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To my parents and aunt for their endless love and support

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Abstract

The main aim of this thesis is to study the motives behind gold investment with a special focus on gold's store of value, safe haven, hedging and portfolio diversification properties. The research question is why these properties do not always hold in different time regimes, geographical locations and socio-economical systems. In order to meet this objective, a literature overview of each property of gold is presented. Overall, the findings suggest that gold has always served as a store of value and always acted as a portfolio diversifier. However, gold's property to act as a safe haven, an inflation and currency hedge did not hold at all times and in all countries.

Keywords: Motives, gold, gold investment, safe haven, inflation hedge, currency hedge, portfolio diversification

You have to choose between trusting to the natural stability of gold and the natural stability of the honesty and intelligence of the members of the government. And, with due respect to these gentlemen, I advise you, as long as the capitalist system lasts, to vote for gold.

George Bernard Shaw (1928)¹

Introduction

For centuries, gold has been a universal currency recognizable beyond state borders and independent from rulers, socio-economical systems and worldviews. Murray N. Rothbard, one of the advocates of gold and a member of the well-known Austrian School, once said that “gold was not selected arbitrarily by governments to be the monetary standard. Gold has developed for many centuries on the free market as the best money, as the commodity providing the most stable and desirable monetary medium”². From ancient times, gold has served primarily as a means of payment and, apart from that, as a symbol of wealth and prestige awakening a particular feeling of fascination and lust of possession. Later, as civilization advanced, gold found its broad application in jewellery manufacturing, technology and as a financial asset. Since then, among all available commodities, investing in gold became one of the most popular forms of capital allocation. Many researchers devoted their attention to gold investment and showed that, in case of a financial crisis, during wars and political upheavals, investors returned to gold and discovered its property as a safe haven. Furthermore, gold also gained importance as an inflation and currency hedge as well as a portfolio diversifier.

But is it still the case? Is gold still playing the same role as before and, if not, what is its new role? Are the motives for holding gold the same as before or have they changed in the course of history and across countries? These are the main questions that this thesis addresses and aims to answer.

My thesis consists of six chapters. The first chapter describes the history of gold and its origins. The second chapter provides some details and characteristics about the gold market as a physical place of trade. The third chapter focuses on gold as an investment asset. It describes the available gold investment possibilities, like financial products and instruments. The fourth chapter describes the supply and demand of the gold market as well as its volatility

¹ <http://www.thegoldstandardnow.org/key-blogs/1562-george-bernard-shaw-qthe-natural-stability-of-goldq> (02.06.2015).

² <http://www.incrementum.li/en/austrian-school-of-economics/the-austrian-school-and-its-view-on-gold/> (27.10.2015).

and liquidity. Furthermore, the fourth chapter shows the historical gold price development and main factors that influenced its fluctuations. The fifth chapter is the main part of this thesis and describes the motives for holding gold. It brings together a few reasons that investors follow when they decide to invest in this precious metal. The sixth and final chapter provides conclusions to the thesis.

My knowledge of this subject, as presented in this thesis, has resulted from a number of sources. Firstly, I concentrated on information about gold as a precious metal and commodity. Secondly, I collected all the necessary data about the types of motives for investing in gold from the literature available in various financial journals. Here, the main challenge is to explain, whether those motives hold at all times and across countries or not.

1. The Phenomenon and History of Gold

Gold was one of the earliest discovered metals, found mainly in the form of nuggets, pellets or sand. In nature it exists as a chemical compound with the symbol *Au*, which comes from the Latin word *Aurum*³. With the fast development of civilization, gold became more and more valued and new ways to use this ore were discovered. Due to its physical properties – the characteristic yellow glow and malleability - gold was already in antiquity used for making jewellery and various ornaments. Later on, thanks to its durability, rarity and high value, gold started to function as money and also as an important asset in investment practice. Gold owes its use in industry and technology to its good thermal and electric conductivity, which is very useful in electronics, for example. This subchapter will describe the history of gold, starting from the very early ages before Christ until the modern times.

The first dated gold discovery, located in Transylvanian Alps or the Mount Pangaion area in Thrace in Eastern Europe, took place in 4000 BC⁴. However, gold's history, known to the modern men, began in ancient Egypt. Then, Egyptians depicted gold in hieroglyphs as the perfection of the sun⁵. Until the end of the antique era, gold played mainly a decorative role. The golden mask and 300-pound solid gold coffin of Tutankhamen, which was discovered by Howard Carter in 1922, serves as the most beautiful excavation of that period⁶. Apart from Egypt, the first jewellery was also created in what is today Southern Iraq in 3000 BC⁷.

More or less in the same period gold began to function as currency. Throughout the period of the Roman and Byzantine Empire, various coins were minted, many of which were made of pure gold. As a result, gold coins started to be used as money and as a medium of payment in the international trade between countries. Starting from 560 BC, gold became the first reliable and commonly recognized form of money⁸. Since then, in many countries the exploitation of gold was intensified until most of the sources became fully exhausted. The production of gold decreased and the shortage of barter money could be felt during commodity exchanges between Europe, Asia and Middle East. Then, commodity merchants saw chances in gold of transoceanic origin. In 1511, the Spanish King Ferdinand began to explore newly discovered territories of the Western Hemisphere⁹. Soon after, due to the predatory regime the cultures of Incas and Aztecs ceased to exist and their great caches of gold were confiscated and sent to Spain for use in Europe.

³ <http://periodic-table-of-elements.org/#/Aurum> (28.03.2015).

⁴ See National Mining Association, n.d., p. 1.

⁵ <http://www.egyptianmyths.net/gold.htm> (17.11.2014).

⁶ <http://atensequence.blogspot.co.at/2013/08/the-importance-of-gold-to-ancient.html> (17.11.2014).

⁷ See National Mining Association, n.d., p. 1.

⁸ *Ibid.*, p. 2.

⁹ *Ibid.*, p. 2.

Slightly earlier, during the Norman Conquest, large amounts of gold were transferred from the far southern part to the western part of Europe. Gold started to be an important element in the economies of European countries. In 1377, Great Britain introduced a system in which gold and silver were used simultaneously in the monetary policy¹⁰. After almost 400 years, in 1700, the Master of the Royal Mint, Sir Isaac Newton, decided to set the price of gold at a fixed rate of 84 shillings¹¹. On the other side of the Atlantic Ocean, the first American gold coin was minted (in 1787), and the dollar became the national currency of the USA¹². In 1816, Great Britain fixed its currency to a specific amount of gold giving birth to the gold standard, while France, Belgium, Italy, Switzerland and Greece followed shortly after. When the USA passed on the gold standard in 1873, new huge gold deposits were discovered in Alaska and South Africa, increasing the production and, as a result, the overall gold supply worldwide¹³. By the end of 19th century, many European countries accepted the monetary policy based on gold. The 20th century witnessed alternating periods of abandoning and returning to the gold standard. Nevertheless, the gold standard lasted only until the outbreak of the World War I due to increased spending on military reinforcement. In 1925, only Great Britain returned fully to the gold standard¹⁴.

In 1933, after the Great Depression of 1929-32, the President of the USA Franklin Roosevelt suspended the gold standard¹⁵. The suspension was released after a year with a gold price of \$35/oz. However, private investors were prohibited from possessing gold holdings for private purposes. This situation lasted for 40 years. Only in 1974 were American citizens again allowed to hold gold¹⁶. Near the end of World War II, in 1944, 44 allied countries agreed at a conference in Bretton Woods on a fixed exchange parity of the dollar to gold, one ounce of which was again worth \$35/oz¹⁷: “The new standard involved setting par values for currencies in terms of gold and the obligation of member countries to convert foreign official holdings of their currencies into gold at these par values”¹⁸. By the end of the 1960s, dollar devaluation in relation to gold became a necessity. This happened also in regard to other currencies in the course of increasing inflation. The ill-advised US monetary policy announced the near collapse of the parity system. Moreover, rising costs involved in military conflicts lead by the USA eventually resulted in printing additional money and inflation. In 1968, a two-tier

¹⁰ Ibid., p. 3.

¹¹ Ibid., p. 4.

¹² Ibid.

¹³ Ibid., p. 5.

¹⁴ Ibid.

¹⁵ Ibid.

¹⁶ Ibid., p. 7.

¹⁷ Ibid., p. 6.

¹⁸ Ibid.

currency conversion system was created. On the one side, central banks could agree on transactions with fixed exchange rates, and on the other side there was also a free fluctuating market price system¹⁹.

On the 5th of August 1971, US President Richard Nixon completely suspended the convertibility of the dollar to gold, which freed up the gold price on the global market and enabled investors to trade gold like a commodity²⁰. This made clear that the conversion system could not survive as it had. Parity was first set to \$38 and then again to \$42,22/oz²¹. The times of gold parity finally ended and the gold price rocketed. According to Ferguson (2008), “the inescapable reality seems to be that breaking the link between money creation and a metallic anchor led to an unprecedented monetary expansion - and with it a credit boom the like of which the world has never seen”²².

In 1987, the World Gold Council was founded. It is an organisation that supports the global gold industry and brings together representatives of mining companies from almost 50 countries²³. The World Gold Council also acts as an information and research centre for its members and the industry, providing reports and advisory services to producers and consumers, among other activities.

In the course of the development of financial engineering, new types of investment possibilities emerged on the global gold market. Nowadays, apart from the traditional forms of investment, investors can choose from indirect forms such as derivatives and other trading products based on gold. Nevertheless, gold, while gaining new functions, as collateral and a safe haven asset, is still regarded as the most precious metal for decorative and practical purposes.

¹⁹ Ibid.

²⁰ Ibid., p. 7.

²¹ Ibid.

²² See Ferguson, 2008, p. 62.

²³ See National Mining Association, n.d., p. 9 and <http://www.gold.org/about-us/our-members> (28.11.2014).

2. Gold Market

This sub-chapter aims to describe the main features of the gold market and to define its major products.

The world gold market is a decentralized OTC market, where most of the physical gold trade takes place twenty-four hours a day, five days a week²⁴. Commonly, we talk about the gold market. However, there is no one centre of trade of this metal. In Europe, the most important centres are in London and Zurich. In America, gold is traded in Chicago and New York. Asian gold markets are concentrated around Hong Kong and Tokyo, while in Australia gold can be traded only in Sydney. Other markets worth mentioning are those in Shanghai, Mumbai, Dubai, Sao Paulo, Jakarta and Istanbul, among others. From all the above-mentioned gold markets, London, Zurich, New York, and Hong Kong are the most important ones²⁵.

The global OTC market concentrates around the deposits available in London. Therefore, most of the world's transactions are carried out based on the changes in those deposits. The London Bullion Market Association (LBMA), established in 1987, is an organization that supports and represents 52 gold bankers and brokers and 14 market makers on the global OTC gold market²⁶. Here, only registered members of the association are allowed to trade gold. Moreover, LBMA set a range of rules and practices that increase the market efficiency, including the regulation of size and quality of gold bars²⁷. Transactions made on gold bars that are assigned to specific reserves in London can be made from any place and at any time in the world. Since 1919, the price of gold is fixed daily at 10:30 and 15:00 GMT, in the London office of Rothschild & Sons Company²⁸. Five trading houses meet in order to fix the price, which is then passed on to other trading institutions. However, on the 20th of March 2015, new regulations were introduced, in which the London Gold Fixing was changed into the LBMA Gold Price. LBMA explains the changes as follows: "The price formation will be in dollars and prices will continue to be set twice daily at 10:30 and 15:00 (London time) in three currencies: USD, EUR and GBP. Within the process, aggregated gold bids and offers will be updated in real-time with the imbalance calculated and the price updated every 30 seconds until the buy and sell orders are matched. Participants, as well as sponsored clients,

²⁴ <http://www.goldpriceoz.com/gold-markets-trading-time.html> (29.03.2015).

²⁵ *Ibid.* (29.03.2015).

²⁶ See O'Callaghan, 1993, p. 20.

²⁷ <http://www.lbma.org.uk/what-we-do> (19.11.2014).

²⁸ See O'Callaghan, p. 19 and p. 21.

will be able to manage their orders in the auction in real time via their desktops”²⁹. The LBMA Gold Price provides an international benchmark, which is used as a base for determining the gold price for producers, consumers, investors, and central banks all over the world. Although, the size of trades is unknown, it is estimated that most of the London gold trades are generated by means of those daily fixings.

However, the biggest market for newly mined gold, which functions separate from London, is located in Zurich and is called the Zurich Gold Pool³⁰. This second largest gold vault determines its price based upon the supply and demand of gold on a given trading day. The Swiss gold market, developed after the WWII, is, apart from London, the main European vault for physical gold distribution and supply³¹. The secretiveness of the Swiss gold pool lies in the fact that the Swiss authorities do not publish statistics on the sources and destinations of gold flows through Switzerland³².

On the American market, investors are mainly trading gold derivatives (gold futures, forwards, options, and swaps). The stock exchange is called the Commodity Exchange (COMEX) and is a part of the New York Mercantile Exchange (NYMEX), which in turn belongs to the Chicago Mercantile Exchange (CME Group Inc.)³³. The trade is carried out electronically via an online platform as well as an open-cry system, i.e. through shouting and gestures used by brokers on the trading floor³⁴.

The last from the four most important trading centres is Hong Kong, which is more than 100 years old. It contains three parts: a traditional market for physical gold (Chinese gold and Silver Society), a network for London and Zurich traders and exchange for derivatives (HK Mercantile Exchange)³⁵. It is the only exchange with “physical gold trading, the invisible market and a futures market”³⁶. Because of the time differences, the Hong Kong market is essential due to the fact that the trade can be carried out between the time the markets in the USA close and the ones in London open. Hence, European quotes are based on Hong Kong quotes. The market in Sydney closes the full 24-hour trade as its geographical location facilitates the trade between the market closing in the USA and opening in Hong Kong. Investor sentiments towards physical gold is bigger in Asia and might explain why the price

²⁹http://www.lbma.org.uk/_blog/lbma_media_centre/post/the-new-lbma-gold-price-to-be-launched-on-20th-march-2015/ (25.07.2015).

³⁰ Ibid., p. 20.

³¹ Ibid.

³² Ibid., p. 23.

³³ <http://www.goldpriceoz.com/international-major-gold-market.html> (19.11.2014).

³⁴ <http://www.sharelynx.com/papers/GoldFuturesMarkets.php> (19.11.2014).

³⁵ <http://www.goldpriceoz.com/international-major-gold-market.html> (19.11.2014).

³⁶ Ibid.

increases when the physical trade is opened in Hong Kong and falls when the paper trade opens in London.

A major disadvantage of the OTC gold market is its limited transparency regarding the size and volume of the transactions carried out on the market. Although the OTC market belongs to the most liquid markets, it tends to be non-transparent, as many trades are not made directly on an exchange but through an intermediary such as a bank.

3. Gold as an Investment Asset

The current gold market allows us to choose from a wide range of gold investment products. Investments in gold are made either directly or indirectly. Direct or traditional forms of investment include the purchase of bullion or gold bars, coins and jewellery. Indirect gold investment, which is subject to greater risk and higher return, include purchasing derivatives with the gold price as the underlying. This includes gold mine stocks, derivatives on gold, gold funds (Exchange Traded Funds, Closed End Funds and Exchange Traded Notes) and gold accounts. For the variety of investment possibilities, the World Gold Council gives the most sensible classification of gold investment products³⁷. Based on this, I will briefly discuss each type of gold investment product.

3.1. Direct Gold Investment

3.1.1. Gold Bars

The primary way to invest in gold is to buy gold bars. Usually, the purchase is made through gold dealers and, in some countries, also through banks. Gold bars are made of pure gold (gold content is 99.99%) and can take on various sizes and forms, with cuboid to be the most common one and weight ranging from 1g to several kilograms. However, the most common measure unit used in the interbank, international and stock exchange gold trade is the troy ounce (31.1 grams). Most of the globally traded gold follows the principles developed by the so-called *London Good Delivery* (determined by LBMA)³⁸. *London Good Delivery* bars are known for their large size (400 troy ounce and about 12.5 kg), as well as high purity. According to the principles, gold bars must contain a minimum of 99.5% of gold, and information such as the weight, serial number, manufacturer's name, purity and the year of production must be minted on the bar's surface³⁹. These gold bars weighing 400 oz. are traded on the international gold market also with the participation of central banks.

3.1.2. Gold Coins

Another form of gold direct investment is investing in gold coins. We can distinguish bullion coins and commemorative or numismatic coins. Bullion coins are coins minted by the governments for investment purposes, whereas numismatic coins are minted to commemorate

³⁷ <http://www.gold.org/investment/how-invest-gold> (19.11.2014).

³⁸ <http://www.lbma.org.uk/good-delivery-rules> (29.03.2015).

³⁹ See World Gold Council, 2010a, p. 41.

a particular important historical event or person. The price of bullion coins depends on the content of gold and its price on the market. The measure of gold content is called carat, where 24 carats stands for the highest gold purity of the coin⁴⁰. The most popular bullion coins are the South African Krugerrand, the American Gold Eagle, the Canadian Maple Leaf, the Austrian Vienna Philharmonic, the Chinese Gold Panda, the French Napoleon and the British Sovereign, among others. The purchase of gold coins can be made in mints or central banks that are emitting coins or from coin dealers that act as intermediaries. The value of numismatic coins is determined by the gold content and the collector value, which is dependent on the supply and demand related to the particular event, year of emission and its beauty. Therefore, most commemorate coins do not reflect the price changes on the gold market.

There are two main disadvantages of buying gold bars and coins. Firstly, buying gold bars and coins involves not only high capital expenditure but also high cost of storage in vaults. Many companies apart from selling gold bars offer also the possibility of storage and of insurance of the kept treasury. Secondly, holding physical gold doesn't yield interest in comparison to indirect gold investments⁴¹.

3.1.3 Gold Jewellery

Investing in gold “has always been a dominant area of demand for gold. Prized for its value as well as its beauty, gold jewellery has a universal status that remains constant. Over the past five years (2010-2014), it has accounted for around 50 per cent of world gold demand, on average, but the source of this demand has shifted in line with the new dynamics of economic growth and wealth in the world”⁴². Hence, gold investment is the most accessible and wide spread type of capital allocation as well as one of the most traditional ways to invest in physical gold. Both men and women use gold jewellery for decorative purposes of clothes, body, and in many cultures it plays an important religious role. The need of wearing gold jewellery has been present since the beginning of civilization as a sign of prestige, wealth and power; whereas its physical features and beauty are advantages that have always been admired. The value of gold jewellery increases by adding gemstones or other precious metals like silver, copper or palladium⁴³. Moreover, not only do the additional ingredients increase the value of a particular jewellery piece, but also its artistic workmanship, aesthetic beauty,

⁴⁰ Ibid.

⁴¹ See O'Callaghan, 1993, p. 4.

⁴² <http://www.gold.org/supply-and-demand/demand/jewellery> (30.10.2015).

⁴³ <http://www.gold.org/jewellery/about-gold-jewellery> (30.10.2015).

rarity and uniqueness. The World Gold Council experts say that “over the centuries, goldsmiths and highly skilled artisans have infused gold with their own unique talents, creativity and passion. The result has been the extraordinary variety of gold jewellery that exists today. A fusion of local artistry and urban chic, symbolism and expressiveness, and finely honed techniques culminates in extraordinary pieces”⁴⁴. The main disadvantage of gold jewellery investment is that, in times of crisis or in situations when the sudden sale of gold is necessary, gold jewellery is worth as much as its gold content. Therefore, it is important to buy jewellery that is made of pure gold i.e. 24-carat gold or gold with 999.9 level of fineness⁴⁵.

3.2. Indirect Gold Investment

The indirect way of investing in gold consists in purchasing financial instruments based on the gold price. This alternative carries a burden of high risk but, unlike the direct method, it yields higher return. Therefore, each investor has to be conscious of the incurred risk and the fact that he or she can lose the whole invested capital. I will now briefly explain each way of accessing the gold market in the form of indirect investment.

3.2.1. Gold Mine Stocks

As mentioned before, mining companies all over the world exploit gold from underground deposits. Investment in gold through gold mine stocks requires the acquisition of stock of a particular gold mine on the stock exchange. This investment gives an investor the possibility of participating in the exploitation of the natural gold deposits. However, due to various factors influencing the operation of the mining company as an entity, gold mining stocks are considered to be volatile. This is due to the “numerous factors that are involved in the pricing and valuation of gold equities”⁴⁶. These can include: the “maturity and geographic spread of mining projects, gold reserves, ore grades, costs, margins, profitability, the strength of the balance sheet, the debt profile and the quality of management”⁴⁷. Apart from factors linked to a company’s profitability, we should also mention factors such as natural catastrophes, corruption, theft, political risk of the country the mine is located in and the risk of inaccurate estimation of resources. The unpredictability of such events implies that valuing gold mine

⁴⁴ <http://www.gold.org/jewellery/gold-jewellery-design> (30.10.2015).

⁴⁵ <http://www.gold.org/jewellery/about-gold-jewellery> (30.10.2015).

⁴⁶ See World Gold Council, 2010a, p. 43.

⁴⁷ Ibid.

stocks is highly complicated and can be done only by using highly complicated mathematical models.

In 2010, there were 300 mining companies, whose resources amounted to \$200billion⁴⁸. Investors can choose from numerous gold mine stocks, which are listed on commodity stock exchanges all over the world, such as Barrick Gold (ABX), Goldcorp (GG), Newmont Mining (NEM), Eldorado Gold (EGO) or Gold Fields Limited (GFI)⁴⁹.

3.2.2. Gold Derivatives - Options, Futures, Forwards and Swaps

Gold derivatives are structured financial products that derive its value from the gold price. Currently, we can distinguish such derivatives as options, futures, forwards and swaps on gold. Gold options are contracts that give the investor the right to sell or buy a specific amount of gold at a given price at a specified time in the future. Gold futures are a type of mutual contract to receive or deliver a specified amount of gold with a specified purity. Here, the buyer/seller agrees to sell/buy a certain underlying instrument at a closely specified price on a specified date. As profitable as this agreement may seem, it also carries along a lot of uncertainty and risk. The initial margin or cash deposit paid to the broker is only a fraction of the price of the gold underlying the contract. Consequently, “investors can achieve notional ownership of a value of gold considerably greater than their initial cash outlay. While this leverage can be the key to significant trading profits, it can give rise to equally significant losses in the event of an adverse movement in the gold price”⁵⁰. Gold futures are traded on numerous exchanges around the world, on the New York Stock Exchange’s COMEX, Japanese TCE or CBOT in Chicago, for example. The symbol that describes the future contracts on gold is GC and the contract should contain a minimum fineness of 0.995 (24 carat gold) with a contract size of 100 troy ounces⁵¹.

From the moment gold derivatives were introduced to the market, they have performed exceptionally well among various types of investors. For example, Neuberger (2001) states that “central banks have been able to get a current income on gold holdings. Gold fabricators have been able to insulate themselves from the impact of fluctuations in the price of gold on their inventory holdings. Hedging has enabled producers to develop new mines using project finance. Speculators, benefited by being enabled to take long or short positions in the gold market efficiently”⁵². In the same manner, “owners of gold can use the derivatives market to

⁴⁸ Ibid.

⁴⁹ <http://www.commodityhq.com/commodity/precious-metals/gold/#stocks> (14.11.2014).

⁵⁰ See World Gold Council, 2010a, p. 44.

⁵¹ http://www.cmegroup.com/trading/metals/precious/gold_contract_specifications.html (14.11.2014).

⁵² See Neuberger, 2001, p. 9.

get extra income from their holdings. Derivatives greatly widen the range of strategies available, particularly to large holders, for managing their gold holdings. By increasing flexibility and return, they make gold a more attractive asset to hold”⁵³.

⁵³ Ibid., p. 12.

3.2.3. Gold Funds

A lot of literature has been dedicated to the innovative financial instrument called Exchange Traded Funds (ETF), which are “financial products physically backed with allocated gold bullion, listed on a stock exchange, and bought and sold in the form of shares”⁵⁴. The most common gold ETF is the SPDR Gold Shares (GLD) listed on NYSE Arca platform as a part of the NASDAQ stock exchange⁵⁵. The World Gold Council Report on gold explains ETFs in the following way” “GLD shares are 100% backed by physical gold bullion, all of which is held in the form of London Gold Delivery 400 oz. bars in allocated accounts. Investors in GLD cannot take physical delivery of the gold, rather it is held by a custodian on their behalf. The shares track the spot price of gold, less the administrative fees”⁵⁶. According to newest statistics published by the World Gold Council in August 2014, the “1,700 tonnes gold held collectively by the 60 gold-backed ETFs had a value of US\$71 billion”⁵⁷. Other similar financial instruments that are connected to gold are Closed End Funds and Exchange Traded Notes.

3.2.4. Gold Accounts

Gold accounts are financial instruments offered by bullion banks and which are directed to institutional and individual investors. We can distinguish between allocated and unallocated gold accounts. In an “allocated” gold account, gold is “stored in a vault owned and managed by a recognized bullion dealer or depository. Specific bars (or coins, where appropriate) are numbered and identified by hallmark, weight and purity and are allocated to each particular investor, who pays the custodian for storage and insurance”⁵⁸. Allocated gold accounts allow buying a specific amount of bars or coins and only the investor has the exclusive right to issue a command of sale, delivery or reception. In the unallocated accounts, gold is not separated from the gold pool possessed by the bank or other trading institutions. The bullion bank keeps the right to use the gold for its own purposes. Unallocated accounts “are cheaper than allocated account as the bank reserves the right to lease the gold to a third party”⁵⁹.

⁵⁴ <http://www.gold.org/investment/how-invest-gold> (19.11.2014).

⁵⁵ <http://www.spdrgoldshares.com> (29.03.2015).

⁵⁶ See World Gold Council, 2010a, p. 42.

⁵⁷ See World Gold Council, 2014, p. 31.

⁵⁸ See World Gold Council, 2010a, p. 42.

⁵⁹ Ibid.

4. Gold Market Analysis

Chapter 4 analyses the demand and supply side of gold. Later, it describes the volatility and liquidity of the gold market, the gold price and its determinants.

4.1. Demand for Gold

We can divide the demand side into groups according to sectors and countries. In regard to sectors, we can distinguish four main buyers of gold: jewellery manufacturers, central banks, private investors and the technology sector. The graphic below shows that, in this dimension, the biggest buyer of gold is the jewellery industry. In general, around 47% (87.000 tonnes) of the whole aboveground resources are attributed to jewellery manufacturers.

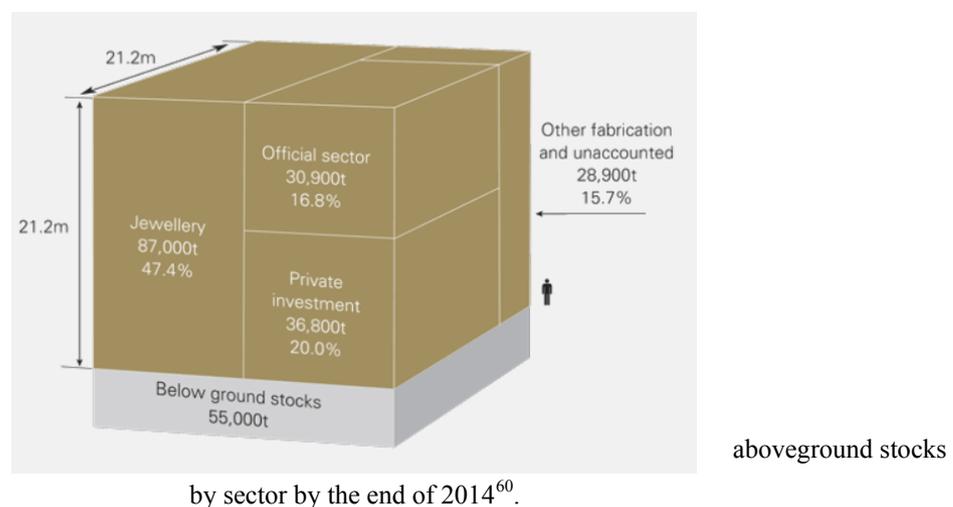


Figure 1: Total

by sector by the end of 2014⁶⁰.

From the figure, we can see that, in 2013, the private investment sector amounted to about 20% (36.800 tonnes) of the overall demand. Here, we can distinguish such products as gold bars, coins as well as products linked to issuing and trading of financial instruments traded on the OTC market. Demand in technology and industry sectors comes from many useful physicochemical properties of gold. Among those, we shall mention its resistance to corrosion and good electrical conductivity. The technology sector applies gold in a wide range of highly complicated and industry specific products such as electronics, electro-energetics, aeronautics, including space and military, among others. Technology and industry sector's share in the overall demand amounted to be a bit over 15% (28.900 tonnes). The rest of the available gold is bought by central banks in various countries. It was estimated to be around 17% (30.900 tonnes) of the whole demand.

⁶⁰ <http://www.gold.org/reserve-asset-management/central-bank-gold-agreements> (25.07.2015).

In the last decades, gold demand was subject to major changes. Dynamic economic development in emerging countries and, increasing wealth of societies affected the geographical demand of gold significantly. The first key event in the past years was almost a complete shift⁶¹ in the gold market from West to East. India and China keep the first and second place in the ranking of countries that consume the most of world's physical gold. These countries are responsible for at least half of the global demand.

In the 1970s, North America and Europe were responsible for 47% of the total global demand⁶². This trend changed, and, during the next 40 years, it dropped to 27%⁶³. Furthermore, the primary role in shifting the demand from West to East is attributed to jewellery demand. Hence, "North America and Europe's dominance of this sector has diminished from 44% share in the 1970s to just 14% in 2010; the Indian Subcontinent and the Far East have grown to represent 66% of demand from 36% in the 1970s"⁶⁴. When it comes to investment, we can observe that the interest in financial products based on gold has increased since the 1970s. The increase can be attributed to the emergence of new innovative products such as gold derivatives and ETFs, among others. Nevertheless, a few main statements clearly shaped the global demand for gold investment. Firstly, during the 40 years between the 1970s and 2010, investment demand decreased in North America and Europe and increased in the Indian Subcontinent and East China, with China being the fastest growing investment market. Only after the financial crisis in 2008 did the demand for gold investment in Europe regenerate. In case of technology, the demand rate remained stable throughout at about 10%. As in other cases, technology demand not only shifted from low to high cost end producers but also shifted geographically. Countries such as Japan, China and South Korea led in the ranking of the highest application of gold in technological appliances, where the technology demand increased from 17% to 67%⁶⁵.

In summary, gold demand is characterised by two main developments, namely, a shift from West to East and an unchanged trend in jewellery demand. The following graphs show both developments.

⁶¹ See World Gold Council, 2011a, p. 2.

⁶² Ibid. p. 3.

⁶³ Ibid.

⁶⁴ Ibid.

⁶⁵ Ibid., p. 5.

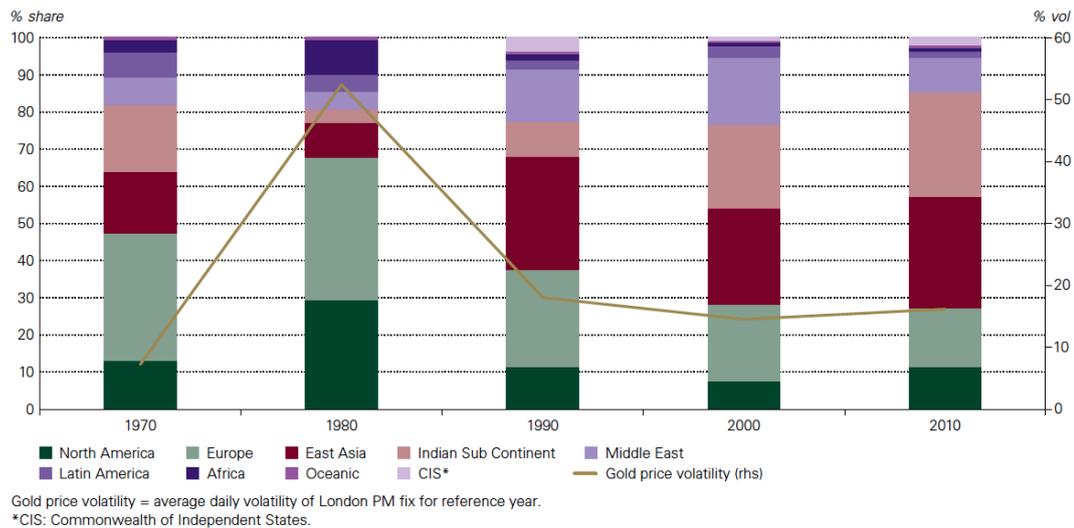


Figure 2: Distribution of gold demand by region (1970-2010)⁶⁶.

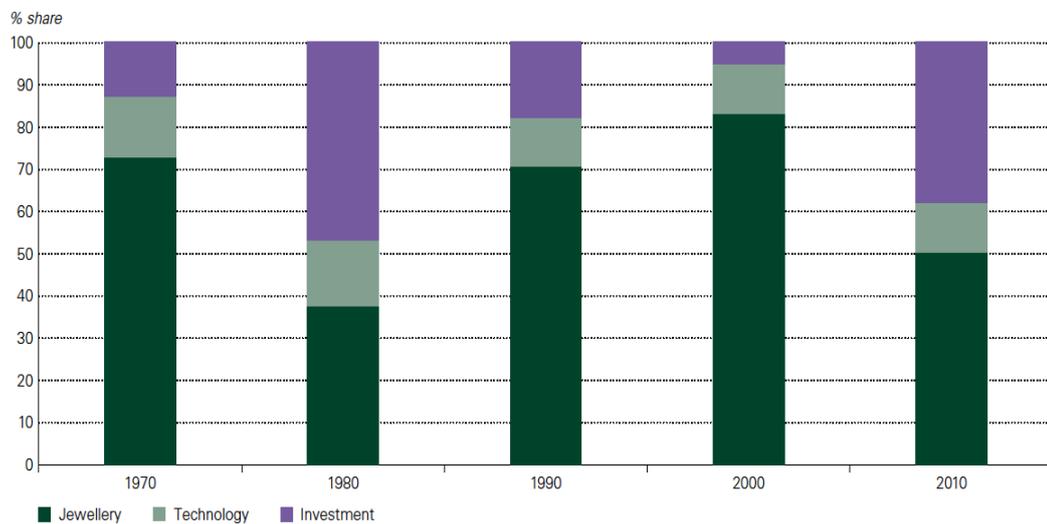


Figure 3: Distribution of gold demand by category (1970-2010)⁶⁷.

4.2. Supply of Gold

In nature, gold occurs extremely rarely, and therefore its production is relatively low and expensive. The current level of supply is made up not only by the mining yield but also by recycled gold i.e. recast from jewellery, bars or coins. Hence, there is no risk of a sudden increase in the supply of gold, since it cannot be increased through artificial creation. This means that huge amounts of gold mined years ago are still in circulation on the market, and they increase the present level of supply. Gold is mined by means of exploitation of

⁶⁶ Ibid., p. 3.

⁶⁷ Ibid., p. 4.

indigenous rocks or of pure gold mines. The size of gold production is determined by natural factors such as the occurrence and content of gold deposits in the rock as well as economical factors such as market price, the cost of exploitation and labour.

In regard to the supply source, we can divide the gold market into a primary and a secondary market. The primary market is composed of mined gold, and the secondary market of recycled gold and the gold sold by central banks and other financial institutions.

Gold mines are located on each continent apart from Antarctica. This geographical diversification allows for low exploitation volatility. During the 40 years following the collapse of Bretton Woods, mine production was the biggest supply source, ranging between 60% and 70% of the total supply⁶⁸. As the World Gold Council estimates, less than 178,000 tons of gold have been mined since the beginning of our civilization⁶⁹. Recalling the Figure 1, this amount can be compared to a 21 cubic meter crate.

The most important mine companies that exploit gold are

- Barrick Gold (Canada) with \$20bn in revenues and 7.16mn ounces/year produced,
- Newmont Mining (USA) with \$11.5bn in revenues and 5.1mn ounces/year produced,
- Anglo Gold Ashanti (South Africa) with \$7bn in revenues and 4.1mn ounces/year produced⁷⁰.

Later on, in the course of time, recycled gold, net producer hedging, net central banks sales and net disinvestment joined the supply distribution. The return of recycled gold on the market as an additional source acts as a price stabiliser in cases of increasing demand.

Over centuries, gold production has changed not only in terms of size but also in terms of geographical location. Along with widespread colonization and exploration of new deposits, the production of gold shifted. As shown in Figure 4, in the 70s, geographically the largest producer of gold (in tons annually) was Africa. Later on, the production shifted to East Asia. In the beginning, the African share in the global supply amounted to 79%⁷¹. By the end of 2010, “no single country supplied more than 14% of global production”⁷². Hence, China became the largest supplier followed by Australia, US, Russia and South Africa. Regarding recycled gold, we could observe yet another shift from the Middle East to East Asia and specifically to China, amounting to 35% and 27%, respectively⁷³. It is estimated that below

⁶⁸ Ibid., p. 7.

⁶⁹ <http://www.gold.org/reserve-asset-management/central-bank-gold-agreements> (28.03.2015).

⁷⁰ <http://www.therichest.com/business/companies-business/the-worlds-ten-largest-gold-mining-corporations/10/> (21.11.2014).

⁷¹ See World Gold Council, 2011a, p. 7.

⁷² Ibid., p. 8.

⁷³ Ibid.

ground reserves amount to 55,000 tons⁷⁴. The graphs below serve as an illustration of the supply structure from 1970 to 2010 by region and by category.

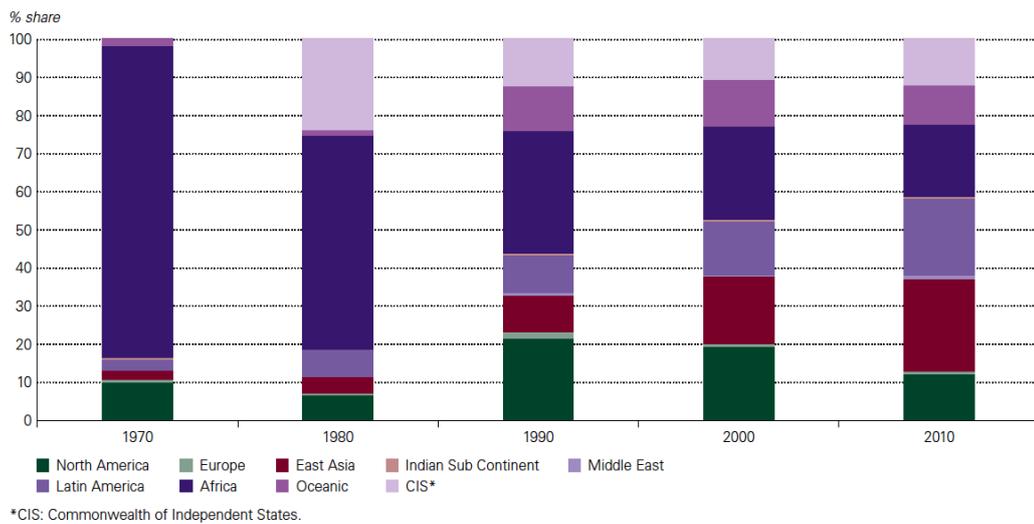


Figure 4: Distribution of gold supply by region (1970-2010)⁷⁵.

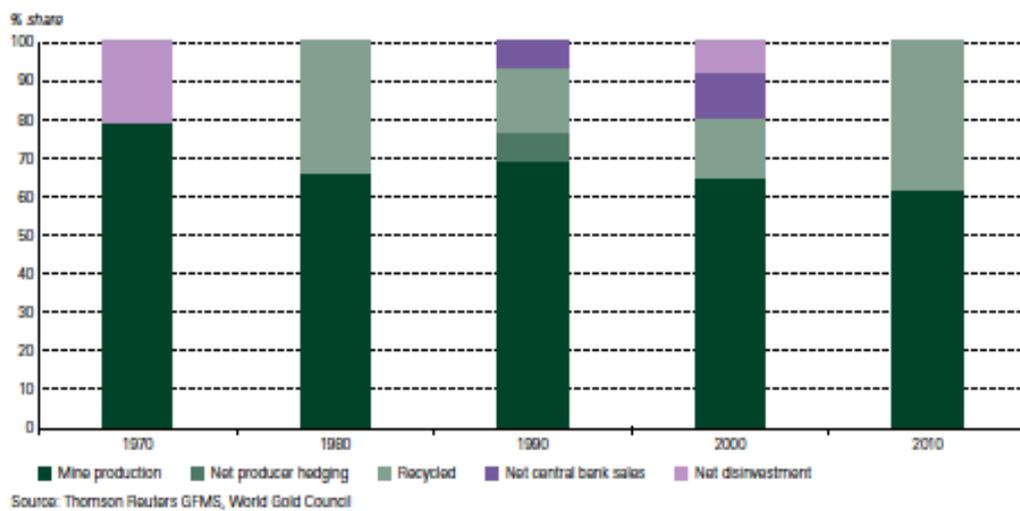


Figure 5: Distribution of mine production by category (1970-2010)⁷⁶.

Still, currently, the biggest holders of gold are countries that were once the pillars of the Bretton Woods system, i.e. USA, Germany, France and Italy. Moreover, gold holdings of such countries like China and India have increased rapidly in last decades. The table below shows the top 40 officially reported gold holdings by country as of December 2014.

⁷⁴ <http://www.gold.org/reserve-asset-management/central-bank-gold-agreements> (25.07.2015).

⁷⁵ See World Gold Council, 2011a, p. 8.

⁷⁶ Ibid., p. 7.

		Tonnes	% of reserves			Tonnes	% of reserves
1	United States	8,133.5	73%	21	Austria	280.0	43%
2	Germany	3,384.2	68%	22	Belgium	227.4	35%
3	IMF	2,814.0	-	23	Philippines	195.1	10%
4	Italy	2,451.8	67%	24	Kazakhstan	191.8	26%
5	France	2,435.4	66%	25	Algeria	173.6	4%
6	Russia	1,208.2	12%	26	Thailand	152.4	4%
7	China	1,054.1	1%	27	Singapore	127.4	2%
8	Switzerland	1,040.0	8%	28	Sweden	125.7	8%
9	Japan	765.2	2%	29	South Africa	125.2	10%
10	Netherlands	612.5	55%	30	Mexico	122.7	2%
11	India	557.7	7%	31	Libya	116.6	5%
12	Turkey	529.1	18%	32	Greece	112.4	70%
13	ECB	503.2	27%	33	BIS	111.0	-
14	Taiwan	423.6	4%	34	Korea	104.4	1%
15	Portugal	382.5	75%	35	Romania	103.7	9%
16	Venezuela	367.6	69%	36	Poland	102.9	4%
17	Saudi Arabia	322.9	2%	37	Iraq	89.8	5%
18	United Kingdom	310.3	11%	38	Australia	79.9	6%
19	Lebanon	286.8	22%	39	Kuwait	79.0	9%
20	Spain	281.6	22%	40	Indonesia	78.1	3%

Figure 6: Top 40 reported official top holdings (December 2014)⁷⁷.

In summary, both the demand and supply side of gold underwent similar changes. In fact, those changes applied to the sectorial and also to the geographical distribution of gold. The table below shows the newest statistics on gold demand and supply with data on QoQ and YoY change.

	2013	2014	Q1'13	Q2'13	Q3'13	Q4'13	Q1'14	Q2'14	Q3'14	Q4'14	Q4'14 vs Q4'13 % chg
Supply											
Mine production	3,050.7	3,114.4	690.2	737.9	802.1	820.5	715.7	742.2	830.7	825.8	1
Net producer hedging	-39.3	42.1	-10.7	-17.9	-5.4	-5.2	8.1	55.3	-6.3	-15.0	-
Total mine supply	3,011.4	3,156.5	679.5	720.0	796.7	815.3	723.8	797.5	824.4	810.8	-1
Recycled gold	1,262.0	1,121.7	363.0	263.3	337.5	298.2	304.1	266.5	270.9	280.2	-6
Total supply	4,273.4	4,278.2	1,042.5	983.3	1,134.2	1,113.4	1,027.9	1,064.0	1,095.3	1,091.0	-2
Demand											
Fabrication											
Jewellery ¹	2,384.6	2,152.9	539.5	746.4	577.1	521.7	561.6	497.0	545.5	548.8	5
Technology	408.2	389.0	103.5	103.5	103.1	98.1	96.1	99.8	97.6	95.5	-3
Sub-total above fabrication	2,792.8	2,541.9	643.0	849.9	680.2	619.8	657.7	596.8	643.1	644.3	4
Total bar and coin demand	1,765.4	1,063.6	460.5	631.4	312.6	360.9	281.9	263.5	235.4	282.8	-22
ETFs and similar products ²	-880.0	-159.1	-176.5	-402.2	-120.2	-181.0	-2.6	-38.7	-32.9	-84.9	-
Central bank net purchases ³	409.3	477.2	130.8	92.1	101.5	85.0	124.3	117.8	116.1	119.1	40
Gold demand	4,087.6	3,923.7	1,057.7	1,171.1	974.0	884.7	1,061.3	939.3	961.7	961.3	9
OTC investment and stock flows ⁴	185.9	354.6	-15.2	-187.8	160.2	228.7	-33.4	124.6	133.6	129.7	-43
Total demand	4,273.4	4,278.2	1,042.5	983.3	1,134.2	1,113.4	1,027.9	1,064.0	1,095.3	1,091.0	-2
London PM fix (US\$/oz)	1,411.2	1,266.4	1,631.8	1,414.8	1,326.3	1,276.2	1,293.1	1,288.4	1,281.9	1,201.4	-6

Table 1. The demand and supply of gold as of 2014⁷⁸.

⁷⁷ See World Gold Council, 2015a, p. 19.

⁷⁸ Ibid., p. 18.

4.3. Gold Market Liquidity

This chapter will focus on the gold market liquidity and its main characteristics. Globalisation has radically changed the way financial markets operate. Its most visible result was the emergence of financial markets in which the participation of many foreign investors increased the number of transactions and trade turnovers. Market liquidity, which is a very important factor in the moment of market entry for each investor, can be described in many various ways. In the literature, market liquidity is defined as follows:

“Liquidity is often defined in terms of the times it takes to sell an asset and still receive full market value. Alternatively, liquidity can be defined in terms of the amount under market value that an asset would command if sold immediately”⁷⁹.

“Liquidity in financial markets – the ability to absorb smoothly the flow of buying and selling orders comes from the depth of buyers and sellers and from market-makers (specialists on the organized exchanges)”⁸⁰.

Furthermore, Kyle (1985) quotes Black (1971) by saying that “the market for a stock is liquid if the following conditions hold:

1. There are always bid and asked prices for the investor who wants to buy or sell small amounts of stocks immediately.
2. The difference between the bid and asked prices (the spread) is always small.
3. An investor who is buying or selling a large amount of stock, in the absence of special information, can expect to do so over a long period of time at a price not very different, on average, from the current market price.
4. An investor can buy or sell a large block of stock immediately, but at a premium or discount that depends on the size of the block. The larger is the block the larger the premium or the discount”⁸¹.

Summarizing those definitions, we can conclude that market liquidity revolves around such factors as the speed/ease of trade, narrow bid-ask spreads, amount of participants, price guarantee and low transaction costs.

⁷⁹ See Kluger & Stephan, 1997, p. 19.

⁸⁰ See Shen & Starr, 2002, p. 53.

⁸¹ See Black, 1971 in Kyle, 1985, p. 1316.

Other properties that describe a liquid market are “‘tightness’ (the cost of turning around a position over short period of time), ‘depth’ (the size of an order flow innovation required to change prices a given amount), and ‘resiliency’ (the speed with which prices recover from a random, uninformative shock)”⁸².

Bhatia et al. (2011) consider the gold market to be liquid and propose an analysis of the gold market liquidity taking into consideration a few of its main characteristics. Firstly, gold is traded on the OTC platform, which, as described in the previous chapters, is one of the most liquid markets in the global economy. This is due to the fact that the OTC platform is an electronic system, which operates around the clock with no specific central location. Here, the liquidity is guaranteed through the high turnover ratio resulting from the great popularity of the platform among private and institutional investors. Secondly, Bhatia et al. (2011) refer to the size of the gold market and say that “the trading volume in the global gold market is significant and greater than trading of the other high quality assets like sovereign debt”⁸³. In order to understand how important the size of the gold market is in assessing its liquidity, Bhatia et al. (2011) compare it to the size of the sovereign debt market. For this reason the comparison excludes the usage of gold in jewellery and technology and only takes into consideration the private and official demand for gold, i.e. the financial demand for gold. In 2010, the year the analysis was carried out, the private and official demand was the second and third largest demand groups respectively, which together amounted to 36%. These shares had a weight of 60,400 tonnes of gold. When multiplied by “the average price for gold in 2010 it gave an estimate of US\$2.4 trillion, which was then compared to the size of the sovereign debt market”⁸⁴. The analysis showed that the gold market is bigger than all sovereign debt markets in Europe and smaller only than the US Treasury market and the Japanese government bond market. Bhatia et al. (2011) conclude that, “simply based on size, the gold market at \$2.4 trillion can provide significant depth and liquidity for large reserve portfolios, as it is only surpassed in size by two sovereign debt markets”⁸⁵. As stated in the beginning of the report by Bhatia et al. (2011), the depth or liquidity of the asset market in regard to central banks plays an essential role due to the fact that reserve managers can buy more assets in fewer transactions which in turn allows for concealing the size of possessed reserves and the activity of the particular country the central bank belongs to. Another advantage of the gold market over the sovereign debt market is that the gold market bares no credit risk and does not constitute an obligation or liability. The debt market might encourage

⁸² See Kyle, 1985, p. 1316.

⁸³ See Bhatia et al., 2011, p. 9.

⁸⁴ Ibid., p. 3.

⁸⁵ Ibid., p. 4.

investors with its size but carries the risk of increasing the deficit and defaulting, which is not observed in the case of the gold market.

Thirdly, Bhatia et al. (2011) notice the importance of the bid-ask spreads in the measurement of the gold market liquidity. The authors state that the global market is characterised by narrow bid-ask spreads, a property, which stands for a deep and liquid market. Additionally, narrow or tight bid-ask spreads account for low transaction costs.

Fourthly, Bhatia et al. (2011) mention the emergence of new markets and stock exchanges. The authors say that “as emerging markets financial systems become more developed and globalised, these local exchanges are likely to see additional trading volume and further support the global liquidity of the gold market”⁸⁶.

Lastly, another factor that demonstrates the gold market liquidity is the diversity of market participants, supply sources and application of gold in various areas. Here, the authors have in mind the importance of geographical dispersal of gold mines which reduces the risk of supply shocks and the availability of recycled gold, both of which serves for increased liquidity in the market.

⁸⁶ Ibid., p. 9.

4.4. Gold Market Volatility

In this chapter the primary focus will be to analyse the volatility of the price of gold. Volatility is a measure of market fluctuations or variations of a given financial instrument or indicator. These fluctuations are often a reflection of investor nervousness caused by many different factors. Volatility is closely related to uncertainty and risk, and therefore it gains importance in times of financial and political instability. Hence, increased volatility increases the prices which might have a negative or positive effect on the return depending on the given investment strategy. Investors facing higher market volatility are taking on more risk, while at the same time expecting more return on allocated capital. Therefore, “risk is often measured by volatility, or the magnitude of return fluctuations around the average return”⁸⁷. There are a few concepts of measuring volatility. In principle, the standard deviation is the most common method and refers to the historical volatility. This method measures the distance (deviation) of a given value from the average. The bigger the deviation, the more volatile is the analysed variable⁸⁸. We shall not forget other methods, including the GARCH method (and its more complicated versions), Black-Scholes or Value at Risk (VaR) method. In 2012, Trück and Liang carried out a study on modelling and forecasting in the gold market. Their study found out that there are no clear-cut results on which method is the most suitable for the gold market; nonetheless, the results were in favour of the GARCH and its variations⁸⁹.

In the market, the uncertainty of future stock prices is reflected in various volatility indices. When prices fluctuate more, the market volatility increases and so do the volatility indices. Hence, the volatility indices do not reflect the direction of the price changes but merely their fluctuations. In the 1990s, the Chicago Board Options Exchange (CBOE) created the Volatility Index (VIX) to measure the volatility of the stock market⁹⁰. The gold price has its own volatility index called the CBOE Gold Volatility Index (GVZ)⁹¹.

In regard to the volatility of commodities, the “volatility is measured by the fluctuations in price that are derived from new information flowing into the market”⁹². In the case of gold prices this could be any information on, for instance, inflation, unemployment or industry quarterly or annual reports. However, quite often “it is the lack of information or uncertainty

⁸⁷ See Biolsi, 2012, p. 4.

⁸⁸ http://www.stockcharts.com/school/doku.php?id=chart_school:technical_indicators:standard_deviation_volatility (27.10.2015).

⁸⁹ See Trück & Liang, 2012.

⁹⁰ See Biolsi, 2012, p. 4.

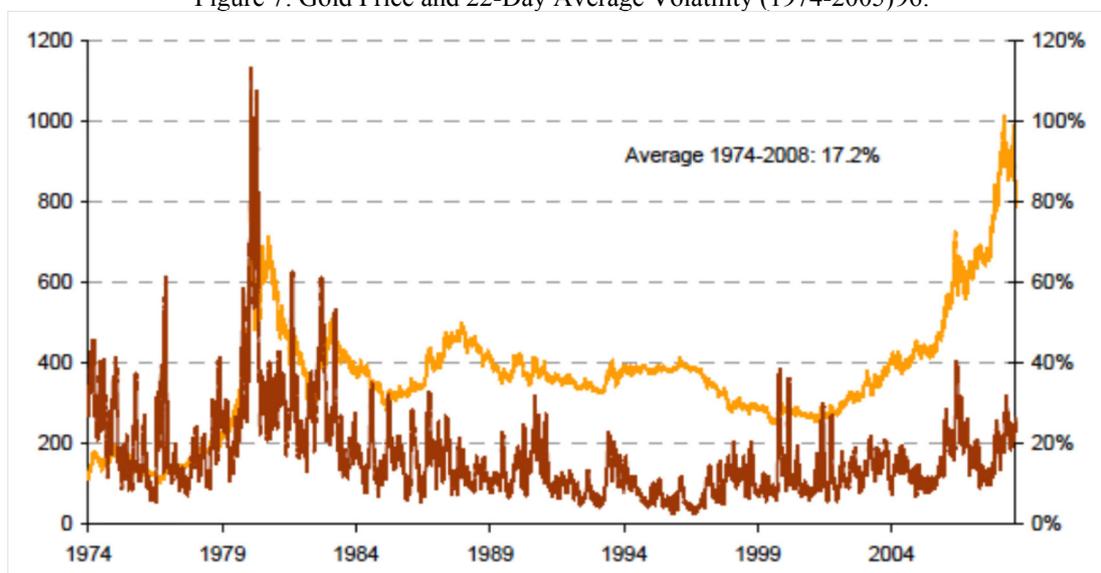
⁹¹ http://www.cboe.com/products/indexopts/gvz_spec.aspx (21.06.2015).

⁹² See Biolsi, 2012, p. 4.

about the demand and supply”⁹³ that causes severe fluctuations in the gold price and its volatility.

The following graphs show when particular events caused volatility spikes in the gold price. Starting with the period after the collapse of the Bretton Woods Agreement to the events that contributed to this behaviour, we can include the sharp increase in oil prices and the Iranian revolution (1979), US and UK inflation (late 1970s) and US inflation (early 1980s)⁹⁴. The volatility surge ended in the early 1990s with the decline of inflation and overall economic improvement in most countries. Later on, the 21st century was again marked by events that brought significant increases of volatility in the gold market, starting with the Internet bubble in 2001. In times during the financial crisis in 2008, the volatility of gold prices increased to 60%⁹⁵. Other periods of gold volatility spikes took place in 2006 and 2011, i.e. during the European sovereign debt crisis and the Iraq war, respectively. In times of moderate or positive news on the market, the gold volatility tends to stabilize which stands for its mean reverting property. This shows that, on average, gold prices are not volatile, as long as there is no event of uncertainty or financial or political instability. The graphs below show the development of the gold price and its volatility during the period 1974-2005 (first graph) and 2005-2012 (second graph).

Figure 7: Gold Price and 22-Day Average Volatility (1974-2005)⁹⁶.



⁹³ Ibid.

⁹⁴ See Wozniak, 2008, pp. 1-3.

⁹⁵ See Biolsi, 2012, p. 5.

⁹⁶ See Wozniak, 2008, p. 1.



Figure 8:
and
(2005-

Gold Price
Volatility
2012)⁹⁷.

Lastly, in the literature, there is sufficient evidence proving gold's low volatility against other assets. According to the 2010 WGC Report, the gold market in the period between January 1990 and December 2009 was slightly less volatile than the S&P 500 Index over the same period. The average volatility of the daily returns on gold amounted to 15.9% compared to 18.4% volatility of the S&P 500 Index per annum⁹⁸. In the event of the 2008 financial crisis, gold was still 10% less volatile than the stock index⁹⁹.

For the following reasons gold proved to be less volatile than other commodities: Firstly, "the gold market is deep and liquid and is supported by the availability of large above-ground stocks. Secondly, in case of sudden supply shocks or demand increase, sudden price increases can be mitigated due to the fact that gold can be recycled and can be quickly brought back onto the market. Thirdly, gold is less vulnerable to regional and country specific shocks due to geographical diversity of mine production and gold reserves"¹⁰⁰.

The following graph shows a juxtaposition of various commodities such as oil, gold, platinum, copper and aluminium, from 2002 to 2004. The yellow line, which represents gold, shows significantly lower volatility.

⁹⁷ See Biolsi, 2012, p. 5.

⁹⁸ See World Gold Council, 2010a, p. 9.

⁹⁹ Ibid.

¹⁰⁰ Ibid.

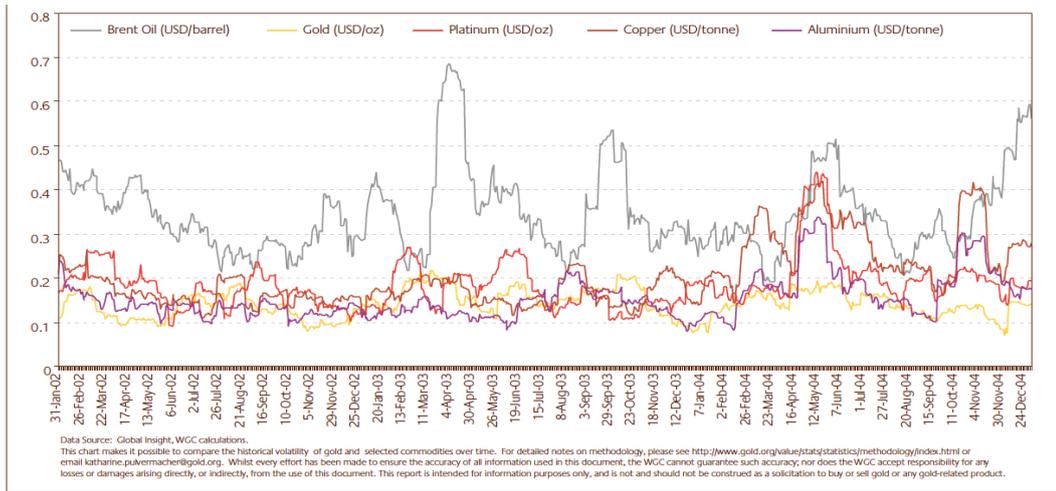


Figure 9: Gold and other commodities - 22-Day rolling historical volatility¹⁰¹.

¹⁰¹ See Pulvermacher, 2005, p. 2.

4.5. Price of Gold

Contemporary gold price movements have their origins in the important events of the 1970s. Then, investors started to earn from gold investment, as it became a tradable commodity. Before I list all the factors that influence the price of gold, I will briefly describe its development over time. The following graph represents the price of gold from the 1970s to the present.

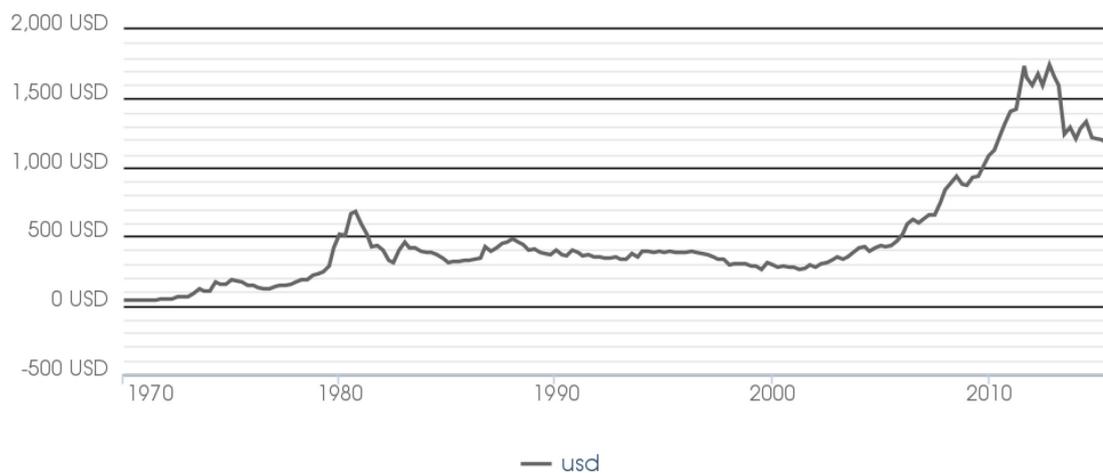


Figure 10. The price of gold (1970-2015)¹⁰².

As we can see from the chart, the price began around \$40/oz. and climbed to \$682/oz. in only ten years, in 1980. Its upward trend continued and, in the outbreak of the 2008 financial crisis, it rose to almost \$1000/oz.. Shortly after the financial crisis, the price of gold continued its ascent reaching \$1800/oz. in just 3 years.. However, by the end of 2013, the gold price bubble burst leaving the gold price at \$1200/oz. On the 24th of July 2015, the gold price “fell to \$1,077.40 the lowest in five years, and has dropped for six weeks in the longest stretch since 2004”¹⁰³. According to the WGC market commentary from the 23th of July 2015, the following four points summarise the major reasons for the sharp fall in the gold price:

- Strengthening of the US economy and the dollar as well as the anticipated rise in US interest rates.
- Disappointment over China’s gold demand.
- Relatively big discounts on the commodity markets, which were caused by the two above-mentioned reasons.

¹⁰² <http://www.gold.org/investment/interactive-gold-price-chart> (15.08.2015).

¹⁰³ <http://www.bloomberg.com/news/articles/2015-08-02/gold-s-m-a-wave-to-roll-on-as-bullion-tumbles-to-five-year-low> (15.08.2015).

- Relatively mild reaction of the gold market to the Greek crisis and its resolution¹⁰⁴.

From just those four points we can observe that there are multiple drivers of the gold price. The diverse literature on the gold price distinguishes short- and long-run drivers in accordance with their effect on the gold price.

In the literature, the most commonly mentioned driver of the gold price is inflation. This long-run driver has a positive influence on the price of gold, as with “higher inflation the fall in the value of the dollar will lead to a rise in the dollar price of gold”¹⁰⁵. Moreover, “if gold is positively influenced by inflation and thus an inflation hedge (in the sense that it fully compensates investors for higher inflation), the price of gold co-moves with the rate of inflation”¹⁰⁶. Hence, a 1% increase in inflation leads to a 1% increase in the gold price, in general.

Secondly, another indicator closely related to the inflation driver of the gold price is the interest rate. The relationship can be described as follows: “high interest rates increase the opportunity cost of holding gold, also known as the ‘cost of carry’ (See Blose, 2010) and will therefore tend to reduce the price of gold. However, since interest rates generally co-move with inflation rates, high interest rates imply high inflation rates and the latter tend to increase the price of gold”¹⁰⁷. Although interest rates are a short-run driver of the gold price, they show that the opportunity cost of holding gold can be high especially because gold does not yield a dividend or interest payments itself¹⁰⁸. The lower the interest rates, the lower the opportunity cost of holding gold is, the higher the gold price, *ceteris paribus*.

Thirdly, another short-run driver of the gold price is the rate of the US dollar. The following two points justify the underlying relationship between the gold price and the value of the US dollar:

- “A falling dollar increases the purchasing power of non-dollar area countries (and a rising dollar reduces it) driving up prices of commodities including gold (or driving them down in case of a stronger dollar).
- In periods of dollar weakness, investors look for an alternative store of value, driving up gold prices. This includes dollar-based investors concerned about possible inflationary consequences of a weak dollar. In strong dollar periods the dollar itself is often seen as an appropriate store of value”¹⁰⁹.

¹⁰⁴ See World Gold Council, 2015b, p. 1.

¹⁰⁵ See Baker & van Tassel, 1985, p. 48.

¹⁰⁶ See Baur, 2013, p. 5.

¹⁰⁷ *Ibid.*, p. 7.

¹⁰⁸ *Ibid.*, p. 12.

¹⁰⁹ See Oxford Economics, 2011, p. 8.

In 2008, 40-50% of the fluctuations in the gold price can be attributed to the change in the exchange rate of the US dollar¹¹⁰.

Fourthly, as a short-run driver we can also consider the influence of political and financial instability on the gold price. For the following reasons the relationship holds:

- “Steep declines in the value of other assets such as equities and high volatility of assets prices, leading demand for a more stable store of value uncorrelated with other assets.
- Fears about the security of other assets such as bonds due to the possibility of default, and even fears about cash if the health of the banking system is in question – the fear of systemic collapse.
- The need for liquidity in an environment where it may be difficult to realise the value (or the full value) of other assets”¹¹¹.

Political and financial uncertainty had the strongest influence on the gold price in times of unrest in the Middle East (Iranian Revolution and Afghan wars), in 1979 and in the early 1980s. Moreover, the financial crisis of 2008 and the WTC terrorist attacks of 9/11 are yet other examples of a significant increase in the gold price due to market uncertainty.

Gold is a commodity that, on account of its specific and multidimensional features, creates a certain set of functions and factors that influence its price, which are in turn formed in the course of socio-economical development. In summary, many factors influence the price of gold, and it is difficult to clearly state which one dominates.

¹¹⁰ Ibid.

¹¹¹ Ibid., p. 9.

5. Motives for Holding Gold

The main objective of this thesis is to present the main results from the scientific literature on the motives behind gold investment. Each chapter presents a wide range of study papers, which contributed to the subject. Moreover, each chapter provides a table, which shall serve as a quick overview of the literature. Each table consists of such details as the date and authors of a publication, countries or currencies and time period, controlled variables and a short description of the results. The conclusions made at the end of this thesis serve on the one hand as a summary and on the other hand as a reflection on the role of gold in the global economy.

5.1. Literature Review

The table below shows each motive behind gold investment and the authors who contributed to its analysis.

Motives	Literature Review
Gold as a Store of Value	Jastram (1977), Harmston (1998), Faugère (2013)
Gold as a Safe Haven and Hedge	Baur & McDermott (2010), Baur & Lucey (2010), Anand & Madhogaria (2012), Hood & Malik (2013), Li & Lucey (2014), Berger et al. (2014)
Gold as an Inflation Hedge	Chua & Woodward (1982), Laurent (1994), Mahdavi & Zhou (1997), Worthington & Pahlavani (2007), Wang et al. (2011), Beckman & Czudaj (2012)
Gold as a Currency Hedge	Sjaastad & Scacciavillani (1996), Capie, Mills & Wood (2004 and 2005), Sjaastad (2008), Joy (2011), Reboredo (2013).
Gold as a Portfolio Diversifier	Sherman (1982), Jaffe (1989), Hillier, Draper, Faff (2006), Conover, Jensen, Johnson & Mercer (2009)

Table 2. Summary of literature on motives for holding gold.

5.2. Gold as a Store of Value

Before discussing gold as an investment safe haven, inflation or currency hedge and portfolio diversifier, it is essential to mention the role of gold as a store of value. Long a tradition, gold has always had a relatively strong purchasing power. Hence, the purchasing power of gold tells us how many goods and services can be bought for one ounce of gold. To measure the development of purchasing power of gold over time, the calculation involves dividing the gold price index year after year by the corresponding price index for goods and services¹¹². This challenge was taken up by Roy Jastram, who analysed the purchasing power of gold in the United States and United Kingdom between 1560 and 1976. According to Jastram, throughout this period, gold owes its constant purchasing power to the *retrieval phenomenon*¹¹³ which assumes that “gold prices do not chase after commodities; commodities’ prices return to the index level of gold over and over”¹¹⁴. This concept was further extended by Stephen Harmston in 1998. In his study, the prices for good and services were replaced by wholesale prices, as they are obtained sooner on the market. Apart from the data from the US and the UK, the study includes data from three other countries such as Germany, France and Japan. The analysed periods for each country differ but not significantly. Those are as follows:

- USA: 1796-1997
- UK: 1596-1997
- Germany: 1873-1997
- France: 1820-1997
- Japan: 1880-1997

Furthermore, Harmston gives two requirements according to which gold acts as a store of value. Those are as follows: “gold must maintain its rate of exchange with other goods and services, or gold must be expected to return to an historical rate of exchange”¹¹⁵. Similarly, Faugère (2013) states that gold owns its store of wealth property to the following two features: firstly, the purchasing power of gold-denominated perpetuity is preserved, and secondly this perpetuity is also priced in a competition with other interest-yielding assets that serve as a substitute inflation hedge and/or safe haven instruments”¹¹⁶. The analysis made by

¹¹² See Harmston, 1998, p. 9.

¹¹³ See Jastram, 1977, p. 179.

¹¹⁴ Ibid.

¹¹⁵ See Harmston, 1998, p. 5.

¹¹⁶ See Faugère, 2013, p. 1.

Harmston (1998) showed similar results for all five countries, which can be observed in the graph below.

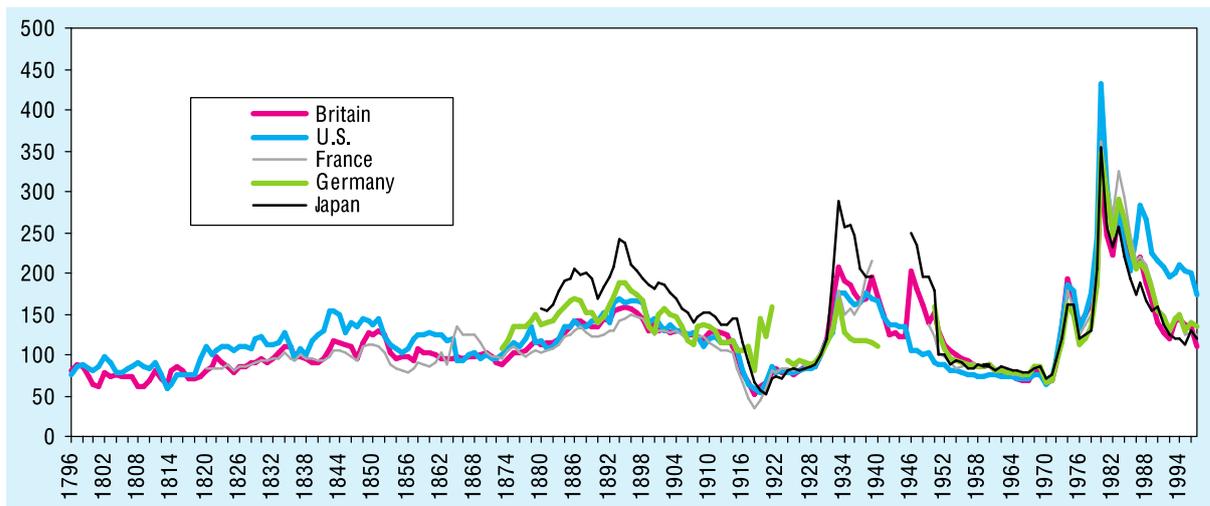


Figure 11: The purchasing power of gold 1796-1997: A five-country comparison¹¹⁷.

As we can see, each coloured line that represents one country moves in similar manner indicating that events affected the purchasing power of gold similarly.

In all five countries, the purchasing power of gold was stable until the beginning of World War I. In the meantime, events such as the American Civil War in the US (1861-1865) and the Napoleonic Wars (1799-1815) in Europe caused that the purchasing power decreased but recovered shortly afterwards. A similar observance could be made during both World Wars as well as during other lesser ones. The author explains this event as follows: “In such times the prices of other commodities, more immediately useful for the war effort, have tended to rise faster”¹¹⁸ decreasing the demand for gold. After World War II the purchasing power of gold returned shortly to its historical rates. However, this didn’t last long. Just after the collapse of the Bretton Woods agreement, in 1977, the purchasing power of gold surged sharply in all five countries. Harmston says that that this increase “was partly a reaction to the prolonged period during which the dollar gold prices had been fixed”¹¹⁹. The upward trend lasted around ten years. Later on, after reaching its peak in the early 1980s, the purchasing power of gold decreased until the early 2000s. The financial crisis of 2008 and the gold bubble of 2011 were other events that had an immense effect on the purchasing power of gold. During these events, the gold price increased uncontrollably and so did its purchasing power. Subsequently, the purchasing power of gold has experienced gradual moves, tied to the inflation rate, the dollar

¹¹⁷ See Harmston, 1998, p. 30.

¹¹⁸ Ibid., p. 6.

¹¹⁹ Ibid., p. 5.

and the US economy in general. However, the most recent gradual decline of gold has left investors feeling slightly confused about its future development.

In summary, Harmston concludes that gold serves as a “long-term store of value”¹²⁰. The author says that although gold’s purchasing power lost its strength in times of war and became instable, features such as “liquidity, acceptability and portability have been particularly important qualities and may well be more pertinent than gold’s rate of exchange with paper money”¹²¹. Through reverting to its historical purchasing power parity, gold showed its untarnished property to preserve wealth. This idea introduces the concept of gold as a safe haven, which will be discussed in the next chapter. The following table summarises the available literature on the discussed property of gold.

Author(s) and date of publication	Period covered and countries	Statistical method	Analysed variables	Results
Jastram (1977)	USA and UK	n.d.	Gold prices and wholesale prices.	Positive evidence indicating gold property to store value.
Harmston (1998)	US (1796-1997), Britain (1596-1997), France (1820-1997), Germany (1873-1997) and Japan (1880-1997).	n.d.	Gold prices and wholesale prices.	Positive evidence indicating gold property to store value.
Faugère (2013)	UK (1821-1914) and US (1873-1914).	Vector Error Correction Model (VECM).	Annual observations for UK and monthly observations for US.	Positive evidence indicating gold property to store value.

Table 3. Summary of literature on gold as a store of value.

Apart from the theoretical approach, gold investment for the mere purpose of enlarging one’s collection of jewellery, coins or bars, can also serve as a storage of value. In this case, this property is also associated with gold’s extraordinary characteristics, which have been repeatedly mentioned in this thesis. The motive behind this kind of investment lies in the sentimental attitude towards gold as a precious metal, ignoring the main determinants of its price, such as inflation, interest rates and currency rates, among others. Here, the focus is based on the aesthetic and appeal values of the metal, its beauty, shine and adornment.

¹²⁰ Ibid., p. 54.

¹²¹ Ibid., p. 3.

5.3. Gold as a Safe Haven and Hedge

The analysis of long-term price tendencies for gold and the on-going discussion in media point out the huge change in the attitude towards the gold market. From the current perspective, however, it is difficult to judge if this attitude will prevail or if it is only an expression of temporary anxiety and the willingness to protect against the unrecognizable and unpredictable consequences of financial crises. What is more, no one can tell if the value of gold in its final valuation is an arbitrary dimension or a resultant of all the factors that create a kind of financial mysticism around it. This should be kept in mind when talking about gold as a so-called safe haven, which will be discussed in this chapter.

The most applicable definition of haven can be found in the Merriam Webster dictionary, which defines haven as “a place of safety or a place offering favourable opportunities or conditions“¹²² and hedge as a “means of protection or defence“¹²³. Following this, the definitions of safe haven and hedge in regard to gold can be found in many scientific papers on this matter, many of which base their analysis on the definitions found in the papers by Baur and McDermott (2010) and Baur and Lucey (2010). Baur and McDermott state that “in times of stormy weather, ships seek out the safe haven of a port or harbour to ride out the storm. A safe haven asset must therefore be some asset that holds its value in ‘stormy weather’ or adverse market conditions“¹²⁴.

The authors distinguish two types of safe haven, i.e. strong and weak, which is defined as follows:

“Strong (weak) safe haven is an asset that is negatively correlated (uncorrelated) with another asset or portfolio in certain periods only, e.g. in times of falling stock markets“¹²⁵.

In the same manner, the authors define strong (weak) hedge:

“Strong (weak) hedge is an asset that is negatively correlated (uncorrelated) with another asset or portfolio on average“¹²⁶.

There are two main differences between those two gold properties. Firstly, both properties differ in the duration of the effect. Both studies (by Baur & McDermott, 2010 and Baur & Lucey, 2010) agree that the safe haven property is short-lived and that the hedging property is

¹²² <http://www.merriam-webster.com/dictionary/haven> (29.03.2015).

¹²³ <http://www.merriam-webster.com/dictionary/hedge> (29.03.2015).

¹²⁴ See Baur & McDermott, 2010, p. 1886.

¹²⁵ Ibid., p. 1889.

¹²⁶ Ibid.

a long-term effect. The short-lived safe haven property was measured by Baur & Lucey (2010). The authors analysed a portfolio consisting of bonds and stocks over 50 trading days following an event which greatly shook the market. The results showed that a gold investment yields positive returns on the day of the extreme market shock, but is then followed by a decline in price over the remainder of the adverse event (on average, 15 days in the UK, 10 in the US, and 1 in Germany). The authors explain that “gold is a safe haven when it is needed most but is not a safe haven, and is not supposed to be, in periods of rising stock markets”¹²⁷. From this, a second difference states that gold acts as a safe haven only in times of crises or uncertainty and as a hedge on average.

The following table summarises the literature on gold’s property to act as a safe haven or hedge against various other indices in various countries and time periods.

Author(s) and date of publication	Period covered and countries	Statistical method	Analysed variables	Results
Baur & McDermott (2010)	1979-2009; G7 countries, BRIC countries, Australia, Switzerland	GARCH	Data on daily, weekly and monthly stock returns (in domestic currency) and the prices of gold.	Gold acts as a safe haven and hedge in major European markets and USA but not in Australia, Canada, Japan and BRIC countries.
Baur & Lucey (2010)	1995-2003; USA, UK and Germany	GARCH	Data on stock, bond and gold returns.	Gold acts as a hedge against stock on average but as a safe haven in extreme market conditions.
Anand & Madhogaria (2012)	2002-2011; USA, UK, Japan, India, Germany China	Granger causality in the Vector Error Correction Model	Data on gold prices and stock indices.	Gold acts as safe haven in developing countries but not in developed countries.

Hood & Malik (2013)	1995-2010; USA	GARCH	Data on daily spot prices of gold, silver and platinum, S&P 500 Index and the VIX Index.	VIX is a superior hedging tool and serves a better safe haven than gold.
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¹²⁷ See Baur & Lucey, 2010, p. 218.

Baur & McDermott (2013)	1980-2010; USA	VAR	Data on gold against bonds.	Gold is a stronger safe haven than bonds.
Li & Lucey (2014)	1989-2013; USA	GARCH	Data on gold, silver, platinum and palladium against stocks and bonds.	In certain periods, other metals seem to be a stronger safe haven than gold.
Beckmann et al. (2014)	1970-2012; 18 individual economies (British pound, Euro, Chinese renmimbi, Swiss franc, among others) and 5 regional indices (Emerging countries, EMU, EU, North America, among others).	GARCH	Monthly data on gold prices in various currencies and stock indices from various regions.	Gold acts as safe haven and hedge but the property is market-specific.

Table 4. Literature summary on gold's property as a safe haven and hedge.

The analysis of the observed historical gold price movements in times of crises or market turmoil and its particular correlation with stocks, bonds, and other commodities serves as a base to define gold as a safe haven or/and hedge asset. From Table 3 it is visible that the 7 papers cover various time periods, countries and test methods.

The majority of researchers chose the time period between the 1970s and the 1990s as a starting point and the early 2000s as a finish line. The data contains daily, weekly and monthly frequencies, which gives the opportunity to obtain very detailed results on the short-term safe haven property of gold. The table below summarises time periods when gold served as a safe haven against stocks and bonds. Some periods were labelled with specific events in parentheses.

	Versus stocks	Versus bonds
Safe haven	Q4 1987 (stock market crisis), Q1 1993 (market recession in the USA), Q2 1996, Q4 1997 (Asian crisis), Q4 2009 (global financial crisis), Q2 2010, Q4	Q3 and Q4 1992, Q1 1998, Q3 2001 (WTC attacks), Q1 2003, Q1 2004, Q2 2008 (global financial crisis), Q3 and Q4 2010

	2012 (European sovereign debt crisis)	
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Table 5. Time periods when gold acted as a safe haven against stock and bonds¹²⁸.

In regard to the analysed countries, the scope is very rich. In general, the results show that gold acted both as a safe haven and hedge in the USA, UK, Germany and France. In countries such as Australia Canada, Japan and the BRIC countries, gold was seen to serve as neither hedge nor safe haven. Although, some papers focus on a few important countries, there are papers that include smaller countries and regions. Nevertheless, an interesting classification is made, suggesting that the safe haven property is stronger in developed countries rather than in emerging ones. Anand & Madhogaria (2012) give a good explanation for this phenomenon by saying that, in emerging countries such as India or China, gold is not just “a mere asset to earn return on”¹²⁹. In these countries, gold investment is triggered by individual sentiments and emotions, which are linked to culture and worship of holy traditions. In developed countries, “since people are very practical and not guided by sentiments, emotions, customs and traditions, gold investment is treated as normal commodity investment”¹³⁰. This distinction translates well into the demand side in regard to the geographical dimension.

Furthermore, most of the papers use one common statistical method, which is the GARCH method or a variation of it. The reason for choosing the GARCH model is that it suitably reflects the stochastic behaviour of gold and other assets, taking into account the volatility of gold prices.

The controlled variables are most predominantly gold prices against stocks and bonds. However, some studies also include other commodities (Li & Lucey, 2014) or indexes (Hood & Malik, 2013). In this case, the authors suggest other variables that might serve as a better safe haven than gold, such as the return on other precious metals like platinum, silver and palladium or the Volatility Index (VIX).

The study by Li & Lucey (2014) shows that, in times when gold does not act as a safe haven, other metals, such as silver, platinum and palladium, might take its place or even possess a stronger safe haven property. Examples of periods when other metals acted as better safe haven assets include “Q3 1996 (silver and equity), Q3 2000, Q2 1997 and Q1 2010 (palladium and equity) and Q4 1999 (silver and bonds)”¹³¹.

According to Li & Lucey (2014), these metals differ from each other both in demand and supply structures as well as in their correlation with stocks or bonds. Although silver,

¹²⁸ Summary based on Li & Lucey, 2014, p. 10 and on own interpretation.

¹²⁹ See Anand & Madhogaria, 2012, p. 28.

¹³⁰ Ibid., p. 31.

¹³¹ See Li & Lucey, 2014, p. 7.

platinum and palladium belong to the same group of precious metals, “gold’s volatility responds only to monetary variables, such as inflation, interest rate and growth rate of the money supply, platinum and palladium respond to both monetary and financial variables, which include S&P500 index returns, while silver responds to neither of them”¹³². For these reasons, the authors suggest that other precious metals can act as a substitute when gold does not react accordingly to market changes. By showing the investment potential of other metals and indexes, Li & Lucey (2014) suggest that there might be an investment alternative to gold in times when gold loses its safe haven or hedge properties in the future.

The intuition behind introducing the Volatility Index (VIX) by Hood and Malik (2013) as an alternative to gold is that volatility is tradable and shows a significantly more negative correlation with stocks at all times (low or extremely high volatile market) than gold. The highest negative correlation between VIX and S&P 500 was documented in the H2 2008 and amounted to -87%. At that time, gold’s correlation with S&P 500 was around 8%¹³³. Another example of a volatility index’s advantage over gold is portfolio analysis. Here, a portfolio consisting of “just 15% VIX and 85% S&P 500 is able to reduce the risk of the market by 42% and still provide a mean return of 0.05%”¹³⁴. This makes the VIX index a much stronger hedging instrument than gold and a better protector against potential investment losses, as a result.

Lastly, Beckmann and Czudaj (2014) point out two drawbacks of studies which deal with gold’s properties as a more effective hedge or safe haven compared to stocks. First of all, when analysing the property in countries outside the US, stocks and gold prices are given in the local currency. As gold is mainly traded in US dollars, an arbitrage possibility between the dollar and local currency arises. The authors say that “through arbitrage conditions, changes in the dollar price of gold also change the gold prices in other currencies. On the other hand, domestic stocks are mostly traded in the domestic currency and are not directly affected by changes of the US dollar (or other foreign currencies)”¹³⁵. The topic of gold prices and currency exchange rates will be covered in the fifth sub-chapter.

Secondly, the authors stress that the “different composition of the country indices across countries”¹³⁶ might also play an essential role in result estimations. What is meant is that countries such as “Canada or Australia have much more natural resources firms in their indices than many other countries. Consequently, we would expect to see a different

¹³² Ibid., p. 3.

¹³³ See Hood & Malik, 2013, p. 51.

¹³⁴ Ibid.

¹³⁵ See Berger et al., 2014, p. 11.

¹³⁶ Ibid.

relationship between gold and the stock indices in these countries, and gold and the indices from countries with less exposure to resources”¹³⁷.

In summary, the main conclusions from the presented papers are as follows:

- Gold acts as safe haven in the short run (max. 15 trading days) and during extreme market shocks and as a hedge in the long-run and in normal times.
- Gold acts as a safe haven in emerging countries and as a hedge in developed countries.
- There is at least one alternative asset to gold which can act as a safe haven/hedge in times when gold is a weak safe haven/hedge or when it indicates no such activity at all.

¹³⁷ Ibid.

5.4. Gold as an Inflation Hedge

This chapter will focus on the issue of gold as an inflation hedge by means of statistical methods as found in some scientific papers.

Already as far back as 1982, researchers discovered that there is a significant relationship between gold and inflation. This relationship relies, of course, on the differentiation between long- and short-run regimes. On the one hand, a long-run regime is characterized by systematic cointegration and the fact that the “hedging value of gold as an asset is determined by the magnitude and volatility of the domestic inflation rate relative to changes in the value of gold”¹³⁸. On the other hand, due to the tendency to more erratic and volatile behaviour of gold prices¹³⁹, the relationship does not hold in the short-run. Laurent (1994) explains that this arises from the “complex nature of the decision to shift between gold and fiat money as a store of value, and shifts in foreign demand of gold”¹⁴⁰. Furthermore, he says that the erratic shifts in the gold price are therefore a consequence of investors’ indecisiveness when it comes to choosing between paper money and the fixed amount of gold available in the short-run. The author says that investors’ sentiment towards gold as a safe investment increases in times when the monetary policy of governments and central banks does not fulfil their expectations, and as a result, the value of paper money decreases. It seems that even more than the influence of gold on inflation, the attitude of the public towards the decreasing value of paper money increases the demand for gold and, as a consequence, also its price¹⁴¹. In other words, many investors are sceptical towards paper money, which loses value due to sharp changes in the inflation and monetary policy. However, the increase in gold prices can be also caused by other factors different from domestic ones, such as a rise in foreign demand for gold¹⁴². Furthermore, there is also another important disadvantage of inflation, which increases the importance of gold as an alternative source of value. Inflation implies rising interest rates and makes borrowing money more expensive. Therefore, investors may seek alternative possibilities of capital allocation such as gold investment. Increasing interest rates as a side effect of inflation also plays here an important role.

In summary, there are two features of gold’s property to hedge against inflation that are most often mentioned in the literature. Firstly, gold and inflation have the tendency to comove or cointegrate, in the long run. Secondly, in the short run, the relationship features increased

¹³⁸ See Chua & Woodward, 1982, p. 191.

¹³⁹ See Laurent, 1994, p. 2.

¹⁴⁰ Ibid., p. 2.

¹⁴¹ Ibid., p. 9.

¹⁴² Ibid., p. 8.

volatility of gold prices, which makes it more erratic. This in turn makes gold a weaker inflation hedge in the short run. These characteristics have been studied from different perspectives and by using different methods of statistical regression, all of which is presented in the table below.

Author(s) and date of publication	Period covered and countries	Statistical method	Analysed variables	Results
Chua & Woodward (1982)	1975-1980; Canada, USA, UK, Germany, Japan and Switzerland	Simple statistic regression	Monthly and bi-annual data on gold prices and domestic CPI.	Gold was an effective hedging medium only in the US.
Mahdavi & Zhou (1997)	1970-1994; USA	Cointegration and error-correction regression techniques of Engle & Granger (1987).	Data on gold and consumer prices.	Gold prices are too volatile and market specific to establish a cointegration relationship.
Worthington & Pahlavani (2007)	1875-2006; USA	Zivot & Andrews (1992) unit root tests and Saikkonen & Lütkepohl (2000a, b and c) cointegration analysis.	Monthly prices of gold and inflation and taking into account endogenous structural breaks ¹⁴³ .	Gold investment acts as an inflation hedge in the long run.
Wang et al. (2011)	1971-2010; USA and Japan	Linear cointegration test of Engle & Granger (1987), non-linear threshold cointegration test of Enders & Siklos (2001) and TC-TVECM ¹⁴⁴	Low and high momentum regimes including the rigidity of gold price adjustment.	In low momentum, gold was unable to hedge neither in the USA nor in Japan, in high momentum only in the USA.

Beckman & Czudaj (2012)	1970-2011; USA, UK, Euro Area	Markov-switching vector error correction	Monthly data on gold price, CPI and PPI from the tested countries.	Gold investment acts as an
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¹⁴³ Endogenous structural breaks are economic crises, changes in institutional arrangement, policy changes and regime shifts.

¹⁴⁴ TC-TVECM stands for Threshold Correction-Threshold Vector Error Correction Model.

	and Japan	model (MS-VECM).		inflation hedge only partially in the long run. The hedging property is stronger in the USA and the UK.
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Table 6. Literature summary on gold's property as an inflation hedge.

Of course, the secret behind the popularity of gold investment lies not only in the cointegration relationship with the inflation rate. In general, many investors choose commodities because, as physical assets, they are the best way to hedge against rising prices, which reduce the returns of purely financial assets like stocks and bonds. However, unlike most commodities, “gold is durable, relatively transportable, universally acceptable and easily authenticated”¹⁴⁵. Another feature worth mentioning in this case is that gold prices are determined in flexible markets with forward-looking expectations. Therefore, they “can quickly incorporate events and news, which might affect the expected inflation rate. Prices of goods and services included in the CPI-basket on the other hand, generally adjust more slowly as sellers gradually react to changing market conditions”¹⁴⁶.

Incorporating all this into the long and short run, “the theoretical model of cointegration shows that an increase in expected inflation will force investors to buy gold, either to hedge against the expected decline in the value of money or to speculate due to the associated rise of the gold price. This generates a purchasing pressure, which leads to an immediately rising price of gold during the upward revision in inflation expectations. Thus, changes in expected inflation will cause changes in the price of gold, and investors with knowledge regarding future inflation have the ability to gain excess revenues by purchasing and selling gold in spot and futures markets in anticipation of prospective market adjustments”¹⁴⁷. Therefore, all of the above-mentioned characteristics of gold and the gold-inflation relationship support a justifiable motivation to invest in gold for inflation hedging purposes. However, although the logic and appearance of gold's property to hedge against inflation has been proved numerous times, the problem lies in the quality, timing and geographical location of the hedging property itself. In other words, the biggest perplexity around gold's hedging property against

¹⁴⁵ See Worthington & Pahlavani, 2007, p. 2.

¹⁴⁶ Ibid., p. 3.

¹⁴⁷ See Beckmann & Czudaj, 2012, p. 4.

inflation can be found in its effectiveness to take into account various time periods and cross-country analysis.

Most researchers that deal with this subject try to find an explanation for the confusion between the long and short-run discrepancy between those two indices. In the literature, the most common and predominant methods used to test for the gold-inflation relationship are cointegration and error-correction regression models. The cointegration model is used to test gold's property to hedge against inflation in the long run, whereas the error correction model is used to check for short-run dynamics and gold's ability to adjust to inflation. On the one hand, the intuition behind using cointegration and error-correction models lies in the fact that these methods assume that two or more non-stationary variables may be cointegrated i.e. that "their levels move in tandem in the long-term, reflecting a long-term relationship"¹⁴⁸. Moreover, if this is true, then there is a stationary relationship between two or more non-stationary variables, and an error correction representation exists, if those two variables are cointegrated. On the other hand, if there are short-term changes in one variable, they reflect "not only its own past changes and the changes of the other variable but also current adjustments to correct for past deviations (errors) from the stable long-term relationship"¹⁴⁹. Many researchers presented in the table favour the Engle & Granger (1987) cointegration and error-correction technique. Nevertheless, in the course of time, other researchers suggest other regression techniques by also taking into account other variables. The criticism of conventional techniques is that they are unable to prove the existence of a stable long-run relationship between gold and inflation, "because they ignore the substantial structural changes associated with the transition of gold from being the basis of the global monetary system, with often heavy official intervention, to a commodity like any other"¹⁵⁰. Structural changes or breaks are economic crises, changes in institutional arrangements, policy changes and regime shifts. Moreover, other papers (Wang et al. 2011) favour more complex models (such as the threshold correction-treshold vector error correction model) because they allow for non-linearity and test for the dependence of transition costs, business cycles and the imperfections in the market competitiveness, as endogenous variables generated by market forces¹⁵¹. Furthermore, Beckmann & Czudaj (2012) think that the Markov switching-vector error correction model is better in cases when market specific factors, market shocks or changes appear in a random or stochastic manner¹⁵². All in all, no matter which method is

¹⁴⁸ See Mahdavi & Zhou, 1997, p. 481.

¹⁴⁹ Ibid.

¹⁵⁰ See Worthington & Pahlavani, 2012, p. 4.

¹⁵¹ See Wang et al., 2011, p. 808.

¹⁵² See Beckmann & Czudaj, 2012, p. 10.

used or variables controlled, the gold-inflation relation is supported in more or less similar environments. The factors that prove otherwise are most commonly linked to time and geographical location.

The time periods tested in the literature generally cover the period after the collapse of Bretton Woods to the present. Undoubtedly, scientific papers that use short time periods arrive at less clear-cut or mixed results in comparison with papers whose sample period is extended to 20 or 30 years. Although the available literature on the subject contains some explanation on specific time horizons in which gold acted as inflation hedge, a straightforward and unambiguous conclusion on when it was the most effective is not given or seems difficult to find. However, from the available literature, Worthington & Pahlavani (2007) state that the most effective gold hedge against inflation can be attributed to the 1970s and early 1980s, i.e. in times of the oil crisis and the Afghan wars, respectively¹⁵³.

Lastly, as can be taken from the table, the majority of research covers the American market with only a few conclusions made in regard to other countries. This calls for future investigation into other countries such as in the Euro zone.

In summary, in order to fully analyse gold's hedging property against inflation, it is essential to take into account the time period, market and country specifications. From the amount of literature and statistical models, there is no clear-cut statement that gold is a good long-term hedge against the fluctuations in consumer prices. The most accurate conclusion made on this topic was by Wang et al. (2011): "There is no denying that gold is a good hedge against fluctuations in consumer price, however, it is not absolute anywhere and anytime"¹⁵⁴.

¹⁵³ See Worthington & Pahlavani, 2012, p. 7.

¹⁵⁴ See Wang et al., 2011, p. 818.

5.5. Gold as a Currency Hedge

The gold-dollar relationship, discussed in this chapter, has received sufficient attention in the literature, which is presented in the table below.

Author(s) and date of publication	Period covered and currencies	Statistical method	Analysed variables	Results
Capie, Mills & Wood (2004 & (2005)	1971-2004; USA and Japan	GARCH	Weekly data on the gold price, sterling-dollar and yen-dollar exchange rates.	Gold served as a hedge against dollar exchange rates changes but was dependent on political attitudes and events. Poor evidence for safe haven.
Joy (2011)	1986-2008; 16 currencies	GARCH	Data on the gold price and 16 US dollar exchange-rate pairings (home currency per US dollar)	Gold served as a hedge against the US dollar but not as a safe haven. Gold serves also as an effective hedge against currency risk linked to the US dollar.
Reboredo (2013)	2000-2012; USA	ARMA, TGARCH ¹⁵⁵ and copula for average and extreme market dependence.	Weekly data on gold prices and US dollar.	Gold acts as an effective hedge and safe haven against the US dollar.

Table 7. Literature summary on gold's property as a currency hedge.

The relationship between currency exchange rates and gold has been studied by Sjaastad and Scacciavillani (1996) and by Sjaastad (2008), among others. Both papers point out that changes in exchange rates of major currencies have a major effect on gold prices in all currencies. The authors also both agree that gold is a perfect candidate to test those effects as they say that a "highly homogenous commodity like gold is traded almost continuously in well-organized spot and future markets. Moreover, as annual production (and consumption) of gold is minuscule compared with the global stock, the gold-producing countries, not all of whose currencies are traded in organized markets, are unlikely to dominate the world gold

¹⁵⁵ ARMA stands for the Autoregressive Moving Average Model and TGARCH stands for the Threshold Generalized Autoregressive Conditional Heteroscedasticity Model.

market”¹⁵⁶. Furthermore, the authors define commodity market domination by saying that, “to dominate the world market for any commodity, a country must have an extremely elastic excess demand for that commodity. When stocks are small compared with annual production and consumption (as in the case of wheat or copper), a country must be a major producer and/or consumer in order to dominate the price of a commodity. Precious metals are unusual in that stocks are very large compared with annual production and/or consumption and hence a country with a high propensity to hoard gold might dominate the world gold market without being a major, or even minor, producer”¹⁵⁷. Therefore, the countries with the highest gold reserves are also the countries that dominate the gold market, which, as in our case, is the United States. The particular amount of gold holdings by country as of September 2014 can be taken from Figure 6 of this thesis.

Going deeper into the literature, we find that there are two types of gold vs. dollar hedge, i.e. internal and external. On the one hand, an internal hedge provides protection against “internal or domestic changes in the purchasing power of the dollar. On the other hand, external hedge is responsible for protecting the allocated capital from changes in the external purchasing power of the dollar”¹⁵⁸. Therefore, in the case of an internal hedge, the analysed variable, apart from the gold price, is the US price index. In the case of an external hedge, the analysed variable turns out to be the gold price and the currency basket consisting of a wide range of world currencies.

The majority of papers apply the GARCH method or its more complex variations. However, although this method proves that gold acts as a hedge against currency exchange rates, it does reject the safe haven property of gold (Capie et al. (2004) and (2005) and Joy (2011)¹⁵⁹). However, by using a far more sophisticated regression, Reboredo (2013) proves the opposite. The author achieved this by implementing the copula mathematical equation in order to test for gold’s behaviour in relation with currency exchange rates on average and including extreme market conditions. Reboredo (2013) says that a “combination of strengthened gold prices and USD depreciation opens up the possibility of using gold as a hedge against currency movements and as a safe haven”¹⁶⁰.

As for the time period covered in the literature, the time horizon spans from the times when gold became a commodity (1970s) until the turn of the century. In the period before the

¹⁵⁶ See Sjaastad, 2008, p. 119 and Sjaastad & Scacciavillani, 1996, p. 880.

¹⁵⁷ See Sjaastad, 2008, p. 120 or Sjaastad & Scacciavillani, 1996, p. 882.

¹⁵⁸ See Capie, Mills and Wood, 2004, p. 9.

¹⁵⁹ See Joy, 2011.

¹⁶⁰ See Reboredo, 2013, p. 2666.

1970s, gold was an “automatic hedge against fluctuations in the value of a currency”¹⁶¹ and therefore carries little informative value when analysing the long-run behaviour of gold prices.

The analysed variables are, in most cases, gold prices against various currencies. However, research shows results only for the gold-dollar relation; results regarding other currencies are also being mentioned but to a smaller extent. There is plenty of scope for further research on the gold hedging property against currencies other than the dollar.

Capie et al. (2004) provide some reasonable conclusions on the subject of gold as a currency hedge. Firstly, the extent to which gold acts as a currency hedge depends on the “exchange rate level and the gold price at that time”¹⁶². Therefore, in the long run, the effectiveness of the hedge will depend on the fluctuations in variables such as exchange rate and gold price. There are three exceptional times when gold did not act as a currency hedge¹⁶³. Firstly, investors sometimes hoped that the fluctuations in the currency exchange rates were temporary, which means that they invested in gold in affection or under some pressure. Secondly, “private sector attitudes to gold may have been affected by problems in gold producing countries”¹⁶⁴. Thirdly, “official attitudes to gold may vary, and the official sector is a significant holder of gold stocks”¹⁶⁵.

This raises a question: how did gold manage to act as a hedge in times of extreme currency and gold price fluctuations? Capie et al. (2004) explained that gold served as a hedge because it is a “homogeneous asset unlike, say, property, and therefore is easily traded in a continuously open market. It acquired the attributes of an asset for a wide variety of reasons (...), but underlying all these reasons is that gold cannot be produced by the authorities that produce currencies. This means that those who can increase the supply of money and therefore, from time to time, debase its value cannot by similar means debase the value of gold”¹⁶⁶.

A critical point presented by Erb & Harvey (2013) reject the supportive argument behind currency hedge property of gold. Firstly, they say that in an external hedge “if the price of gold in a country is driven by its own inflation rate and if the exchange rate between two countries is driven by the difference in their inflation rates, then gold will only reliably be a hedge of the foreign exchange rate if one of the two countries always has an inflation rate

¹⁶¹ See Capie, Mills and Wood, 2004, p. 25.

¹⁶² Ibid.

¹⁶³ Ibid., p. 26.

¹⁶⁴ Ibid.

¹⁶⁵ Ibid.

¹⁶⁶ Ibid.

equal to zero”¹⁶⁷, which is hardly possible. Secondly, in the case of the internal hedge, the critical explanation relies on the event of currency debasement caused by inflation in the domestic market. Thus, in such cases we are dealing with the property of gold to hedge against inflation.

The main takeaways from the literature on this subject are as follows:

- Gold acts as a hedge against dollar movements; however, the safe haven function is not straightforward.
- Appreciations and depreciations in dominant currencies such as Euro, USD and YEN have a significant effect on the gold price in all currencies.
- Currencies of the biggest gold producers (Australia, South Africa and Russia) have no effect on the gold price as those countries do not possess the biggest gold holdings or reserves.

¹⁶⁷ See Erb & Harvey, 2013, p. 18.

5.6. Gold as a Portfolio Diversifier

With the development of the financial markets, an increasing number of investors declare the need for more sophisticated portfolio investment strategies, which, on the one hand, can increase the profitability of investment portfolios and, on the other hand, will protect against the traps of the financial market, especially in times of crises. The key issue related to the investment process is the appropriate diversification of risk, which, according to the theory of Markowitz¹⁶⁸, enriches the portfolio with different financial instruments, leading to risk reduction. This theory allows for the determination of an optimal portfolio giving the maximum rate of return for a given level of risk incurred or for a portfolio with a minimal risk level for a given expected return. In other words, this theory argues that, for any particular rate of return, there is only one portfolio that provides the lowest level of risk, and, for each level of risk, there is only one portfolio to provide the highest return. However, investors making decisions about allocating their capital have different preferences regarding the rate of return and the accepted level of risk.

Therefore, investment portfolio diversification should consist of such selection of financial instruments to optimize profit while fixing risk. Gold is argued to be a perfect asset for portfolio diversification, because the forces that determine its price on the world markets are different, and, in many cases, quite contrary to those that determine the financial returns on investment from other assets. The data and results from the argument on portfolio diversification by means of gold investment are presented in the table below.

Author(s) and date of Publication	Period covered	Method	Analysed Variables	Results
Sherman (1982)	1972-1981	Conventional correlation method.	Data on gold against bonds and stocks.	Gold served as a portfolio diversifier and reduced the overall volatility.
Hillier, Draper & Faff (2006)	1978-2004	GARCH	Daily data on gold, platinum and silver against S&P 500 Index and MSCI Europe/Australasia/Far East (EAFE) Index.	Gold, silver and platinum act as portfolio diversifiers. Portfolios consisting of financial assets and gold perform better than a portfolio without gold.

¹⁶⁸ See Markowitz, 1952, p. 1.

Conover et al. (2009)	1973-2006	Conventional correlation method.	Daily returns from the US equity market against six precious metals indices consisting of gold, silver and platinum.	Adding precious metals into a portfolio improves its performance. Gold acts better as a stand-alone asset and as an inflation hedge than other precious metals.
The World Gold Council 2011b	1987-2010	Value at Risk (VaR ¹⁶⁹) to calculate the maximum expected loss from a portfolio and resampled efficiency optimization ¹⁷⁰ .	Data on gold prices against cash, US Treasury and corporate bonds, international debt from developed and emerging markets, US and international equities, a commodity index as well as gold as an asset class.	Adding gold into a portfolio reduces the Value at Risk ratio and brings higher risk-adjusted returns.

Table 8. Literature summary on gold's property as a portfolio diversifier.

As noted above, in recent years, individual investors are increasingly interested in the possibility of alternative investments and appropriate diversification of their investment portfolio. Their interest is directly pointed at the markets, including the precious metals market.

In the initial literature, an assessment of the degree of dependence between the prices of gold and rates of return on other assets was obtained using the simplest linear correlation method. This was achieved by means of the analysis of the correlation coefficient beta that has an "excellent predictive value"¹⁷¹. Hence, the essence of portfolio diversification is risk minimization, achieved by investing in the least correlated or negatively correlated assets. Both Sherman (1982) and Jaffe (1989) proved that in the 1970s and 1980s the correlation with gold was low or negative for both stocks and bonds selected in the portfolio. Hence, gold returns move independently or are unrelated to the returns gained from stock or bond investment. The advantage of this relationship was the reduction of risk with the consequent increase in the overall portfolio return, which compensate for the incurred additional risk. The ability of gold to act as a portfolio diversifier was later studied by Hillier et al. (2006) and Conover et al. (2009). The advantage of both papers is that they use more recent data from a longer time period, which allows for a wider overview. Although the advantage of the paper

¹⁶⁹ This is defined as the nominal expected return divided by volatility (See WGC 2010b, p. 5).

¹⁷⁰ <https://www.newfrontieradvisors.com/about/research/Articles/documents/ResampledEfficiencyIntro.pdf> (5.03.2015).

¹⁷¹ See Sherman, 1982, p. 22.

by Hillier et al. (2006) is the application of the GARCH model and the inclusion of another region, the results from both papers are similar. Nevertheless, the paper by Conover et al. (2009) extends the subject with a few other aspects.

On the one hand, the study by Hillier et al. (2006) points out that “all precious metals are potentially valuable diversifying assets as a part of an investment portfolio”¹⁷². In regard to the precious metals separately, gold’s performance is the most significant, whereas silver gives the least significant results¹⁷³. These results are valid only in the U.S. markets. On the other hand, Conover et al. (2009) agree with the conclusions made by Hillier et al. (2006) and add the following remarks: “Adding a 25% allocation of the equities of precious metals firms improves portfolio performance substantially. Indirect investment in precious metals via equities dominates a direct investment in precious metals via coins, bars etc. Gold, relative to other precious metals, has better stand-alone performance and appears to provide a better hedge against the negative effects of inflationary conditions. The benefit of including precious metals into a portfolio is long-term”¹⁷⁴.

Some other contributions to this subject originate from the World Gold Council publishing house. A report on gold investment shows that even smaller allocations can, in fact, bring desirable results. By creating various scenarios, the authors managed to prove that gold investment of 2.5% to 9.0% reduced the potential loss from a portfolio by 0.1% to 15.5%¹⁷⁵. As an example, the authors say that, in times of the recent financial crisis, portfolio diversification containing 8.5% of gold resulted in 5% expected loss reduction. In terms of numbers, gold allocation amounted to US\$500,000 savings on a US\$100mn portfolio¹⁷⁶. The table below shows the effect of different gold allocations on portfolios consisting of equities, fixed income assets and cash. Hence, as we can see from the table, through the years, gold investment within a portfolio increases return and decreases volatility.

The portfolio presented in the table consists of 30% US equities, 20% international equities, 39% fixed income, 1% cash and different weight in gold and commodity indexes¹⁷⁷. The table is divided into time periods in which the assets had different values. Hence, for example, if we look at the period of the financial crisis the return increased from -24.3 to -20.3 and the volatility decreased from 20.5 to 18.4 (marked red).

¹⁷² See Hillier et al., 2006, p. 101.

¹⁷³ Ibid., p. 103.

¹⁷⁴ See Conover et al., 2009, p. 15.

¹⁷⁵ See WGC 2010b, p. 1.

¹⁷⁶ Ibid.

¹⁷⁷ See WGC 2011b, p. 3.

	Gold (US\$/oz)	MSCI US	MSCI ex US	BarCap US Agg	JPM 3M Tbill	S&P GSCI Light	Portfolio ²		
							0% gold	5% gold	10% gold
January 1991 to December 2010									
Return	6.8	7.1	4.1	6.9	4.3	3.2	6.0	6.1	6.3
Volatility	15.6	17.2	17.8	3.9	0.3	15.3	8.9	8.6	8.5
Inf. ratio	0.43	0.41	0.23	1.74	13.23	0.21	0.67	0.71	0.74
5% VaR	3.39	3.74	3.53	0.85	0.01	3.09	1.67	1.65	1.67
2008									
Return	4.1	-36.5	-43.3	4.9	4.1	-37.7	-24.3	-22.3	-20.3
Volatility	31.3	34.9	39.6	5.6	0.5	36.9	20.5	19.4	18.4
Inf. ratio	0.13	-1.05	-1.09	0.87	8.28	-1.02	-1.19	-1.15	-1.10
5% VaR	7.96	7.88	9.27	1.15	0.03	10.38	3.17	4.77	4.26
2009									
Return	29.6	30.7	34.6	6.3	1.4	24.3	20.4	20.6	20.9
Volatility	18.4	25.4	26.6	4.0	0.1	22.0	13.6	12.9	12.3
Inf. ratio	1.61	1.21	1.30	1.59	10.32	1.11	1.50	1.60	1.70
5% VaR	3.17	4.90	7.43	0.88	0.01	4.49	2.75	2.54	2.64
2010									
Return	29.5	13.2	6.2	6.5	0.5	17.1	9.4	9.9	10.5
Volatility	14.4	17.4	19.9	3.0	0.0	18.6	10.2	9.8	9.4
Inf. ratio	2.04	0.76	0.31	2.22	9.13	0.92	0.92	1.01	1.11
5% VaR	3.16	4.08	4.32	0.53	0.00	3.78	2.31	2.24	2.26

Figure 12: Performance of assets and portfolios containing various allocations of gold¹⁷⁸.

Lastly, portfolio diversification by means of gold allocation brings the best results in the long run. Moreover, investors can adjust the gold allocation in their portfolio according to current circumstances. These circumstances are as follows:

- “Portfolios with higher volatility require more gold to balance the risk incurred by investors.
- When the risk of holding bonds increases (e.g. long-term bonds during periods of rising interest rates or sovereign bonds in imminent threat of default), so should the share of gold in the portfolio.
- During periods of heightened uncertainty, especially linked to systemic shocks to the economy, a higher gold allocation can reduce losses further.
- Similarly, in periods of expected higher inflation, a larger allocation to gold is warranted.
- Finally, if investors expect their local currencies to lose value, the gold weight in a portfolio should be increased¹⁷⁹.

The negative correlation both with stock and bond markets shows that gold possesses a huge diversification potential. An investment portfolio that consists of stocks and bonds improves its performance by adding gold, substantially. Gold’s share in a portfolio of up to 10% seems to be a legitimate supplement in a traditional portfolio.

¹⁷⁸ See The World Gold Council, 2011b, p. 3.

¹⁷⁹ See The World Gold Council, 2013, p. 14.

6. Conclusions

Whether in emerging or developed countries, in the short or in the long run, and as a luxury good or a mere investment asset, gold has never lost the attention of investors, no matter its price. Its long history as money, applicability, value, physical characteristics and the number of various ways of investment gives us an idea of how important gold really is. We appreciate gold for its luminance and beauty in jewellery. It is rare, tangible and practically indestructible. Paper money can be destroyed and, in the common opinion, it is worth as much as the cost to print it. Anyone knows that gold is a precious metal symbolizing wealth and prosperity that has accompanied humanity for over 6000 years. Initially, gold was desired due to its rarity and beauty. With time, it was used in the monetary system, and, finally, in the era of the modern economy, it became a real collateral of paper and electronic money. Moreover, according to the common opinion, gold investment is the one of the safest one on the planet, giving a sense of security and stabilization. It is regarded as a hard currency resilient to recession and market turmoil.

After due diligence, one can conclude that gold is a good investment choice. Gold is a precious metal that allows for many different forms of investment and chances for additional income; for both the rich, looking for a good way to allocate capital, and for those less prosperous who can buy coins or unique gold rings hoping that one-day their collectible value will increase. Even if it will not, the value of pure gold in such products will always guarantee some protection. Gold is gold, and no one can in fact argue against it. There is only a question: What is our expected return from the investment and our level of risk aversion? Investors that are prepared to take risks look for quick return and are well versed in the market will choose gold mine stocks, gold derivatives or hedging strategies. However, there are investors who seek more stability and security for their capital allocation. In this case, their choice would translate into buying physical bars or coins. Moreover, there are also investors who prefer to worship the beauty and aesthetics of gold. We would find their interest in jewellery, collectors or commemorative coins.

For a sufficient number of reasons, Erb & Harvey (2013) called the motives behind gold investment a *golden dilemma*¹⁸⁰. A dilemma that in many cases refers to a situation which each investor faces before investing in gold. From the various results that have been presented in this thesis there is one true conclusion. As shown, gold's safe haven, hedging and diversification properties are not absolute and differ in strength and effect in different time periods and in different places. The force that lies behind each investor's motive to invest in

¹⁸⁰ See Erb & Harvey, 2013.

gold is hidden in the public perception of the real gold price, which increases the purchasing power of gold.

This mixed and complex perspective of different market participants shows that there is significant room for speculation in gold investment practice. Gold is a popular reserve among central banks, which can be found in their balance sheets in unknown amounts. The confidential or secret nature of gold trade on the OTC market suggests that no one can clearly say which country holds how much gold reserves. Central banks are the biggest enemy of gold, and an increase in the price of gold is unfavourable. They would do anything to decrease the price of gold, if its increase exposes the worthless system of paper money. Therefore, we should not forget that apart from the factors that directly influence the price of gold presented in this thesis, there is an invisible and manipulative force that controls the price of gold, which we might not fully be accounted for.

It seems that the choice of the type of gold investment depends in huge part on investors' risk aversion as well as on their available financial resources. Each investor is driven by different incentives, and emotional and psychological factors that lead to a particular choice. Hence, different perspectives and different models lead to different insights. In practice, we form our opinions based on our own experience and the experience of other investors as well as on observations, which are eventually transformed into our actions. Although the literature overview and results summarized in this thesis help us to learn about the issues and problems linked with gold investment, this does not suggest which method is the best in each case. Lastly, the wide range of applicability of gold and the current amount of possibilities to invest in it indicates that the motive behind it relies on financial capabilities and is related to individual need and circumstances of each investor.

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Appendix

A. Verpflichtende deutsche Zusammenfassung der Arbeit

Das Ziel dieser Arbeit ist es, die Motive hinter Gold als Investitionsobjekt mit dem speziellen Fokus auf den Eigenschaften des Golds als Wertaufbewahrungsmittel, sicherer Hafen, Inflationsschutz, Währungsabsicherung und Portfoliodiversifikation zu analysieren. Die Forschungsfrage stützt sich hierbei auf das Verständnis, dass diese Eigenschaften nicht immer in allen Zeiträumen, geographischen Orten und sozioökonomischen Systemen gelten. Um diese Frage beantworten zu können, wird eine Literaturübersicht über die verschiedenen Eigenschaften von Gold präsentiert. Insgesamt deuten die Ergebnisse an, dass es sich bei Gold vor allem um ein Wertaufbewahrungsmittel und um eine Portfoliodiversifikation handelt. Allerdings verfügt Gold nicht zu allen Zeitpunkten und in allen Ländern über die Eigenschaft als sicherer Hafen, Inflationsschutz und Währungsabsicherung.

CURRICULUM VITAE

EDUCATION:

MSc in International Business Administration 03/2012-11/2015
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WORKING EXPERIENCE:

Corporate Finance Department, Deloitte Austria, Vienna from 08/2015
Analyst

Management Secretariat, Raiffeisen Bank International AG, Vienna 02-11/2013
Freelancer 07-09/2012

- Supported the preparation of Board of Management and Supervisory Board Meetings.
- General organizational and administrative work.
- Responsible for correspondence, telephone calls and archive.
- Maintenance of files, records, reports and databases.

Project Finance, Kredyt Bank, Warsaw, Poland 08/2011
Internship

- Prepared calculation sheets for financial ratios and indicators.
- Analysed financial statements of various companies and prepared market analysis.
- Analysed investment projects and financing projects for municipalities.
- Learned about real estate valuation methods.

Dataföreningen Sverige, Stockholm, Sweden 10/2009
Assistant and Representative

- Responsible for the admission of new members.
- Reported on seminars and lectures and prepared statistics on visitors.
- Responsible for technical support and hosting of lectures and seminars.

SLB Fastighetservice AB, Stockholm, Sweden 07-08/2008
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