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BACHELOR THESIS

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Specialization: Management and marketing of Foreign Trade

Analysis of the current state of mining, demand, distribution, consumption and prognosis for the world market in silver

(Bachelor thesis)

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ZADÁNÍ BAKALÁŘSKÉ PRÁCE

Jméno a příjmení: **Radka Ležáková**
Studijní obor: Management a marketing zahraničního obchodu

Téma práce:

Analýza současného stavu těžby, poptávky, distribuce, spotřeby a prognóza vývoje světového trhu se stříbrem

Cíl bakalářské práce:
Cílem práce je analýza současného stavu těžby, poptávky, distribuce, spotřeby a prognóza vývoje světového trhu se stříbrem. V úvodní části vypracujete teoretický úvod (charakteristika a význam komodity pro hospodářství světa), v následující části z české a slovenské odborné literatury, z článků v časopisech českých a zahraničních, z originálních zdrojů těžařů, distributorů, informačních zdrojů zemí, které v těžbě zaujímají významné postavení, statistických systémů EU, OSN, ASEAN, WTO atd., ve spolupráci se specialisty v ČR a zahraničí, kteří s danou komoditou obchodují, nebo jinak zachází kvantifikujte a popište světová centra těžby (stručný popis a mapka), časové řady těžby komodity ve světě od roku 2001, stručný popis největších firem světa, které tuto komoditu těží, včetně rozsahu těžby, filiálek, popište distribuční cesty komodity ve světě a v ČR (včetně map distribuce po světě, názvů distributorů, objemů, atd.), časové řady ceny komodity ve světě od roku 2001, největší spotřebitelé suroviny ve světě od roku 2001 (mapa, celkový rozsah spotřeby, celkový, popis největších center, v nichž se s komoditou obchoduje, atd.), a na základě těchto dat vypracujte za pomoci fuzzy logiky či teorie neuronových sítí prognózu dalšího vývoje těžby a cen s ohledem na vývoj ekonomiky a hospodářství jednotlivých zemí a integračních seskupení světa (především ASEAN, EU a NAFTA). Práce bude obhájena před vedením Ústavu ekonomiky a řízení a hodnocení bude součástí bakalářské práce. Před odevzdáním práci podrobte testu na plagiátorství a jeho výsledek předložte zkušební komisi. Vytvořte příspěvek na mezinárodní studentskou konferenci pořádanou EPI, s.r.o. či jinou vysokou školou, nebo článek do odborného časopisu. Bakalářská práce podporuje výzkum v rámci IGS - úloha č. B1/2008/02

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I declare that this bachelor thesis was prepared on my own under the direction of Ing. Jan Prachař and I have also set the list of all literature used in literature and professional resources.

Kunovice, 2012

Thank Ing. John Prachař for a very useful methodological assistance that he have provided to me with the conception of my work.

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Radka Ležáková

Obsah

INTRODUCTION

In the past, silver has played a big role for humanity. Firstly it was used as a currency, many important commodities were made from it, f.e. silver trays, sculptures, silverware and is now known in use of jewelery, industry, minting, health and many other fields. Silver, however, above all mankind as precious metal, with whichare traded on commodity exchanges in different countries. Its value was sometimes higher than gold, but for its wide use in various industries has irreplaceable importance. In the form of pure metal occurs only very rarely, but other metals like compound is more usual.

In the contribution of this work to explain the functioning of commodity exchanges in which the silver traded in bulk, and also its minimum quantity to trade. Its physical properties of the periodic table of chemical elements are chemical stability, durability, divisibility and productive value. Its history, which I detailed described in section number one dates back to the 4th millennium BC, when it was discovered in the tombs of the Chaldean kings. Silver was processed mainly in jewelry making for higher society and also the production of coins leading processors such as the Babylonians and Assyrians.

The history of silver is very rich in its production worldwide. Among the most famous mining Laurium mines were mine (Athens), further mines in Asia Minor, Sardinia, Greece and also in Asia. In later times, after the discovery of America has the majority of silver production focused in Mexico, Peru, Bolivia and Argentina, where are till now large significant mining mines. Equally important places are located in Europe, such as mines in Germany, Hungary and Russia. Increased production flourished also the United States.

Mining in Slovakia and the Czech Republic was less significant for the low incidence of metal despite of its bearings with the occurrence of minerals. In the first chapter, I discussed the classification of silver metallogenic in Slovakia and the Czech Republic and the way the miners sought silver on the surface and inside the Earth. For high incidence of silver abroad and especially in America, I have analyzed the production of silver in the world. The important point is to work with silver trading on commodity bourses, which will be further discussed in next chapters.

In the second part of the thesis I will devote to production centers around the world, famous for its silver mining companies and the largest production of this commodity. The main producing countries with the largest production, which I have deeper analyzed in my thesis are countries like Mexico, Peru, Poland, England, Russia, America and China. Several mining companies own the mines, which are either owned one hundred percent or partially with other companies.

Business making is described in the third chapter. Nowadays there is very popular and traded with it 24 hours a day in various world centers such as London, Zurich, New York, Chicago and Hong Kong. Commercials use it in industry, jewelry, coinage, dentistry and many other sectors. In the past, silver has been significant in China, where the financial system was based only on the silver standard. Traders on the bourses have to comply with rules established by the commodity bourse. Among the most important commodity exchanges trading of COMEX silver are in New York and LBMA in London.

Chapter four and five is oriented in mining and commodity price in the world from 2001 to present. High consumption of silver is an investment in silver and also already in the industry, jewelery and other sectors. The major silver producing countries in the USA and Canada are advised that in the 19th century there were main producers. However, the ongoing lack of this commodity in the country ahead of the mining of raw materials. Supply and demand for silver are increasing every day.

Largest consumer of this commodity is described in chapter six. Silver is consumed in almost every country. The biggest consumers are the United States and China, whose steel industry is constantly growing. In the last chapter I will discuss the prognosis of the development of mining and silver prices. The prognosis is very difficult to determine. Each prognosis is affected by many factors, that analyst must take into the account in resolving the future status of production and prices of this commodity.

1 Theoretical basis

1.1 Silver history

The rich one is not the one who owns gold and silver, but they one who is satisfied with a little.

Mika Toimi Waltari

Any quantity of gold or silver is not worth more then the virtue.

Marcus Tullius Cicero

Mature is worth for a silver, decision is worth for a gold.

Hans Urs von Balthasar

Latin title:	argentum
Index:	Ag
Proton number:	47
Melting temperature:	961, 78 °C
Boiling temperature:	2 161,85 °C
State:	compact
Consistence:	10,49 $kg \cdot dm^{-3}$
Group:	transition element, metal
Contract size:	5 000 troy ounces / 1 000 troy ounces = 31,1 kg of silver
Business hours:	14:25 – 19:25 CET, electronically 21:15 – 14:00 CET
Business beginning:	5.7.1933

Silver can be obtained "in the processing of Pb-Zn ore as a by-product" [2, p. 305]. The gold-silver ores can get 10 to 15% silver with a silver 200 to 1000 $g.t^{-1}$ and 10 to 20% of the world production we have benefited from its own deposits of silver, where the contents reached 900 to 2000 GT-1 and sometimes much more.

Silver can be defined as "shiny metal having the highest electrical conductivity" [2, p. 305] (see Annex. 1). It is located in a natural form, as an alloy of gold and ores containing sulfur, arsenic, antimony or chlorine. It was probably discovered along with copper, which usually occurs in a nature with.

Oxygenation of silver sulfides, there is usually a secondary mineral called as a sterling silver. The form of silver is usually in the form of the strips, wires, coatings and dendrites that fill cracks. They are never in pure form. It contains elements of gold, copper, mercury and antimony. The characteristic features are its silver hooked quarry, excellent malleability and silver-white color on mine. Similarity of silver can be attributed to mineral Argent, which contains 87% of silver, whose properties are black-white color, malleability, and does not split. In the past, silver was very popular for the production of coins. Two-thirds of silver can also be obtained from galena minerals and sphalerite.

Silver and its features are often used in the food industry, for example in the coating of jelly, or as decoration on cakes. The use of silver in the food industry is approved in the European Union but the United States and Australia is not allowed. Great importance of using silver was in the past it in the Health sector, industry, jewelry, coinage and the photographic industry.

Silver belongs among the intermediate element which has d orbit of valence electrons. More resources say "despite the fact that silver is one of the precious metals, which are characterized by a strong chemical stability, responds very well with nitric acid" [49]. In the presence of dissolved oxygen and fresh air is still unlimited, but only a small amount of hydrogen sulfide and silver on the surface will begin to produce a thin layer of silver sulphide, what results into silver blackening.

Silver is usually found in nature in compounds possibly as a pure metal. The concentration of three micrograms per liter, we can mine from seawater and in the universe accounts for one atom of silver, about one trillion atoms of hydrogen.

The periodic table of chemical elements we find silver in the 11th group and in the 5th period among the transition metals (see Annex. 2).

Silver and its features are often used in the food industry, for example in the coating of jelly, or as decoration on cakes. The use of silver in the food industry is approved in the European Union but the United States and Australia do not. In the past, made use of silver of great importance in the health sector, jewelery and photographic industry.

The utilisation of silver in the past was important as a trading currency. It is core values are durability, divisibility, and has considerable practical value. Silver is the second oldest known gold precious metal. In nature it is found in pure form or as a chemical compound in the ores. Pure silver is never quite pure, containing admixtures of gold, copper, mercury, antimony and other metals. With the softness of silver are made the more resistant alloys with other metals. As the mineral, crystallizes in the form of cube system or in the form of irregular octahedron. Its characteristics are hooked quarry, silver-white color of mine and excellent malleability. Silver is known by people and has great popularity for its durability, beauty and versatility, which are people already using for more than 6000 years.

The history of silver extends up to 4 millennium BC, where it was discovered in the tombs of the kings of Chaldean. Processing was already in an old Babylonia and Assyria. We were used for jewelry making, then for making coins. The first silver ore BC was attributed to the Chaldeans in about 2500 BC, who gained silver from lead-silver ores. After the destruction of the Minoan civilization in 1600 BC and the decline of Mycenaean culture around 1200 BC, the production of silver has changed. The writings we know the "center of silver production in about 1200 BC moved to Laurium (Greece) "[50]. According to historical writings generated by the mines for one year about 1 million troy ounces of silver. Production is concentrated mainly in Asia Minor, Sardinia, in other Greek areas and to a limited extent in Asia.

In the 8th century AD the Spanish mines became critically important sources of silver for household needs of the Roman Empire, but also for the Asian spice trade for 1000 years. Spanish production had to be for growth and fulfillment by the terms and conditions of Greece, Asia Minor and Italy.

Between 750 and 1200 AD there were several significant discoveries of silver mines. These mines were Schemnitz, Rammelsburg, Goslar in Saxony and in Germany. Deposits have also been in Austria-Hungary and elsewhere in Eastern Europe. The spread of silver

thus took place between 1000 and 1500 AD, when increased number of mines and processing of silver began to improve.

Improvements in technology area and the discovery of the "New World" in 1492 resulted in the development the merger process with mercury. Production from Bolivia in the years 100 - 1800 by Spanish writings showed about 1 billion troy ounces of silver. In the same period in Mexico was extracted 1.5 billion troy ounces of silver. Peruvian mine Cerro de Pasco was one of the main sources of silver in Peru, where in years 1600 - 1800 harvested an average of 3 million ounces per year. *"Between 1500 and 1800, accounted Bolivia, Peru and Mexico for more than 85% of world production and trade"* [50].From 1500 to 1800 are Bolivia, Peru and Mexico accounted for more than 85% of world production and trade. The remaining production made Germany, Hungary and Russia. After 1850, is increased production, especially in the United States.

"The period between 1876 and 1920 presents an explosion of technological innovation anduse of new district around the world" [50]. Between 1876 and 1920 there was an explosion of technological innovation. Production has increased fourfold, which consisted of a total of nearly 120 million ounces of silver annually. New discoveries are located in the United States, especially in Nevada, Colorado and Utah. Production was expanded in Australia, Central America and Europe. Production of 190 million ounces yearly at the end of 1920 was enabled by the discovery in Canada, the United States, Africa, Mexico, Chile and Japan. The breakthrough came in improvements in transportation, the drainage of mines, mining and drilling. By improving the techniques obtained a greater ability to process the ore and the greater use of ore that contained silver.

Till the late 19th century worldwide high-quality ore were exhausted. As a result, it had to develop methods which allow extracting large amounts of base metal ores, containing silver, improved techniques in the separation of silver, lead, zinc, and copper concentrates. During the World War II due to lack of copper led to the replacement of silver in many industries. Most of the silver that was used in the industry came from the United States reserve of West Point.

1.2 Metallogenic silver classification

Silver can only belong to the hydrothermal reservoirs connected with the tertiary volcanic activity. Czech Republic and Slovakia are among the polycyclic metallogenic units, which are typical for the occurrence of minerals. At the time of Czechoslovakia metallogenic units were represented in the Bohemian Massif, which formed a large part of the Czech territory, and the Carpathian alpinid, which comprised the territory of Slovakia and eastern Moravia.

J. Havelka classified metallogenic bearings:

- *„endogenous - hydrothermal - subvolcanic,*
- *transient endo-exogenous - submarine - volcano-sedimentary,*
- *transient endo-exogenous – submarine – amagmatic hydrothermal sedimentary"* [2, p. 81].

Rozložník said: "Formation bearings of Sn-W-Bi-Ag ores so called *Bolivian type* are associated with Tertiary volcanic centers, generating zone, stretching from Lake Titicaca, Oruro and Potosi through to Argentina "[2, p. 141].

Formation of silver can be attributed to sulphide mineralization at a later stage. Bearings type silver-gold, often referred to as a young gold-bearing formations are in the inner zone of the Carpathian arc. These bearings, which had a predominance of silver at a ratio 10:1 or even 100:1. It was the bearings Pachuca in Mexico, Comstock Chakandža in the U.S. and the USSR. But were the bearings, which should prevail in gold, like Kremnica. Deposits of polymetallic ores, in which there has been little admixture of silver were stored in volcano complexes. One example is the famous Cerro de Pasco or Banská Štiavnica and Hodruša.

1.3 Search and bearing exploration

Search and bearing exploration is an important activity in the development of mining operations. Bearings search was not preferred due to low consumption of raw materials. They were able to cover deposits, which were based on the surface and can be found by simple methods.

The activities associated with prospecting and exploration falls under the Slovak Geological Office in Bratislava and the Czech Geological Survey office in Prague. The role of these authorities is difficult due to multiple load bearing. Therefore must seek to discover new deposits covered, which appeared in the past. This growing focus on the quantitative survey but also qualitatively.

Activities that are closely related to miningare the geology and geophysics for mineral deposits. They involve the mining stage of production. Searching and exploration can be defined by several professional disciplines. They can advise discipline geometrization and geostatistics.

Searching and exploration can be divided into stages which follow each other and each successive starts after the previous assessment results. The table below brakes down the various stages of a review of the search for it is given the objective of the survey, methods search and inventory.

Phase	Goal	Methods	Reserves
Geological research	Defines the forecast area by searching assumptions and symptoms.	Basic geological mapping, comprehensive research on stratigraphy, lithology, tectonics of the area, geophysical work, geochemical and other methods, structural holes.	Prognosis (D)

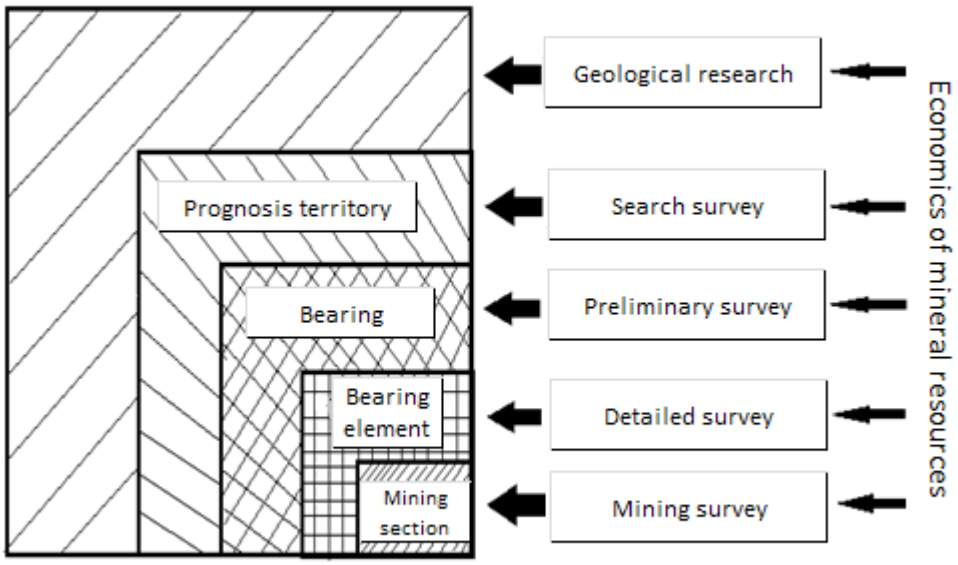
Research exploration	Verify prognostic perspectives of territory by discovery methods. The discovery of new deposits.	Detailed geological mapping. Thematic maps of geophysical, geochemical,, hydro-geological and other. Technical work (scratches, avoid, search wells).	D, C_2
Preliminary exploration	Verifying of the mining bearings from the site and the amount of stocks, options processing technology and raw materials, mining and geological conditions below.	Geological exploration works documentation. Detailed geological map of the bearings. Drilling and mining works in the network corresponding to the category of stocks C1 and C2. Technology research of mineral resources.	C_2, C_1
Detailed exploration	Determine the detailed geological mining conditions.	Detailed documentation for geological exploration works. Advanced knowledge of the deposit. Mining works in conjunction with wells, the density corresponding to the category of stock B. Experimental mining and processing of mineral resources.	C_2, C_1, B
Mining research	Deepen understanding of the mining-geological conditions for mining sections. Replace loss reserves exploration of new reserves.	Mines usually work well for the preparation and extraction. The combination of mine works with drilling. Detailed geological documentation of mining works and felling.	C_2, C_1, B, A

		Tracking of inventories and productivity of pollution.	

Table no. 1: Stages of research and exploration
Source: [2]

To simplify the search and exploration to develop principles which apply in the art makes it easy to find a better chance of success and goal achievement. These are the principles:

- **the principle of economic sense,** which is designed to provide sufficient resources to meet current and future needs, but the national economy also,
- **search the principle types of industrial bearings,** which is mainly about finding bearings, which have the largest share of the world's economic importance,
- **the principle of comprehensiveness**, after which they identified with the assembling of the data reveals what objectives are important for search,
- **the principle of methodological complexity sense**, to which should be included in all the methods and compositions suitable for utility management.



Pict.no. 1: Schematic principle of geological exploration works stages
Source: [2]

1.4 Deposits of silver in Slovakia

The most important silver mining locality in Slovakia was Banská Štiavnica, where silver was discovered in the form of various shapes, along with other minerals. Silver were found in vein deposits siderite formation[1] with copper mineralization and mercury and other metals in Rožňava, Slovinky, Gelnica and Novoveská Huta.

Already at the time of the Celts in Banská Štiavnica there were mined silver and gold. The Celts knew the technology of processing and treatment of silver and gold. Then one minted coins and jewelry. Significant silver mining in Banská Štiavnica occurred in the 10th century, when it was detected by high levels of metal in surface deposits and the first written record, which confirms the extraction of silver, dates from 1217. A large expansion occurred in 1690 when it was produced in the mining area of 29,000 kg of silver[2]**.** Later in the period 1946-1993 will now benefit polymetallic ores containing silver, lead, zinc, gold and copper. At the end of production mines was the year 1994, when it acceded to the liquidation of the company and resulted in the industry that has ensured the city and development.

Mining in Rožňava dates back to medieval times, when the most gold and silver was mined. In addition to gold and silver during the history of mining in Rožňava mined copper and iron ore. Mine Mary has a chance to reopen because of the discovery of silver, which would get by for 18 years. The project is not only still in preparation. It is estimated that it could get 350 tons per a day. However, the assumptions are only illustrative.

Citizens of Slovinky were mostly miners and charcoal burners who mined silver and copper. Currently is mining in Slovinky in decline and remained just accessed mine the public along with the last wagon, which is filled with outstretched last copper.

The oldest mining towns include Gelnica in which was mined a silver, gold, copper, mercury, lead and iron ore. Mines in Gelnica can be the richest in Slovakia. In 1327, they

[1]The extraction of siderite and silver are mined nearby Nižná Slaná, thus increasing the importance of bearing siderite.
[2]The most of extracted silver during the life of banska mines

were forced Štiavnica mining law and in the 15th century, the Gelnica had its own mining right.

Novoveská Huta is already known from prehistoric mining, where the presence of minerals discovered and started mining copper ore. Moreover, began to exploit the iron ore, which were obtained in addition to smaller amounts of silver, nickel and cobalt. However, at present, no silver in the locality is mining anymore.

1.5 Deposits of silver in the Czech Republic

In the Czech Republic, the silver mined since the 7th century, but the greatest expansion was recorded in the late 13th century and early 14th century, when there was found in Kutna Hora the largest finding. It was situated here for many hydrothermal deposits of polymetallic association (Ag-Pb-Zn). Kutna Hora was then the largest supplier of silver into the treasury. Later in the 16th century silver began to capitalize on the Five-arm Jáchym Association (CO-Ag-Ni-Bi-U). At the time when Jáchymov prospered, Kutna Hora has declined to its glory in silver mining. In the 13th century Kutna Hora became a prosperous Jáchymov a constant subject of mining in the Czech Republic. The total amount of silver extracted was estimated at 7,000 tons. Silver is also mined in Jihlava and its surroundings, Pribram, Havlickuv Brod, Golden Hills and Benes.

Silver occurred in the Moldanubian Zone in the Central district and the Central Moldanubian Pluton and the eastern part of the Bohemian-Moravian Highlands.

Silver streak in Jihlava is recorded since 1238 when silver ore was found. In 40th years in 13th century silver crusade expansion occurs and becomes the basis of economic power of monarchs. It is known a coin reform that brought minting of silver coins. The largest expansion campaign in silver came in 40th to 80th years in 13th century.

Silver mines were discovered in Pribram, where they discovered the lead mines also. A place where the 16th century silver mined, were Birch Mountains, but the turn

of the 16th and 17th century, stopped working in the mines. Renewal of mining happened in 1708 and 1978 when mining in the mines has finally been closed.
Havlickuv Brod was considered by King Premysl Otakar II for the Promised Land campaign for silver ore. After the conquest of Havlickuv Brod came the end of mining silver ore.

According to the information has Benesov a long mining tradition in quest of gold, silver, copper and iron ore, but a mining activity was completed in a 992. Rich mines for gold, silver and ferrous metals were Gold Mountain, operating campaign of silver, gold ferrous metals and were completed in 1993.

1.6 Silver mining in the world

In the past the famous deposits of silver were in the Pachuca-Real del Monte in Mexico, which had an unusually high silver content, which was measured at $kg.t^{-1}$. The big mining area, whose main priority is mining silver, was the American Cordillera. Mexico is known for its silver veins, which are components of horst - tertiary volcanic structures. The main sources of silver are copper ore, nickel, lead, zinc collected in Peru (Antamina, Cerro de Pasco and Colquijirea), Bolivia (San Cristobal and Malk Khota), Mexico (Fresnillo, and Penasquito Jaunicipio), Canada (Hackett River), Argentina (Navidad), China, Australia (Cannington), Chile (Pascua Lama), Poland (ore) and Serbia. Among the major world producers of silver, we can advise Peru, Bolivia and Mexico since 1546. High-grade silver minerals are found in nests of vein quartz with calcite, which can be found in deposits of Guanajuato, Taxco, Zacatecas or in Peru, Bolivia and Chile.

Australia

Cannington –located in the northwest of Queensland, near the small town of McKinlay. It was discovered in 1990. Mine is the world's largest producer of silver. The concentrate contains 70% lead and more than 3,000 g / t silver with low levels of impurities. Long-term contracts were negotiated with Zinifex in Australia, Metaleurop in France, Germany and Berzelius in various companies in Japan and Korea. The mine is open a total length of 5 250 m.

Mexico

Proaño / Fresnillo – underground silver mine discovered in 1550. Located in central Mexico and is one of the largest and most profitable mines in silver. The mine is located near the town of Fresnillo, Zacatecas, from the results it is also known as the Fresnillo mine. Mine was certified ISO 14000 for environment. The area was an "ecological park", which was founded in 2004, used for exercise and relaxation.

Penasquito –mine is located in Zacatecas, rich in gold, silver, lead and zinc, was reopened after about four years. After reopening the mine was assumed that the mine will produce approximately 28 million ounces of silver annually for a period of 22 years. According to the records at the end of 2009, inventories of silver were round 1.0701 billion ounces of silver.

Russia

Dukat –Russia's largest silver mine, located in Magadan. It was discovered in the 1965th. In 1995 it was closed, but now re-opened to foreign investment. Mine has great potential to become one of the world's largest silver mines with the lowest levels of operating costs. Russia supplies the Dukat mine silver for about 90% of whole consumption.

Peru

Antamina – mine focusing on the production of silver, copper, zinc, molybdenum and lead located in the district of San Marcos. In 2008, an approximate reserve of silver was 1107 g / t.

Cerro de Pasco – is situated almost in the center of the city. In 2009, the mine expanded and new stocks were found containing gold, silver and copper. In addition has to these supplies of lead and zinc.

Pallancata– located about 520 km from the capital city Lima. The mine belongs to the top 10 primary silver producers known worldwide. In 2008, the production was round 4.2 million ounces of silver. Together they own Hochschild (60%) and IMZ (40%).

Uchucchacua – produces mainly silver and zinc. Is owned by company Cia de Minas Buenaventura SA and is located about 20 km south of Rauris mines. Mining operations dates back to colonial times.

Arcata – located about 300 km from the city of Arequipa in southern Peru, 4,600 m above sea level. The mine operates a device that makes a concentrate containing gold, silver. In 2010, produced 21 443 t of concentrate, 8.1 million ounces of silver and 25,800 ounces of gold.

Alaska

Greens Creek Mine – is located in southeast Alaska. Mine is operated by Hecla Greens Creek Mining Company and is an important part of the economy in Southeast Alaska. Mine is the fifth largest producer of silver in the world and the largest producer in the USA. The mine was discovered in 1975 and production began in 1989. In 2009 was produced about 7.5 million ounces of silver and 67,000 ounces of gold.

Bolivia

San Cristobal – one of Bolivia's largest mining mines engaged in silver mining, lead and zinc contained in the city of San Cristobal, Potosi. The stock of silver showed and shows account for about 450 million ounces of silver.

San Bartolome – silver mine is located southly from the city Potosi. It owns a subsidiary of Coeur d'Alene Mine Corporation. At the end of 2010, stocks were 107.0 million ounces of silver.

Canada

Hackett River – one of the largest undeveloped sites in the world. A concentrate, which a mine production, contains 182.8 million ounces of silver for more than 16 years. Mine is one of the top largest producing silver mines in 2015.

Argentina

Navidad – mine located in Chubut province has great potential in the annual production of silver, gold, copper, zinc and lead. The operation should be launched

in 2013 and its production is expected at 23.4 million ounces of silver. Therefore it belongs among the top producing mines in 2015.

Chile

Pascua Lama – this mine is located in the Frontera district on the border of Chile with Argentina. In 2010, probable reserves were 671 million ounces of silver and the average of annual production in the first five years would be approximately 35 million ounces of silver. Thanks to its inventory belongs to the top of the producers of silver in 2015.

Poland

Rudna – one of the largest mines in Poland is rich in copper and silver, located in Polkowice. During 2008, 13 million tons was mined ore containing 46 g / t silver.

1.7 The utilization of commodities in an individual sectors

Utilisation in health sector

„Hippocrates, "father of medicine ", he knew about the healing characteristics against diseases"[51].

Silver is used in the health sector since the Middle Ages, when it was known to be characteristic of silver to prevent growth of pathogenic organisms in the vicinity of silver. In that time they found that silver has properties such as biocides thatkill many bacteria. During the I. World War leaflets were used silver to prevent infections in wounds of soldiers and colloidal silver as an antibiotic is used for its antibacterial effects. The mending of wounds after surgery doctors used silver thread. Silver is used mainly in healthcare for the production of chemical containers and various medical tools in the form of metallic silver. The hospital began using at furniture with silver particles and silver catheters. The admixture of many alloys of silver is also used in dentistry.

In early 1900, appeared to use silver negative evaluation, because of staining of the skin called argyria[3], which is shown incorrectly prepared silver.

Therefore, should the use of silver fight against infections of short duration. But still, some preparations used in traditional medicine. For example, in the eyes of newborn infants drops of dilute silver nitrate to prevent infection, also used to burn salve on the basis of silver, nearly every first-aid station in America. Still are used and are commercially available silver and silver foil dressings for wounds.

Dental fillings are a mixture of powdered silver, tin and mercury that the resulting paste can better adapt to the shape of the cavity. The dental amalgam achieves its hardness within a few hours.

The silver added into the dress is added to prevent the growth of bacteria and fungi. It is part of clothing or footwear that silver nanoparticles are integrated into the polymer from which the fibers or yarn are coated with silver. However, it is known as the silver of the clothes lost in the wash.

Utilisation in a photographically sector

„*Silver plays an important role in photography and film*“[52].

The relative popularity of digital photography and its growing popularity are constantly film documentaries based on silver constantly in a demand. Film studios prefer to use film based on silver for its vivid colors and brightness. Photographic film contains a thin layer of emulsion containing light-sensitive silver halides. Black and white photograph contains a layer of silver salts. When exposed to light radiation is converted into silver salt to metallic silver, which then creates a negative film. For color film, they must be at least three layers and add them to the dyes that are sensitive to different colors of the spectrum.

[3]Poisoning with prolonged use of silver products containing silver

The fact is that almost 5,000 color photographs can be used one ounce of silver. For nearly ten years, the use of silver in photo is still declining. Many people keep their photos in digital form, or choose a cheaper way - printing at home.

Utilisation in an industry sector

„Silver is an essential part of almost all sectors. Its unique elementary properties could be replaced by applications in almost all industries"[53].

Because of its physical properties, as the highest conductivity of heat and energy, became silver indispensable for the industrial sector of other metals. So it has a high potential for this sector. Almost every computer, mobile phone contains silver. We use it in electrical contacts, catalysts, solar panels, mirrors, windows in the production, in refrigerators, office equipment, but also in batteries, as silver-zinc can produce more energy. It is ideal for coating of electrical contacts, circuit boards, due to its high electrical conductivity and resistance. The painting consists of silver in non-metal surfaces to provide electrical path, which eliminates the need for cables in many devices. Silver replaced lead in solder alloys due to toxic fumes. The use of silver is also used for coating the compact disc CD and DVD digital video. In addition, also used in plasma screens, television sets and monitors.

Silver alloys are used to design high-quality of musical wind instruments (flute), the frictional properties of the surface of silver. As a result of light absorption of free neutrons it is used for control rods of fission chain reactions in nuclear reactors.

Industrial demand for silver since 1999 has increased by 75%, this move prevented the collapse of the market. The increase in the use of silver rose in the chips, the electronic collection data. Nowadays is almost half the annual supply of silver consumed in the industrial sector.

The industry is also used as a silver-based alloy of copper and silver and can be divided into three groups:

- the alloy content round 0.5% silver - high electrical conductivity and temperature recrystallisation,

- alloys with 0,5 till 16% silver – solder production for welding,
- allovs with 16 till 30% silver – coins production.

Jewelry utilisation

„Silver jewelry has been long priced for its brilliant shine and easy processability"[54].

Jewelry in the past served as amulets, status and authority set off. In Egypt during the extended small silver amulets, which mass production was made by casting in stone molds. In the past, silversmiths haven't created silver hot as blacksmiths, but at room temperature with gentle hit hammers and other simple tools.

Today, silver became popular equipment of creative and innovative designers due to its soft and malleable surface. The main states for the production of silver jewelry belongs Italy, Thailand, India and Mexico. Silver jewelry represent almost a third of world demand for silver.

Often is coated with rhodium silver jewelry, which guarantees brighter and more radiant appearance jewelry. Silver is a component of almost all ferrous alloys. For example, 9 carat white gold and contains 62.5% silver and 22 carat gold, 8.4% silver.

The silver jewelry is placed hallmark guarantees the buyer that the product has a verifiable purity. Paves the product hallmark of the Assay Office is independent of the manufacturer or retailer. Act on hallmarking and testing precious metal regulates law no. 10/2003 Collections of Laws of. 03 December 2003.

The law states: "Purity is the relative weight of the precious metal content in the alloy, expressed in thousandths (1/1000), so pure metal has a purity of 1000/1000. The legal fineness for the silver goods:
fineness no. 0.....999/1000,
fineness no. 1.....959/1000,
fineness no. 2.....925/1000,
fineness no. 3.....900/1000,

fineness no. 4.....835/1000,
fineness no. 5.....800/1 000"[5].

Silver utilisation in coinage

„Silver coins have a long and glorious history. The roots go back to the first record when silver was used as a medium of exchange"[55].

Silver in the form of gold-silver alloy called electrum, was created to produce cash early as 700 BC by Lydias. In later times, the coins produced in pure form of refined silver.

During the reign of Stephen I. Hungaria in the country began to produce silver coins used in that time. Therefore, there has been established a mint in Kremnica. 16th century required the excavation of large silver coins.

During the 19th century of bimetalism, when it was disturbed by the discovery of a rich silver deposit in the U.S., there was a large decline in the value of silver and thus the currency. Then most of the states passed the gold standard. Silver gradually ceased to be used in coinage.

1.8 Dealing with silver on commodity exchanges

History of commodity trading dates back to medieval times, when the goods exchanges for goods, or commodities for commodity. The introduction of exchange of goods was known already in the Old Sumerian civilization, when the Sumerians introduced a means of so-called commodity money, which served as a means for goods exchanging, which play the role of money. The exchange consisted first in the form of small clay jars which is contained a small statue of sheep that created commodities which were traded with. Over time, this method has changed into a commitment to equal the tables. Then is began to form with the current commodity accounting.

Stock can be characterized as a place or kind of an organized market, in bringing together buyers, sellers and intermediaries (so called brokers, dealers, etc.) in order to carry out various business structures (securities, goods, currency, etc.) .

Law no. 249/1994 defines the commodity exchange as:
"Commodity Exchange is a legal person established in the Slovak Republic, established as a joint stock company that organizes commodity trading, provided the related activities under the license for the establishment and operation of the commodity exchange under this Act"[4].

Commodity exchange has its own organizational structure, which creates:

- General Assembly,
- Stock Exchange Chamber,
- Board of Supervisors,
- Secretary General.

The Trading terms are used by traders which need to be understand among all of them.

- **rate –** goods price,
- **cotated object –**subject admitted to official trading,
- **deadline –** the smallest goods amount, which can be traded with,
- **ring –** a place admitted only for Exchange partners,
- **scene –**rest of the stock exchange space.

Commodity exchanges arose because of trading with a lot of money and it was found necessary to establish rules that are binding on every member and thus circumvent the complications arising from the conclusion of futures contracts[4]. Complications may arise from the failure to perform under contracts, protection against fraud, the supply of commodities in sufficient quality and quantity.

In Slovakia is the only commodity exchange, which is the name of the Commodity Exchange in Bratislava (CEB), which was licensed to Ministry of Economy. "*Commodity Exchange organizes commodity trading and stock exchange transactions on the secondary*

[4]Futures contracts = agreement the two parties to buy or sell a commodity, its quality, for a price of a certain future date.

market. With supervision from the state creates a safe place for the implementation of contracts. CEB was the first bourse in the world launched non-stop trading with immediate supply of money and goods "[48]. It is the first and thus the only commodity exchange in Slovakia.

The Czech Republic is the Commodity Exchange in Prague (CEP), which was founded in 21.06.2002 drafting of the memorandum.

The first stock exchange, which traded in the form of modern futures, began to function in Chicago, USA and in the early 19th century, for its convenient location near the farms and lakes. The most famous stock trading with the silver is COMEX (Division NYMEX) in New York, USA and LBMA in London, England.

COMEX Commodity Exchange was founded in 1933 in New York. Its principal business subject is gold and silver. The large amounts of precious metals are attractive to others. It is traded for people from Europe, Asia and the Middle East. Trading hours on the stock market are 08:20 to 14:30 New York time. In 1994 the exchange merged with COMEX NYMEX exchange.

Commodity Exchange in London, LBMA (The London Bullion Market Association) trades in gold and silver. Officially was founded in 1987 to co-operate with the Bank of England.

Entry to the commodity exchange, have only persons who are authorized to stock exchange authorities. You just specify the persons respectively, the institutions that have access to the exchange:

- **brokers -** brokers, who are representatives of brokerage firms, conclude transactions on their behalf and on behalf of their clients,
- **sell-side dealers** - representing companies and banks and stores carried own account, specializing in securities
- **exchange officials** - representing the company and enter into transactions on behalf of the company
  and on their behalf. This is the authorized personnel of companies and banks,
- **guests** - those who cannot participate in trading in the commodity exchange.

The stock is trading in certificate contracts, which is used by wholesalers. The use of futures trading is utilized certificate contracts with delivery next month contracte:

- **LTD (last trading day) –** - the last day when you can contract to sell, otherwise if the owner is obliged to accept the commodity and pay the agreed price,
- **FND (first notice day) –** a term that notifies the owner of the contract, when is close to the LTD contract.

Commodity Exchange CBOT in 1979 declared that no investor can hold the silver in the total value of more than 3 million ounces. Exchange COMEX and CBOT have been accused of enriching the silver market. However, later it was found that a shortage of silver, the price of silver soared. In 1979 it amounted to 34.45 dollars per ounce. COMEX during 1980 changed the rules for traders and increased the amount of the contract up to10 million ounces. But during the COMEX exchange suspended trading and received only orders that disposed existing positions. The price of silver fell to $ 10.

Among the most famous traders of silver belong Hunt brothers, who invested in silver in 1970, the value at that time was 1.5 dollars. Due to inflation, the Vietnam War and soaring government debt is one of the brothers decided to protect their property. Therefore, between 1970 and 1973 the brothers bought200 000 ounces of physical silver, and its price increased by 100%.

Great Hunt brothers game started with buy of 55 million ounces (80% of world reserves), which transferred to Switzerland for fear of confiscation of precious metals. Price increased by $ 6. The big problem was the Hunt brothers little cash with which could continue with their purchases. Although the property is estimated to be 6 to 8,000,000,000 U.S. dollars. The plan was to raise the price of the brothers and the silver by which would they have more cash.

The result was an agreement with Saudi sheikhs who suggested investment in silver, in consequence of which was International Metals Investment Company, which started buying silver in 1979 through the COMEX and CBOT, where the price of silver has doubled from 8 to $ 16 within two months. Exchanges began to panic, because the store had only 120 million ounces of silver, which ran in October and many retailers, including

The Hunt brothers asked for their supplies of silver. At the end of the price rose to above-mentioned price of 34.45 dollars per ounce. Then the brothers owned 40 million ounces in Switzerland and 90 million through the International Metals. After the suspension of trade with the silver price fell by $ 10 per ounce. The market comes in the form of secondary silver coins and silver objects. Then the brothers left to deliver26 million ounces of silver, it is once again trying to raise the price of silver.

After the game of the Hunt brothers ended when silver price dropped to $ 21, and brothers were loosing each day $ 10 million till the end and had no cash owed to banks by $ 1.5 billion.

"The Hunt brothers caused silver market massive panic, which culminated till the foreclosure. It was their purchases of the precious metal, which almost destroyed the system of paper futures contracts." [24, p. 5].

2 The world mining centers

2.1 Mexico and Peru

Mexico

Company:	Fresnillo Plc
Address:	Moliere No. 222, 11 540 Mexico, D.F., Mexico
Contact:	+52 (55) 5279 3000
WWW:	http://www.fresnilloplc.com
President:	Alberto Baillères
Logo:	

Pict.no. 2: Logo of Fresnillo Plc
Source: [28]

Fresnillo Plc is the largest primary silver producer in the world and the Mexican second largest producer of gold. Based in Mexico City and trades on the London and the Mexican Stock Exchange. It has strong and long tradition of mining and replacement reserves. Fresnillo has five mines, all located in Mexico - Fresnillo, Cienega, Herradura, Soledad-Dipolos and Saucito, two development projects - Noche Buenaand San Ramon, and many other perspectives and possibilities of research.

The aim of Fresnillo Plc is to strengthen and maintain the position of the Fresnillo as the world's leading silver producer and Mexico's highest producer of gold. The aim is to produce 65 millionounces of silver and more than 400 thousand ounces of gold annually till the end of 2018. Fresnillo Company has corporate office in London.

Pict.no. 3: Map of mining mines of Fresnillo Plc company
Source: own processing

Peru

Company:	Volcan Compania Minera S.A.A.
Address:	Avenida Gregorio Escobedo 710, Lima, Peru
Contact:	+51 1 219-4000
WWW:	http://www.volcan.co.pe
President:	José Picasso Salinas
Establishment date:	1942

Logo:

Pict. no. 4: Logo of Volcan Compania Minera S.A.A.
Source: [29]

Volcan is placed between the two largest owners of Peruvian mining company and the largest producer of silver concentrates, zinc and lead. He dedicates for decades of its work in the mine Carahuacra Ticlio and other major items of activity in the Cerro de Pasco, and Yauli Animon and Alpamarca.

Pict. no. 5: Map of mining mines of Volcan Compania Minera S.A.A.

Source: own processing

2.2 Poland

Company:	KGHM Polska Miedź s.a.
Address:	st. M. Sklodowskiej-Curie 48, 59-301 Lubin, Poland
Contact:	+48 76 74 78 200
WWW:	www.kghm.pl
President:	Herbert Wirth
Establishment date:	May 1st 1961

Logo:

Pict. no. 6: Logo of KGHM Polska Miedź s.a.
Source:[30]

The company KGHM is the third largest silver producer in the world and the ninth largest producer of copper, one of the largest exporters of Poland. Silver in bars is a registered KGHM HG brand and holds a certificate of "Good Delivery". In their acts cares of the environment, what made it the leader of Poland's KGHM ecology. In 2010 produced 1,161 tons of metal silver.

KGHM company has mining divisions across whole Poland: Lubin, Polkowice-Sieroszowice, Rudna, Legnica, Glogów and many other mining centers.

Pict. no. 7: Map of mining mines of KGHM Polska Miedź s.a.
Source: own processing

2.3 England

Company:	Hochschild Mining plc
Address:	45 Albemarle Street, London W1S 4JL, England
Contact:	+44 (0) 207 907 2930
WWW:	http://www.hocplc.com
President:	Eduardo Hochschild
Establishment date:	1911

Logo:

Pict. no. 8: Logo of Hochschild Mining plc
Source: [31]

The company is one of the leading manufacturers focused on silver and gold in America. In 2010 produced 17.8 million ounces of silver. The company currently operates four underground mines and in southern Peru (Arcata, Ares, Pallancata) in southern Argentina (San Jose) and one opened mine in northern Mexico (Morris) and many other projects.

Hochschild Mining Company is listed on the London Stock Exchange's main market based in Lima and Peru. But the company has branches in Argentina, Chile and Mexico.

Pict. no. 9: Map of mining mines of Hochschild Mining plc
Source: [32]

2.4 Russia

Company:	Polymetal
Address:	Prospect Narodnogo Opolcheniya 2, St-Petersburg, 198216
Contact:	+7 (812) 334-3664
WWW:	http://www.polymetal.ru
President:	Ilya Yuzhanov
Establishment date:	1998

Logo:

POLYMETAL

Pict. no. 10: Logo of Polymetal
Source: [33]

The company has nine major mining centers of production - Dukat, Khakanja, Vorontsovskoye, Lunnoye, Varvarinskoye, Albazino-Amursk, Mayskoye, Avlayakan and Kirankan. The company is based in St. Petersburg and Moscow and is listed on the London Stock Exchange. The company plans in 2012 to increase the production of silver for more than 50%.

Pict. no. 11: Map of mining mines of Polymetal
Source: own processing

2.5 America

Idaho

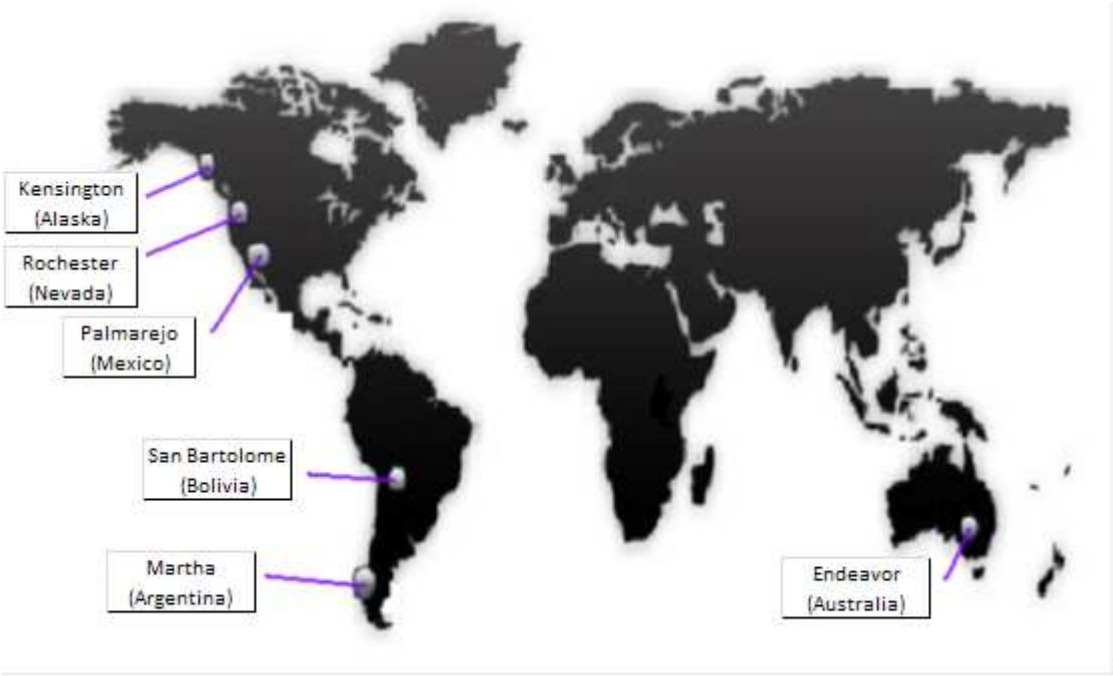
Company:	Coeur d´Alene Mines Corp.
Address:	505 Front Avenue, 83814 Coeur d´Alene, Idaho
Contact:	+1 (800) 624-2824
WWW:	http://www2.coeur.com
President:	Robert E. Mellor
Establishment date:	1928

Logo:

COEUR
THE PRECIOUS METALS COMPANY

Pict. no. 12: Logo of Coeur d´Alene Mines Corp.
Source: [34]

It is a major producer of silver and gold in the USA. Owns mines in Bolivia (San Bartolomé), Mexico (Palmarejo) and Alaska (Kensington). The company also owns a mine in Australia (Endeavor Mine), Argentina (Martha), Nevada (Rochester), and leading research activities in Mexico and in Alaska. It is traded on the New York (CDE) and Toronto (CDM) exchange.



Pict. no. 13: Map of mining mines of Coeur d´Alene Mines Corp.
Source: own processing according [35]

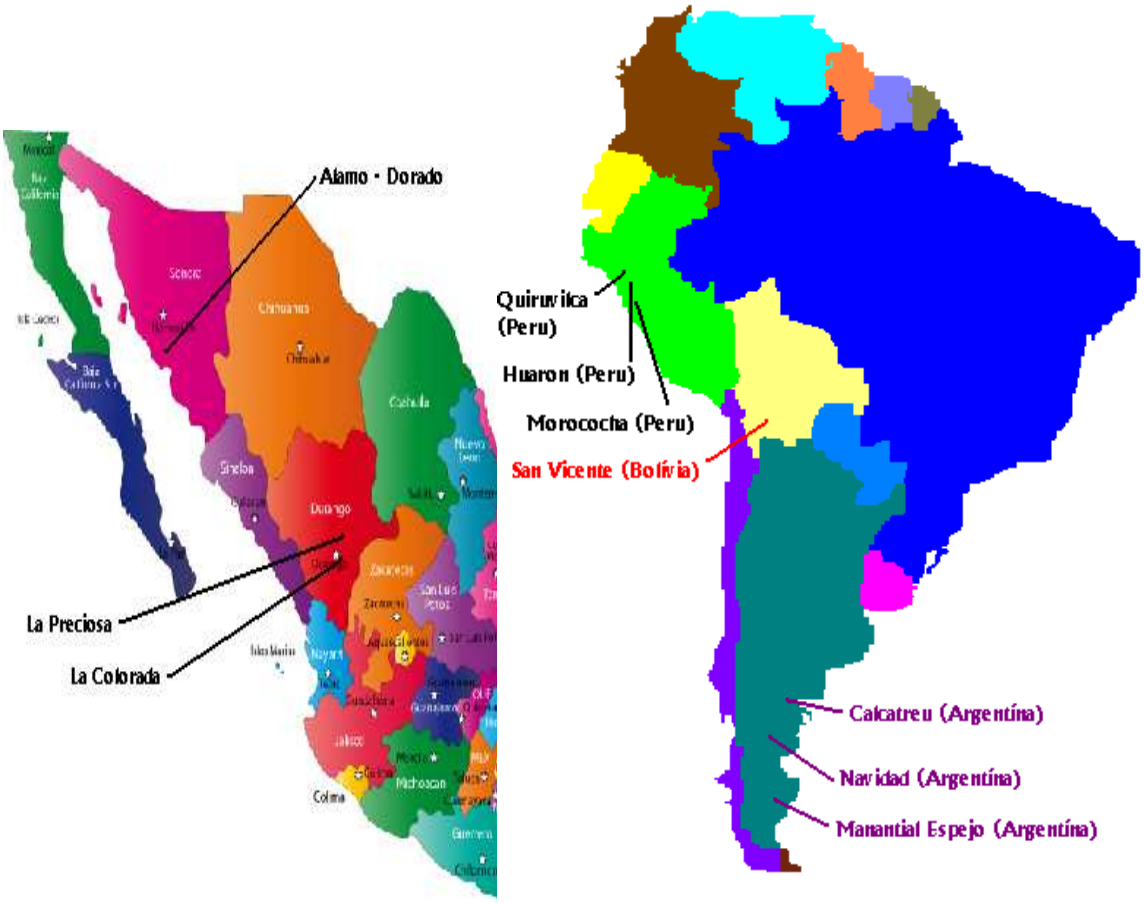
Canada

Company:	Pan American Silver Corporation
Address:	625 Howe Street, Suite 1500, Vancouver
Contact:	+1-604-6840147
WWW:	http://www.panamericansilver.com
President:	Ross J.Beaty
Establishment date:	1994

Logo:

Pict.no. 14: Logo of Pan American Silver Corporation
Source: [36]

Pan American is the second largest primary silver mining company in the world, owning seven silver mines located in Peru (Quiruvilca, Huaron, Morococha), Mexico (Alamo Dorado, La Colorada, La Preciosa), Argentina (Calcatreu, Navidad, Manantial Espejo) and Bolivia (San Vicente). Owns a silver mine in the Navidad (oneof the largest undeveloped silver deposits in the world) and is the operator of La Preciosa silver project.



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Pict. no. 15: Map of mining mines of Pan American Silver Corporation
Source: own processing

Toronto

Company:	U.S.Silver Corporation
Address:	401 Bay St, Suite 2702, P.O.Box 136, Toronto, ON M5H 2Y4
Contact:	+1 416-907-5501
WWW:	http://www.us-silver.com
President:	Gordon E. Pridham
Establishment date:	1953

Logo:

Pict.no. 16: Logo of U.S. Silver Corporation
Source: [36]

The U.S.Silver Company owns and operates the Galena mine in the valley of northern Idaho. It is the most productive silver mine in U.S. history with more than 1.2 billion ounces of silver. In December 2008 is exceeded the monthly production of silver production by 30% and in 2009 production exceeded by 200,000 ounces per month.

Pict. no. 17: Map of mining mines of U.S. Silver Corporation
Source: own processing

Canada

Company: First Majestic Silver Corp.

Address: 1805 – 925 West Georgia Street, Vancouver, BC Canada V6C3L2

Contact: +1 604-688-3033

WWW: http://www.firstmajestic.com

President: Keith Neumeyer

Establishment date: 2002

Logo:

Pict. no. 18: Logo of First Majestic Silver Corp.
Source: [37]

The company currently owns silver mines in Mexico - La Parrilla, San Martin, La Encantada and development projects, Del Toro and La Luz. The company expects that in 2011 these mines produce more than 7.5 million ounces of silver.

Pict. no. 19: Map of mining mines of First Majestic Silver Corp.
Source: own processing

Company:	Avino Silver & Gold Mines Ltd.
Address:	Suite 900, 570 Granwille Street, Vancouver, British Columbia, Canada V6C 3P1
Contact:	+1 (604) 682-3701
WWW:	http://www.avino.com
President:	David Wolfin
Establishment date:	1968
Logo:	

Pict. no. 20: Logo of Avino Silver & Gold Mines Ltd.
Source: [38]

Avino mine is located in the northern region of Durango. The company has developed four major projects, which are mined silver, gold, zinc and indium. Three are located in British Columbia (Canada) and one in the Yukon Territory (Canada).

Pict. no. 21: Map of mining mines of Avino Silver & Gold Mines Ltd.
Source: [39]

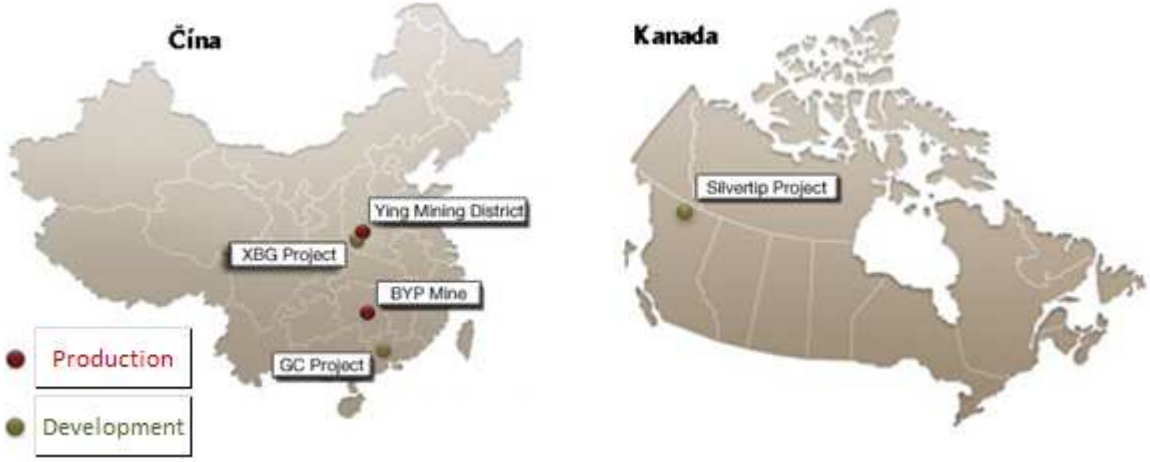
2.6 China

Company:	Silvercorp Metals Inc.
Address:	Suite 601 – Building 1, #A2 East GongTi Road, Chaoyang District, Beijing, China, 100027
Contact:	+86 10-8587-1130
WWW:	http://silvercorpmetals.com
President:	Rui Feng
Establishment date:	2003

Logo:

Pict.no. 22: Logo of Silvercorp Metals Inc.
Source: [40]

It is a major producer of silver in China. Design, development and research focuses in Canada (Silvertip project). In China, the company has the Ying Mining area, occupying mines Zing, HPG, TLP and LM. The company constantly examines the existing projects and trying to acquire new development projects. The company achieved the lowest price of silver among its peers in the five-year balance.



Pict. No. 23: Map of mining mines of Silvercorp Metals Inc.
Source: [41]

3 Distributions channels in the world and in the Czech Rep.

Impact on the price of silver has also a supply and demand. Demand for silver is constantly increasing, but supply is rapidly running. With silver as a commodity is traded 24 hours a day on the world market centers in London, Zurich, New York, Chicago and Hong Kong. Trading is thus carried out on the world stock exchanges where traders meet the very strict conditions. Its use throughout industry, jewelry, coinage is very rich. Most of the silver went in the form of silver reserves in China, where their grouped into the Chinese People's Bank. This should serve as a base upon which stands the future of the Chinese currency.

Silver has become a significant portion of provisions in the most of countries, but China can rank among the historical exceptions that extend the time before 1900, when the financial system operate on a silver standard. At that time China owns significant stocks of silver.

The world market of silver is a whole big national and international markets, at which this commodity traded 24 hours a day. They meet themselves at parties, where they must respect the rules that created them.

The main trade centers of silver can be considered:

- London,
- Zürich,
- New York (COMEX),
- Chicago (CBOT),
- Hongkong,
- Tokyo Commodity Exchange (TOCOM).

London Stock Exchange London Bullion Market Association is one of the largest stock exchanges where there is a real exchange of precious metals with delivery, and taking a physical commodity. It is an association of big dealers with metals. The London market is today the most important international trading center for precious metals, where it is trade between members only, which are major banks, retailers, processors and producers

of silver. Merchants place their trades in various forms which use more financial instruments. Constant presence of many investors and traders from Europe, Middle East and East Asia during business hours is guaranteed for COMEX commodity exchange, which has a large volume of commodities.

Stock Exchange traders pay the U.S. dollar and cents under the code "XAGUSD" and traded on the so-called spot market with the code "XAG". Futures trading of silver and its delivery can be later than the last working day of the current month of service. Trading of silver takes place in so-called "lots" (1 shekel = 5000 ounces of silver), beginning at 50 ounces = 0.01 lot.

4 Time series of mining commodities in the world since 2001

Because of permanent increasing of demand for silver, price fluctuates. Till today, is used as a free asset in monetary markets from collapse which also protects the buying. Incredible consumption of a silver can be seen in an investment silver, which price is constantly growing, and even begins to be more precious than gold, investment silver can provide the ideal characteristics of an industrial precious metal that is used in several sectors like jewelry and industry.

The best silver-producing countries, we can always advise Mexico, Peru, China, Australia and many other countries (see picture no. 24).

	Mine production	
	2009	2010[e]
United States	1,250	1,280
Australia	1,630	1,700
Bolivia	1,300	1,360
Canada	600	700
Chile	1,300	1,500
China	2,900	3,000
Mexico	3,550	3,500
Peru	3,850	4,000
Poland	1,200	1,200
Russia	1,400	1,400
Other countries	2,820	2,600
World total (rounded)	21,800	22,200

Pict. no. 24: The main producers of silver in the world in the years 2009-2010
Source: [21]

The USA and Canada was in the 19th century the largest producer of silver in the world, but over 40 years they get to eighth place in the production of silver, due to the use of bearings for 150 years. In 2006 the top five silver producing countries can advise Peru (111.6 million. ounces), Mexico (96.4 million. ounces), China (75.4 million. ounces), Australia (55.6 million. ounces) and Chile (51.5 mil. ounces). When comparing the ratio of world production of gold and silver we get number 13. Thus we have obtained information that the silver is mined 13-times more than gold. However, this ratio dropped to level 8 in 2006, which shows us that the production of silver has long been low.

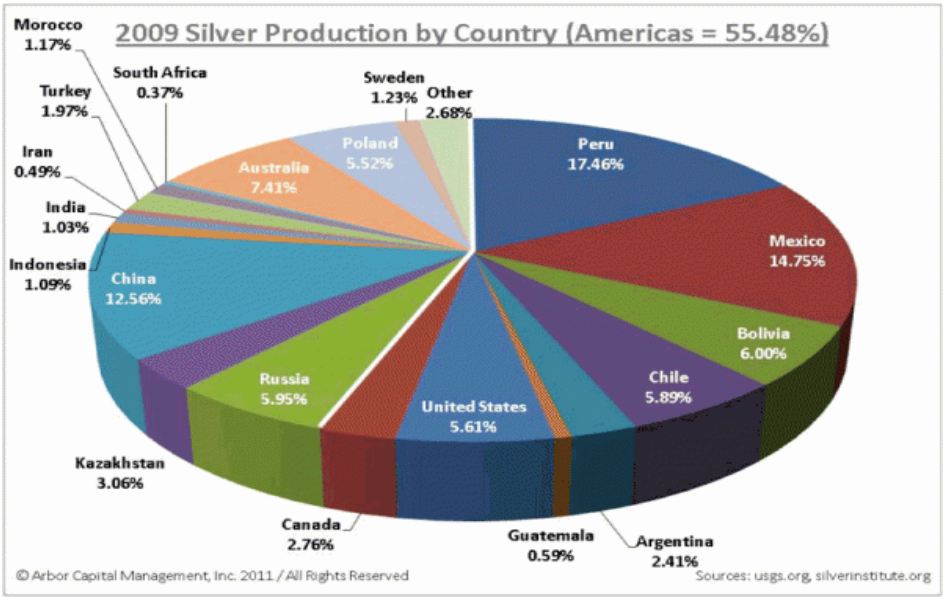
Supply and demand for silver has grown over 10 years. Supply and demand of silver in 2001 was 877.1 million ounces of silver over it in 2010 amounted to 1,056,800,000 ounces. More supply and consumption broken down by sector over 10 years what can be seen in the table below.

World Silver Supply and Demand (in millions of ounces)										
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Supply										
Mine Production	606.2	593.9	596.6	613.0	637.3	641.7	665.4	681.9	718.3	735.9
Net Government Sales	63.0	59.2	88.7	61.9	65.9	78.5	42.5	28.9	15.5	44.8
Old Silver Scrap	189.0	196.3	194.0	195.2	198.6	203.3	199.0	193.7	188.4	215.0
Producer Hedging	18.9	--	--	9.6	27.6	--	--	--	--	61.1
Implied Net Disinvestment	--	18.9	1.6	--	--	--	--	--	--	--
Total Supply	**877.1**	**868.3**	**881.0**	**879.7**	**929.5**	**923.5**	**907.0**	**904.5**	**922.2**	**1,056.8**
Demand										
Fabrication										
Industrial Applications	349.7	355.3	368.4	387.4	431.8	454.2	491.1	492.7	403.8	487.4
Photography	213.1	204.3	192.9	178.8	160.3	142.2	117.6	101.3	79.3	72.7
Jewelry	174.3	168.9	179.2	174.8	173.8	166.3	163.5	158.3	158.9	167.0
Silverware	106.1	83.5	83.9	67.2	67.6	61.0	58.5	57.1	58.2	50.3
Coins & Medals	30.5	31.6	35.7	42.4	40.0	39.8	39.7	65.4	79.0	101.3
Total Fabrication	873.6	843.5	860.1	850.6	873.6	863.5	870.3	874.7	779.2	878.8
Producer De-Hedging	--	24.8	20.9	--	--	6.8	24.2	11.6	22.3	--
Implied Net Investment	3.6	--	--	29.1	55.9	53.2	12.5	18.2	120.7	178.0
Total Demand	**877.1**	**868.3**	**881.0**	**879.7**	**929.5**	**923.5**	**907.0**	**904.5**	**922.2**	**1,056.8**
Silver Price (London US$/oz)	4.370	4.599	4.879	6.658	7.312	11.549	13.384	14.989	14.674	20.193

SOURCE: World Silver Survey 2011

Table no. 2: World supply and demand for silver (million ounces)
Source: [22]

High consumption of silver, which constantly keeps the price of silver at a higher level is mainly in the industry. Demand for silver is about 45% of industrial consumption, 25% of jewelry, 15% of the photographic industry and 15% of investment demand. Every year as investors purchased approximately 100-150 million tons of silver. With the silver and higher price can be monetary stimulus from the FED, but silver is still doing well without them, thanks to Asia, where there is still industrial demand.



Graph no. 1: Production of silver in the world in 2009
Source: [23]

Year	Annual of silver mining in tonnes
2001	1740
2002	1350
2003	1240
2004	1250
2005	1230
2006	1160
2007	1280
2008	1250
2009	1250

Table no. 3: Annual extraction of silver between 2001-2010
Source: own processing

5 Time series of prices of commodities in the world since 2001

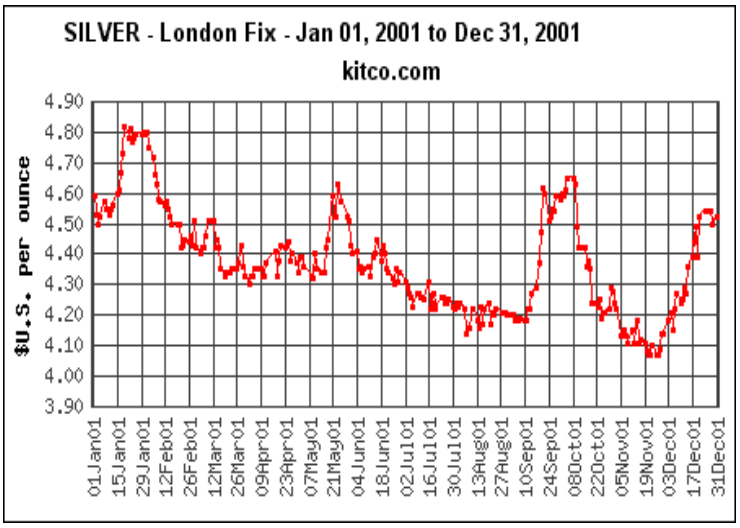
Price of silver has a long development. A large proportion of the stock prices have a silver and demand. The wide industrial use helps to encourage price level and its consumption is increasing at an increasing number of sectors, what caused a lowering of its demand. Because of its unique properties are being developed for new uses.

Graph no. 2: Development of silver prices in 10 years

Source: [27]

There are many reasons why managers of pension funds, private investors and even governments begin to include silver in their portfolios. The most important can be included, but the silver and other metals provide considerable insurance in times of financial uncertainty. However, the decision to own silver, we must be ready for large price movements of silver.

Price of silver is very unstable. The height of price was in January 2001, according to the LBMA around 4.6628 dollars per ounce and in the end of year it was round 4.3549 dollar. We see here that the price of silver fell by about 6.6% over one year.



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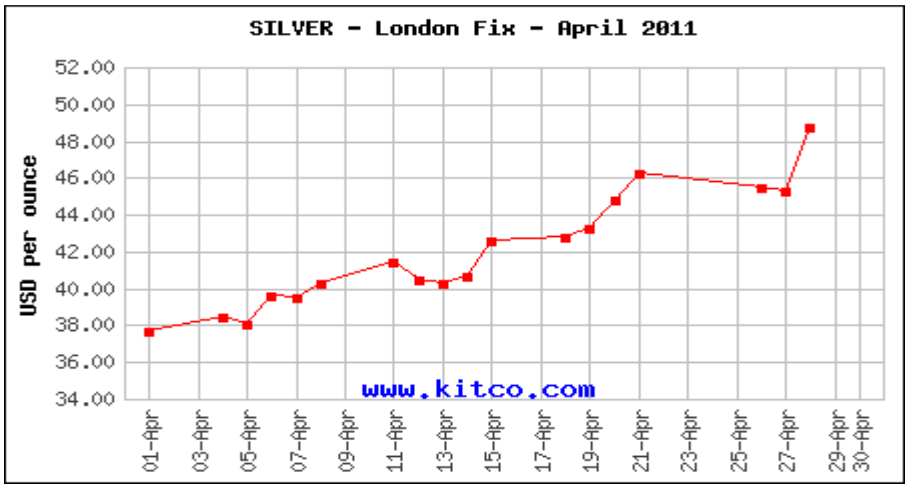
Graph no. 3: Development of silver prices in 2001
Source: [42]

But when you compare the price change from 2001 to 2011, the change is almost 6-times higher. For growing rates of silver help some major concerns like inflation and better growth conditions, as is likewise gold. Silver from the beginning of the year is clearly a metal with the highest appreciation. Since January 2011, the price increased by about 29%, while the price of gold only about three percent.

Great interest for precious metals became last year in August, when the Federal Reserve Bank (Fed) indicated that resume buying government bonds to support the revival of the local economy. This breach a trust in paper money and increasing fears of inflation. Analysts predict that the price of silver may go up in price $ 50 per troy ounce. He would record the price of silver, while the highest price since silver is from 1980, when silver had risen to a limit of $ 49.48 ounce.

Manipulation of silver prices in mid-2008 and early 2010 came to the court, where the bank JPMorgan Chase & Co. accumulated a huge amount of short positions in silver futures contracts and in options. By the end of 2008 the Bank held with HSBC Bank, more than 85% of all commercial short positions in futures contracts traded on COMEX silver. However, while on any world stock exchanges is not strictly applied and complied with positional limits. These two companies had to press down the price of silver. The banks apparently used different methods and have reportedly broadcast signals, which are about massive coordinated sales orders to sink the price of silver down, allowing them to earn the market hundreds of millions of dollars.



Graphno. 4: Silver price in April 2011
Source: [43]

In April 2011, the price of silver reached a height of 40 U.S. dollars per troy ounce. Last time it has been done in 1980. But at the end of the month it has reached an incredible height of 48.700 dollars per troy ounce. The growth rates of silver helped by inflation. As I wrote before, silver is becoming clear with the highest metal recovery, by increasing its prices by about 29% from the end of April 2011.

Analysts predict that the silver price could go up to $ 50 per troy ounce. He would record the new price of silver per troy ounce, the highest price since silver was in 1980, when the price climbed to 49.48 dollars per troy ounce.

The development of silver prices shows out a London Manufacturers Association LBMA bullion. This is an association of 58 members, which include central banks. The role of associations is to set the price of silver every day 2-fold, according to which trading in physical silver in the world. For 2011, members agreed an average price of silver at $ 29.88 per troy ounce.

Silver in 2011	
Minimum price	22,93 USD/ounce
Average price	22,98 USD/ounce
Maximum price	38,36 USD/ounce

Table no. 4: Estimated price of silver in 2011, according to LBMA
Source: [44]

While the end of November was the lowest price of silver 26.68 dollar an ounce, the highest of 48.7 and an average was 37.69. Here we can see that we cannot consider the analysis of LBMA 100% forecast for the development of prices, but their experience and a good estimate, which already had in the past we can take as a guide when buying and when selling the commodity.

The Company has made assumptions for the LBMA prices of silver between 2009 and 2010. In the tables below we can see the conditions to the cost and also the real price of silver in 2009 and 2010.

2010	Silver price in USD per ounce		
	Maximum	Minimum	Average
Assumption LBMA	23,54	14,8	19,02
Actual price	30,9	14,4	22,7

Table no. 5: Estimated and real price of silver in 2010, according to LBMA
Source: [44]

2009	Silver price in USD per ounce		
	Maximum	Minimum	Average
Assumption LBMA	15,6	8,4	11,6
Actual price	19,11	10,5	14,32

Table no. 6: Estimated and real price of silver in 2009, according to LBMA
Source: [44]

The market for silver could save an interest in buying the metal from the general public investing, many of whom see in the drop off opportunity to buy silver at bargain levels. In addition, commodity markets are often opaque and stands out clearly speculative capital, thus not need the high volatility of the price of silver in the coming months.

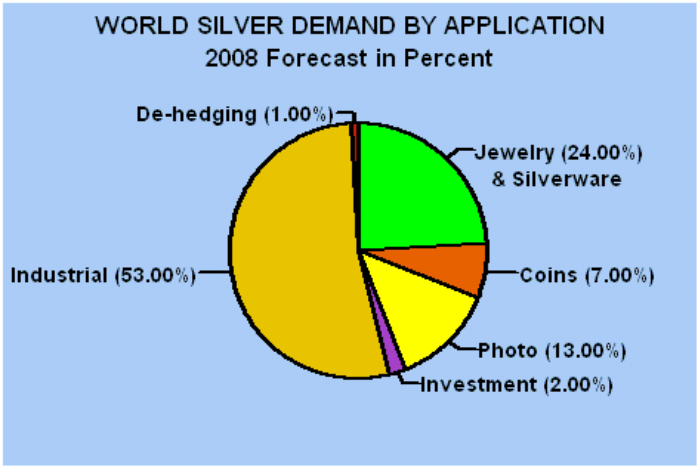
6 The largest consumers of raw materials in the world since

The main industry, which consumes a large amount of silver, is electronics. The main consumer countries over the past ten years can be considered:

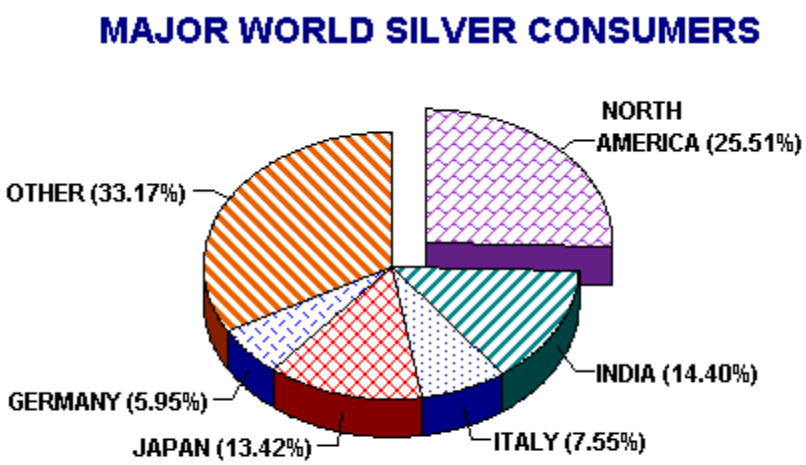
- United States,
- Canada,
- Mexico,
- United Kingdom,
- France,
- Germany,
- Italy,
- Japan,
- India.

In 2001, total production of the world's silver was in the amount of 27 000 tones. For the jewelry and silverware went around third, fourth on the photographic industry and the rest for industrial purposes. United States in 2001 were the largest consumers of silver. This was followed by India, Japan and Italy. Thirteen major consuming countries in 2001 made around almost 90% of world total.

During 2005, China climbed to the consumption of 2 600 tones of a silver, which is nearly three times more then the amount of consumption twenty years ago.



Graphno. 5: Global demand for silver by sector in 2008
Source: [45]



Graphno. 6: The main world consumers in 2009
Source: [45]

China and India in the last two years get to the top of the marketwith silver around the world. The price of the silver deeply increased in the last years by thank of high consumption of silver in the country, which forces people to buy silver. Price of silver has risen sharply in recent years due to high demand for precious metals in these two countries. High prices and the fact that both countries are the biggest buyers of silver constitute the engine of the world's great companies to invest in production capacity.

7 The prognosis of further development of production and prices

7.1 Prognosis of the silver prices evolution

Based on the findings in the previous chapters there we can see that the rising price of silver had an increasing and decreasing tendency with which it is traded in U.S. dollars, which represents a world reserve currency for several decades. Price has been long developed by trading on commodity exchanges. But the dollar against other currencies may weaken, so you should watch the price of silver and its development in the euro. When buying silver, traders have to count with the VAT relating to the investment in the form of silver coins, bricks and castings.

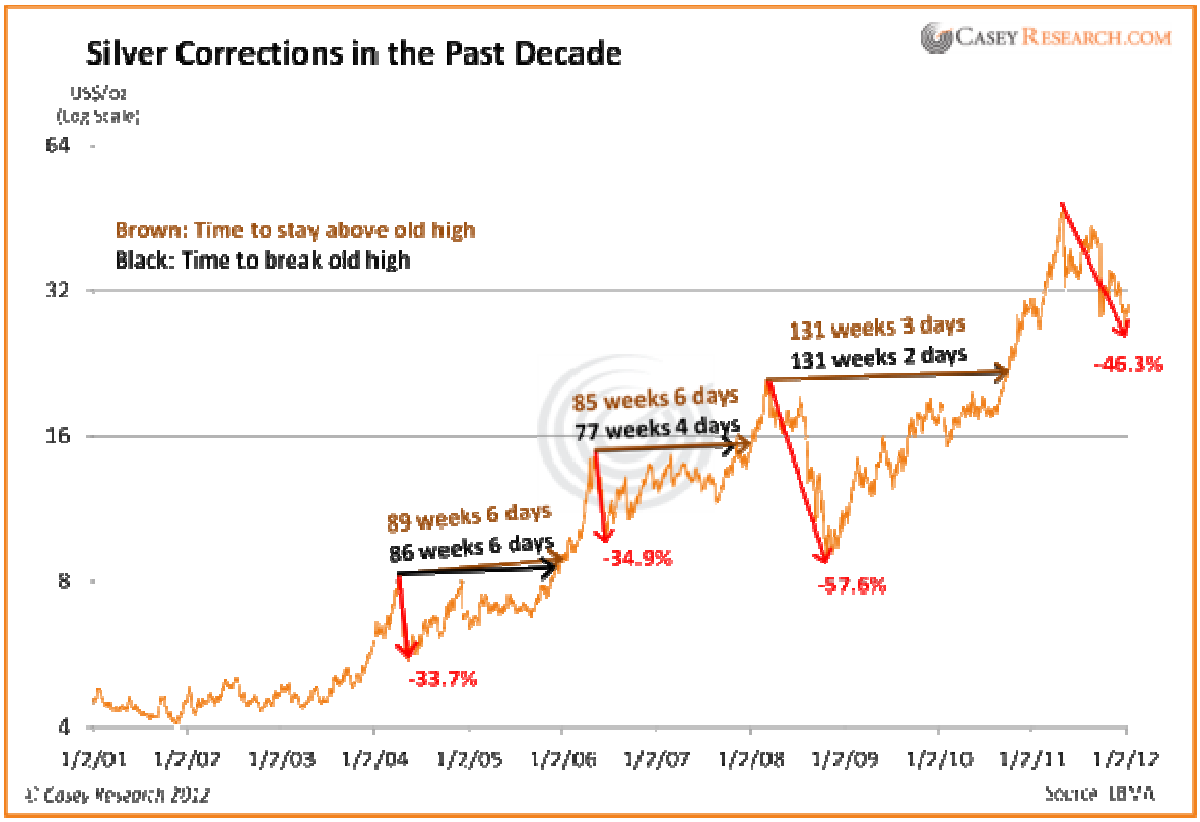
Fluctuations in the world silver prices can be blamed mainly due to stocks of commodities and tradable on world exchanges. They are quite often tried to artificially suppress the price of silver in their favor. Among the most famous in the history of trade in silver we can be considered the Hunt brothers.

Graphno. 7: Price of silver in the last 10 years
Source: [46]

On the graph no. 7 we can see a rise in the price of silver in U.S. dollars in last 10 years. In 2001, the price was below its 10 dollars per ounce, which cannot be compared with today's silver price, which moves on the edge of 30-dollars per ounce. In terms of chart one would predict that the price of silver will grow, but it is not always possible to rely on this method of forecasting. Price of silver as well as its development is

unpredictable, although it can affect the price, we cannot always guarantee the growth or decline in prices.

The main reasons for increase in the price of silver can belong a huge mismatch between demand and supply in the global market, silver stocks continue to drop,get a very low level, and China as a major producer of silver and lifted its production were those is a major importer. The rise in the price of silver really helps its historical value, when it considered the value of money and restore the gold standard for its help in the growth rates. A wave of concern about the U.S. dollar and other currencies, of course, was its quantitative easing. Commodities respond to the growth, the effect is long-term trend.



Graphno. 8: Silver correction in the last ten years
Source: [47]

Graph no.47 explains us the volatility[5] of silver in the three major periods in which they can find another outlook for silver prices. Analysts on the graph analyze that the price of silver could climb up on the price of 48.70 U. S. dollar on26th May 2013. This date is

[5]Volatility, fluctuations in the price assets, securitiesand funds in financial markets.

only an estimate based on the volatility of silver in the three periods of the graph no. 47, which ignores the underlying factors that affect the price of silver.

Ronald Ižip from the company of TRIMBroker wrote a manual which at the outset, wrote that silver has a chance to grow its value: "*It's not just gold that is growing. While this, at the time of writing this guide it broke the $ 1 400 level, but may fade envy toward what has succeeded the silver. Silver for 3 days grew up by a whopping 15%* "[24].

7.2 Predicting of the development of silver mining

There is currently no large mine, which produces only silver and should be in it soon started mining. The threat of supply continues to grow. Some threatened nationalization of mines and China is no longer able to produce a range of silver, on the contrary becomes is the main importer of this commodity.

Investors are constantly in demand for precious metals and the growth rate of a record pace. This leads to continuous innovation in technology, healthcare, electronics and alternative energy sources.

Looking at the supply and demand of silver can show us the low supply and high demand, which could tell us the price increase of silver, but at what price it is difficult to assess. It is uncertain whether it can rely on a forecast of prices referred to in chapter 7.1.

7.3 Forecast of a silver price using fuzzy logic

The role of fuzzy logic is to try to cover the reality of its imprecision and uncertainty. Values, which reflect the truth take their values in the interval <0, 1>, where 1 will represent the price development of maximum risk (low price) and the number 0 will pose any risk (high price).

Up to the price of silver there are some entering factors:

- supply risk (lack of it),
- economic risk (currency stability),
- the risk of raw material (quality),
- demand risk (high consumption).

The amount of the price can be divided into a rating scale:

0,00	Very low risk - VLR
0,30	Low risk - LR
0,50	Medium risk - MR
0,70	High risk - HR
1,00	Very high risk - VHR

A silver offer on the market is limited. Its reserves are decreasing and the risk of shortage of the commodity is high. The economic risk of entering the price of silver has a low risk, because of the commodity trading mostly in U.S. dollars or euros, it depends on where the commodity exchange in which currencies are traded on it. The quality of the silver is difficult to influence. In pure form, occurs rarely. Located mostly in conjunction with various ores and it limit its quality. Therefore, the raw material has a low risk. Demand for silver is very large. Industry, which uses silver particles are continuously growing and we assign it a very low risk.

The previous text can export the conclusion that the price of silver and the amount for us represents a medium to lower risk. Therefore, the development of silver prices should have increasing rather than decreasing tendency.

Conclusion

The current price of silver, which stands at $ 32 per ounce, has developed thousands of years. The first mention of silver is dating from the fourth Millennium BC. Since then underwent several changes. First, a name later used as the jewels in the industrial sector, especially in the healthcare industry and photographic industry. Currently, its use is much wider because of constant innovation in the industry.

A silver offer was higher in the past than now. It was more mines, whose output was high. However, in the 19th century were significant and high quality of ore exhausted to higher demand for this commodity. Therefore, new methods have been developed, which had the task to extract ore containing silver. In Slovakia, the main mine advised Banská Štiavnica, Rožňava, Gelnica and Novoveská Huta. However, not even one of the mines in the cities is not active, but recently it was found that the mine in Rožňava has a chance to reopen because of the presence of silver, which should be enough for 18 years. The main mining towns in the Czech Republic are advised Kutna Hora, Jihlava and Příbram.

Slovakia and the Czech Republic did not belong to the major places where silver was mined. The rich silver mines were located and are still located around the world. The most important mines can advise mine in Argentina, Chile, Peru, Alaska, Canada, Poland and many other major countries. These mines are owned either by a company or more companies that have the exact percentage split.

Silver as a commodity comes to the commodity exchange, where brokers and participants of an exchange traded in a particular currency, trading hours and quantity. Access to the stock market has only registered users who have permission from the stock exchange authorities. The most famous exchanges that deal with the silver are COMEX in New York and LBMA in London. Trading on the stock is specific by futures contracts.

In the second chapter I have discussed the most famous world center of silver mining. Silver is mined around the world and there are many companies that are significant in this area. Each year, dozens of the best companies show nearly the same company, only

in different order. Among the best known companies, which are important in the extraction of silver, I took into account the territorial survey. I tried to substitute any country that is specific to the extraction of silver. Countries such as Mexico, Peru, Poland, England, Russia, Canada and China are among the largest mining center. Each country has a lot of companies engaged in this activity. They own many mines owned by either 100% or have certain interests in other companies.

An important role makes a distribution of silver, which is affected by supply and demand for silver. With silver as a commodity it is traded 24 hours a day on world markets as London, Zurich, New York, Chicago and Hong Kong. Among major states, which have purchased the silver belonged China, which wanted to ensure the future of the Chinese silver currency. Silver has a specific commodity market term "XAGUSD", what means that it trades in U.S. dollars and spot markets with code "XAG". Marketers need to understand all the concepts related to trafficking. These include the word "shekel", which is traded and means 1 shekel of silver = 5,000 ounces of silver.

Silver is mined in the world for many thousand years. High consumption of silver is an investment in silver, which is useful in industry. The best producers of silver are for many years Mexico, Peru, Australia and other countries involved in the production of this commodity. Extraction of silver is also associated with other mining ores containing silver particles. In 2006, among the top producing country belonged the Peru, which produced 111.6 million ounces of silver. Silver compared to gold mining exploits 13 more times, but the ratio is constantly decreasing due to the decrease in production of silver. The resources we can find that supply and demand for silver of 10 years has grown. In 2001, the demand and offer was round 877.1 million ounces of silver and in 2010 it was 1,056,800,000 ounces of silver. Impact on the price of silver has a consumption of this commodity in various industries. The use of silver in industrial consumption is around 45%, 25% of jewelery, photographic industry and investment demand, approximately 15%.

Silver is mined in large amounts. Over the past decade it was extracted approximately 11 750 tons of silver. The extracted amount of silver and its stocks are constantly spending depends on the price, you can watch 24 hours a day on the commodity exchanges in which it develops. Impact on the price of silver also has industrial use, which has unique

properties for use in industry. Silver is included in portfolios of many investors what is included in their portfolios for the case of financial uncertainty.

Development of silver prices was very volatile and unstable. The amount of silver prices in January 2001 was below $ 5 per ounce. This price does not compare with the current price, which is approximately $ 33 per ounce. The amount of silver prices was highest in April 2011, which amounted to 48.7 U.S. dollars per ounce. It can affect so many factors such as supply, demand and inflation of course. According to analysts, the price of silver could climb up to a limit of $ 50 per ounce. But we cannot always assume that price with 100% of success rate.

The development of prices is responsible for placing at the London Association of expensive ores producers LBMA, whose task is to determine the price of silver every day 2 times. On the basis of forecasts, investors can estimate when it is appropriate for them to buy and when to sell. Investors could buy the metal to save the silver market. They see a big drop in the chance to purchase this commodity.

Industry, which consumes the most silver is electronics. Because of its constant innovations it is necessary its continuing need for silver. Over the last ten years we can among the largest consumers of raw materials put in place countries like Mexico, Canada, United States, United Kingdom, France, Germany, Italy, Japan and India. But not only electronics has the share in the consumption of silver. The main industries involved in the consumption of silver, we also advise the photographic industry, gems and jewelery and the remaining industries.

China and India become major consumers of this commodity since 2005. The result has become the high price of gold, which is forcing people to buy and invest in silver. Due to the purchase of silver of the two countries was rising price of silver and became the driving force for international companies to invest in production capacity.

From previous data, the analysts can infer what will be the probably level of prices of silver and also the development of silver mining. Despite all the information that analysts have available to the development of the price of silver is very difficult to predict. Its price has a history of falling and rising trend. Big impact on price developments

ismainly of its stock. Traders on the world's stock markets are artificially trying to suppress the price of silver in their favor. Before buying the lowest and the highest in sales. The most famous traders of silver who have experienced the heights and lows are Hunt brothers.

The amount of silver prices in 2001 was below the 10 dollars per ounce and today it hovers above the 30 dollars. It could be assumed that the price of silver will continue to rise. However, if the mining companies to start producing more than is consuming, it is possible that the price of silver will go down vice versa. So far, however, there are no new resources that will result in increasing the supply of the commodity.

The mismatch between supply and demand in the global market, where continually decreasing supplies of silver are among the main reasons for the growth of silver prices. China belong among the major producers of silver, but stopped its production and has become one of the main consumers of this commodity.

The value of the dollar, which extends to many economists fear was the reason for quantitative easing silver. Silver reacts to this growing phenomenon that will have long-term trend.

Analysts predicted on the ground of charts, where it has been analyzed the price of silver in recent years, that the price could climb to nearly $ 49 per ounce to May 2013th. The calculation of this date is only an estimate based on the volatility of silver, which I indicated in graph no. 47, which does not take into the account the basic factors affecting the price of silver.

Budúci stav ťažby striebra je veľmi ohrozený. V súčasnosti neexistuje žiadna baňa, ktorá by produkovala len striebro a jej zásoby by boli dlhodobé. Zásobovanie touto komoditou je preto ohrozené.

The future status of silver mining is highly endangered. There is currently no mine, which produced only silver and its stock would be long term. The supply of this commodity is therefore compromised.

Predictions for the development of mining and silver prices are different. On the one hand, we see limited supply and high consumption of this commodity. Continuous innovation in the industry increases the consumption of commodities and a small number of mines producing this commodity to the world are low. It can be expected to increase the price of commodities. But on the other hand, technologies that are looking for a new mining site continues to improve and it can be assumed that they discovered new places, which would ensure a supply for several decades. This should cause a reduction in prices of commodities.

Therefore it is very difficult to expect the development of mining and silver prices. When investing in the commodities, investor must study the history of the commodity, its price development in the charts and of course to study all available literature, which should include all mining mines that produce silver, what are their stock and for how long these stocks run out.

ABSTRACT

Radka LEŽÁKOVÁ*Analysis of the current state of mining, demand, distribution, consumption and prognosis for the world market in silver*. Bachelor Thesis. European Polytechnic Institute, LTD. Kunovice

Thesis Supervisor: Ing. Jan Prachař

Key words:

Demand, supply, consumers, mining, commodity, price, producers, market, traders, development, prognosis, industry, investment Exchange.

The aim of the bachelors work is to analyze the current position of production, demand, distribution, consumption and outlook for the global market for silver. The content thesis is divided into seven chapters. It contains 26 illustrations, 6 tables and 8 graphs. The first chapter presents the theoretical knowledge about the characteristics, utilisation and trade of silver. The second and third chapter deals with the world's centers of production and distribution channels worldwide and in the Czech Republic. The fourth and sixth chapters include information on mining, the price of the largest consumers of commodities since 2001. The last chapter is the result of thesis, for which the identified knowledge describes the prognosis of further development of production and the price of silver.

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List of abbreactions

AD – our era

Ag – silver (argentum)

BC – Before Christ

Bi –bismuth

CBOT – Chicago Board of Trade

CD –Compact Disk

CDE – ordinary shares of Coeur tradable on the New Zork Stock Exchange

CDM – ordinary shares of Coeur tradable on Toronto Stock Exchange

CEB – Commodity Exchange in Bratislava

CEP – Commodity Exchange in Prague

CET – Central European Time

CO – cobalt

COMEX – division of NYMEX

DVD –Dissociated Vertical Deviation

f.e. – for example

FED – Federal Reserve System

FND – First notice Day

g/t – gram/tonne

ISO – International Organization for Standardization

kg – kilogram

km - kilometer

LBMA – London Bullion Market Association

LTD – Last Trading Day

m – meter

Ni – nickel

no. – number

NYMEX – New York Mercantile Exchange

p - page

Pb – lead

Pict. - picture

Sn – tin

t - ton

TOCOM – Tokyo Commodity Exchange

U – uranium

U.S. – United States

USA – United States of America

USD – United States Dollar

USSR – Union of Soviet Socialist Republics

Zn – zinc

XAGUSD – troy ounce of silver in U.S. dollars – is used for stock

XAG – troy ounce of silver – used for stock

W - wolfram

WWW – World Wide Web

°C – Celsius

% - percentage

List of pictures, graphs, tables

Attachments

Appendix no. 1: Silver and its shape [1]

Appendix no. 2: The periodic table of elements [3]