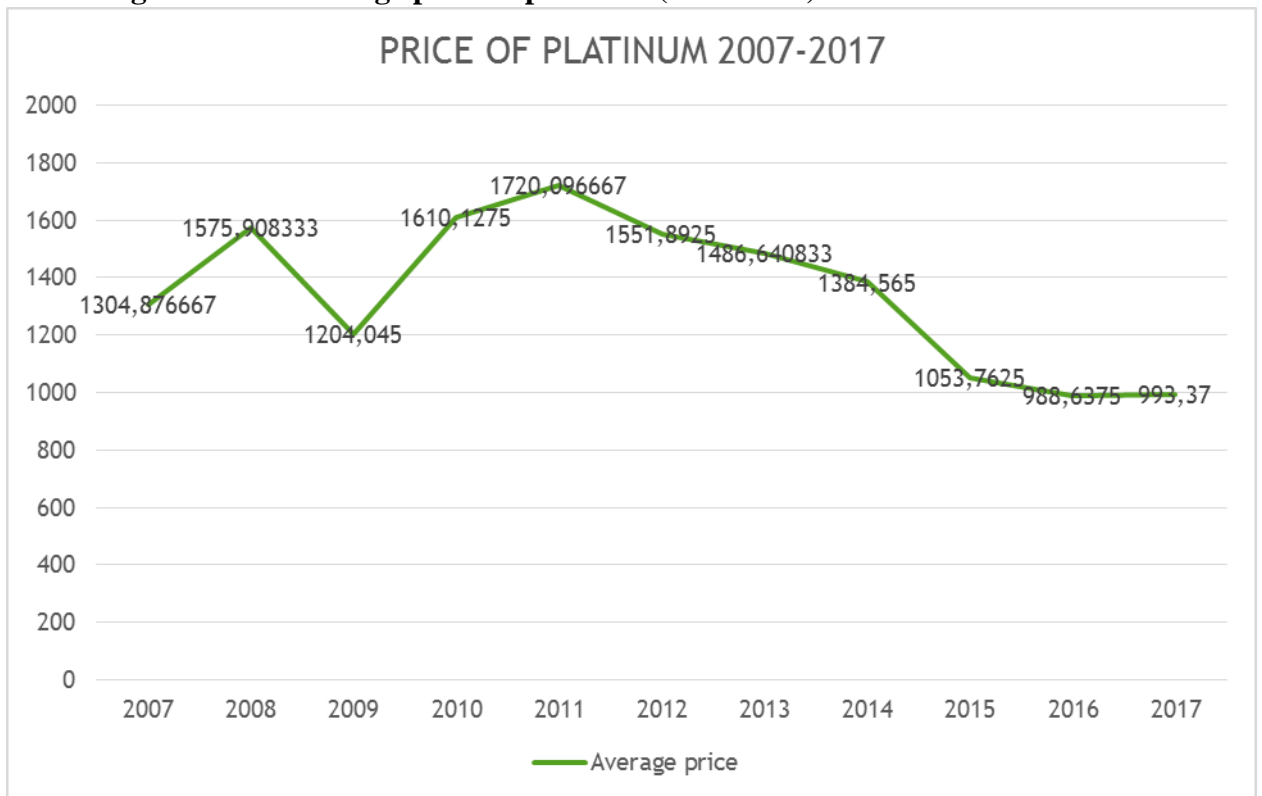
According to the **Table No. 5**, a new phase of growth began in 2011-2013, the character of the movement was abrupt and difficult to forecast. The price of the metal in 2010 increased to 1610.13\$ per ounce, the figures in the following year provided the positive trend: the price of platinum in 2011 was 1720.097\$ per ounce. Then prices gradually went down until the end of 2016, \$ 920.5 per ounce.

Platinum has a lot of uses in industry, and its demand is “industry-driven” opposite to something purchased exactly by consumers, as gold is. Likewise, platinum is used in catalytic converters, bigger vehicles use larger catalytic converters, and therefore more massive amounts of platinum are needed for the fabrication of those converters. This type of industry gradually develops; results of this development are displayed on the **Figure No. 4**, the price of platinum rises very slowly from December 2016.

About what percentage should be platinum in an investment portfolio, there are no clear recommendations. In any case, investing in platinum can help to diversify a portfolio of precious metals and to reduce the risks.

⁴¹ "LBMA Prices Summary". *Lbma.org.uk*. Web. 22 Nov. 2016.

Figure No. 4: Average price of platinum (2007-2017)



Source: Own figure based on: "Historical Platinum Charts And Data - London Fix". Kitco.com. N.p., 2017. Web. 4 Mar. 2017.

4.2 Profitability analysis of investment

The most important role in analysing which precious metal is the best commodity to invest nowadays is to calculate the return on investment (ROI) for every year between 2007 and 2017 and finally find the geometric mean return, in other words, the average indicator for each metal.

The table below (**Table No. 6**) shows the results of calculation, which were made with the help of Excel program.

4.2.1. Calculation order:

- 1) Calculate the ROI for each year for gold, silver and platinum, according to the number in the table #1, #2, #3 respectively
- 2) Calculate the geometric mean return, using the numbers, obtained in the previous step.

Table No. 6 Return on investment and geometric average return (2007-2017)

Year	Gold ROI	Silver ROI	Platinum ROI
2007	15,44%	18,19%	14,23%
2008	25,13%	10,08%	20,77%
2009	11,62%	-2,44%	-23,60%
2010	25,87%	37,56%	33,73%
2011	28,08%	74,19%	6,83%
2012	6,39%	-10,32%	-9,78%
2013	-15,45%	-24,32%	-4,20%
2014	-10,26%	-19,94%	-6,87%
2015	-8,38%	-17,72%	-23,89%
2016	7,61%	8,93%	-6,18%
2017	-2,24%	2,76%	0,48%
Geometric average return	11,52%	-13,51%	9,02%

Source: Own table

Return on investment is a calculated measure used to assess the effectiveness of an investment or to compare the productivity of various investments, in presented analysis return on investment calculation will determine the best precious metal for investment among gold, silver and platinum. ROI measures the profit of an investment concerning its cost. To count ROI, the return on investment (earnings minus initial investment) is divided by the initial investment, and the outcome is expressed in percentages.

The return on investment formula:⁴²

$$ROI = \frac{\text{Earnings} - \text{Initial Investment}}{\text{Initial Investment}}$$

The maximum gold yield was in 2011: 28,87%, silver gave an incredibly maximum yield of 74,19% also in 2011, while platinum gave a maximum revenue of 33,73% in 2010. This data shows that those who bought gold and platinum in the last decade received a return on their investment.

However, the last year, the rate of return on precious metals is significantly reduced, and in some cases even began to show a negative rate of return (gold: -2.24%).

Over the past 11 years, as shown in the table above, investments in gold have given yield (11,52%), silver (of -13.51%), platinum (9,02 %). Average yield levels of precious metals

⁴² "Return On Investment (ROI)". *Financeformulas.net*. Web. 5 Feb. 2017.

shown in the row "Geometric average return". These data shows that those who bought gold and platinum in the last decade received the most return on their investment. These numbers were calculated with the help of the geometric mean return formula:

$$\text{Geometric Return} = \sqrt[n]{(1 + r_1) \times (1 + r_2) \times \dots (1 + r_n)} - 1$$

$r = \text{rate of return}$

$n = \text{number of periods}$

The geometric mean return formula is utilised to calculate the average rate per period on an investment that is compounded over multiple years. The geometric mean return may also be applied to as the geometric average return.

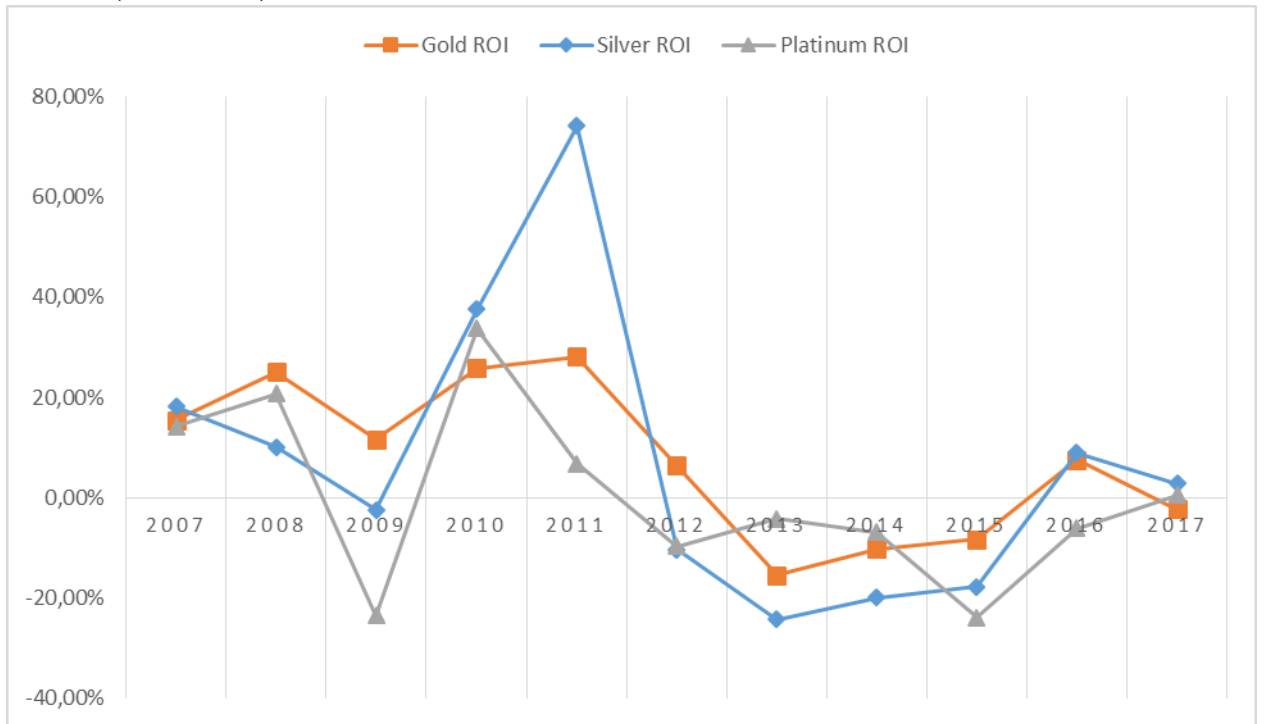
The formula for the geometric mean return is utilised specifically for investments that are connected. By contrast, with a simple interest, the account would use the arithmetic average, which sums the rates and divides by the number of periods.

The geometric mean return formula can also be used to break down the effective rate per period of the holding period return. The holding period return is the complete return over multiple periods.⁴³

Figure No. 5 was constructed according to the **Table No. 6**. According to this scheme and the results in the **Table No. 6** we can observe that nowadays gold is the best metal to invest for a long-term period, after it, goes platinum, and silver with a negative average: -13,51%.

⁴³ "Geometric Mean Return". *Financeformulas.net*. Web. 15 Feb. 2017.

Figure No.5: Gold, silver and platinum return on investment trend (2007-2017)



Source: Own figure

5. Conclusion

This bachelor thesis focused on economic analysis of precious metals, such as gold, silver and platinum. Literature review contains detailed information on these precious metals, starting with the history, supply and demand trends, specific characteristics of production and mining, ending with the use in various spheres of human activity and the possibilities of investment in precious metals to generate income. Practical part was focused on economic analysis of each precious metal (gold, silver and platinum) to find out which of them is the most attractive for investors nowadays and what the main reasons of this attractiveness are. The analysis includes return on investment and geometrical mean return calculations, which can give a clear picture of the prospects of trading to the novice investor.

In the group of precious metal is comprised primarily of gold, platinum and silver. Precious metals, in addition to its jewellery value widely used in the economic sphere as a means of ensuring the national currency, the object of a market for trade, investment and payment tool in a global market economy. Precious metals are used as means of accumulation and the creation of the state financial reserve funds. Among other objects of international market trade, precious metals are characterised by high price stability.

In addition to financial and economic destiny and jewellery, precious metals widely used in industrial production. Due to its physicochemical properties, gold and silver are in high demand in electronic industries as conductors, platinum and its alloys are an indispensable catalyst for chemical reactions and processes in many modern industries. In addition, platinum is used in precision engineering for the manufacture of high precision instruments and tools.

Gold, silver and platinum are traded in many structures around the world, and they are surely available to any investor that has access to the commodity market of precious metals. Precious metals can be invested in many forms, for example, physical gold, silver or platinum can be bought everywhere in the world either in a document or physical form, for instance, coins. This bachelor thesis gives a good understanding of the precious metals determinants, and how, the price of gold, silver and platinum can fluctuate according to changes in different factors, such as a difficult economic situation in the world, demand for

a particular metal or the position of US Dollar in given period. It is very hard to predict how the price of precious metals will change. However, they are considered to be a reliable and safe investment. The author of this thesis suggests that the best solution for someone who wants to start investing in precious metals is to buy and put money into gold for long-term prospects. Because it is a low-risk investment, which shows the highest parameter in return on investment, and if the history repeats itself, the price of gold will rise again and give investors the opportunity to succeed.

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