

Evaluation of Efficiency and Effectiveness of Silver as Investment

Dr. Partap Singh,
Former Head (MBA), SDITM
Faculty Member of Deptt. of Management studies,
NC College of Engineering
Israna, Panipat, Haryana

Dr Sanjay Singla
Professor
IET Bhattal Technical Campus, Punjab

Abstract - India ranks thirteenth in the world at 12.1 million oz of annual silver production. With a population of over 1.2 billion, it's no wonder India needs to import silver to meet the demand of its citizens. Total annual Indian silver production represents just one-tenth of one percent of the population of the country. Basically, India and the United States import nearly half (44%) of total global silver mine supply. The present paper analyzes the strengths of silver as an investment asset and reasons why it should be a part of one's investment portfolio. The discussions begins with analysis of various methods available for investment in silver, factors contributing to price variation silver, test of efficiency of futures trading in silver contracts in Indian context and ends with analyses the performance of silver as an investment avenue.

Key Words: Industrial Demand, Volatility, Industrial demand, & Physical Demand

I. INTRODUCTION

The price of silver has been very volatile historically. Although the ratio of gold to silver prices has varied over the past, in recent times we observe that silver prices follow gold prices and may act as a substitute for them in the future. This article tries to identify the major factors that cause volatility in the silver prices and analyze in detail the impact of these factors on the silver prices. The study aims to provide directional inputs that can help predict future trends in the silver prices. Silver is one of the most precious metals, valued both as a form of currency and store of value. The major components of silver demand¹ are Industrial use (54%), Photography (15%), Jewellery and Silverware (26%) and Coins (5%). Twenty countries together produce 96% of the silver mined globally². Mexico is the largest producer followed closely by Peru³. The main consumer countries for silver are the US, India, Canada, Mexico, UK, France, Germany, Italy and Japan.

The key factors that affect the volatility of silver are fluctuating industrial demand and store of value demand, geo-political uncertainties, rising crude oil prices, depreciating dollar, government policies on major export and import destinations, sales by China and other central banks, direction of gold prices and direction of other commodity prices.

In 2013, total identifiable investment demand, which includes physical bar investment, coins and exchange traded funds (ETF) inventories, rose by 27 percent to a three-year high at 247.2 Moz. The growth was driven principally by a strong rise in retail purchases of silver bars and coins. Demand for physical bullion bars more than doubled last year to reach a high of 127.2 Moz, while purchases of silver coins and medals rose 38 percent to a record 118.5 Moz. ETF holdings showed only modest growth in 2013. The average price of silver was 23.79 in last year

II. FACTORS AFFECTING SILVER PRICES

Gold Prices

In a bullish environment, speculators tend to be interested in most of the precious metals. So it leads to an increase in the investment demand for silver. Silver having a comparatively smaller market as compared to gold, it does not take much time to drive the prices higher. At the same time when the environment is bearish, investors lose

confidence in silver very fast and cause the prices to fall. From the analysis of the trend of the gold-silver ratio, it can be seen clearly that silver has a tendency to follow the prices of gold. During the subprime crisis when the prices of gold increased silver also increased. However, it would pace the gain of gold at best. During the days when the gold prices decreased we see that the silver prices plummeted by an even greater margin. Based on our hypothesis we would recommend to buy silver during a recession and to sell during a boom.

Rarity

Like gold, the role of silver historically was as a currency. Moreover similar to gold it was removed from its role as a currency and primarily became a commodity. More recently silver is trying to regain its role as a currency. However, silver's role as a commodity was far more successful than gold's, as it has a lot more industrial uses than gold. As a result, silver is getting consumed at a faster rate than it is being mined, and therefore it is becoming rarer. Should this trend continue, silver will one day transition from precious metal to rare earth metal. This will have a significant impact on its price. Failing that, silver's price will be determined by how it stacks up against gold as a currency, and whether both are required or not.

Declining Supply of Silver

There are only a handful of pure silver mines remaining. This inflexible supply means that we cannot expect significant mine supply to depress the price after silver rises in price. It is extremely rare to find a good, service, investment or commodity that is price inelastic in both supply and demand. This is another powerfully bullish aspect unique to silver. The supply of silver is inelastic. Silver production will not ramp up significantly if the silver price goes up. Supply didn't increase in the 1970's when silver rose 35 fold in price - from \$1.40/oz in 1971 to a high of nearly \$50/oz in 1980. Importantly, silver is a byproduct metal and some 80% of mined silver is a byproduct of base metals. Higher prices for silver will not cause copper, nickel, zinc, lead or other base metal miners to increase their production. In the event of a global deflationary slowdown demand for base metals would likely fall thus further decreasing the supply of silver.

Silver is a rare metal that is used in various industrial areas beyond jewelry making. In recent past the growing demand from the industry has expanded the role of silver in the global silver markets. Unique technical proficiency of silver makes it suitable for a wide array of applications, both in industry and healthcare, but also limits the ability of users to switch to other low cost alternatives. Most common uses of silver include manufacturing of Radio Frequency Identification, Super capacitors, Water purification, medical uses, wood preservatives, batteries, auto catalyts, super conductors, photovoltaic's , brazing alloys and soldiers, ethylene oxide etc. Silver is expected to continue its bullish run in industrial demand and the total demand is expected to increase to a record high of 665.9 Million Ounces in 2015 from present 487.4 million ounces.

Oil Prices

In past oil has registered a strong correlation with gold. Gold and silver also seem to have a stable relationship. Based on this it might be logical to conclude that oil and silver should also have a stable relationship. It has been argued that the mining of silver is an energy intensive process and hence as the oil prices rise or fall, the prices of silver would also rise or fall. This however would be over simplification as it undermines various other important factors. There is also another argument that says that silver and oil should have greater correlation than silver and gold as they are industrial elements and the factors affecting their demands would be common. However, contrary to this silver is not a perishable commodity whereas oil is.

Since the 1960's silver and oil have had a 0.7 positive correlation¹¹, this is quite strong but not as strong as of gold and oil that have a correlation of 0.8. Our analysis of the silver and oil relationship shows that silver does have a positive correlation with oil during secular commodities bull periods and the secular bear periods.

Stock Indices

The correlation between silver and the stock markets was low pre-recession. But we see that during the subprime crisis and post it, silver has been highly correlated with the stock markets. This shows the returning demand for investment in silver with the growing confidence in the markets. There is certainly some interplay between the fortunes of the stock markets and capital flowing into silver. Silver's appeal as an alternative asset is definitely higher when traditional investments are not faring well¹. Yet, the relationship between silver and the S&P 500 (SPX) is far more nuanced and complex than merely a direct inverse or even parallel relationship. The SPX is not, and never has been, silver's primary driver.

Us Dollar

There exists an inverse relationship between silver prices and USD Index. During recession US Dollar is considered a safe haven, people around the world tend to disinvest in commodities and invest into US Dollar. From our analysis, we can clearly see that the prices of precious metals such as silver, palladium, titanium, etc. declines during recessionary periods. The above trend clearly suggests that silver can be used only as a long term hedge against inflation, but it cannot be used in short term as a recessionary hedge.

Large and Private Institutional Investors

Large investors have the power to affect market prices. Silver market is a much smaller market than gold. Large investing funds or groups can inadvertently affect silver value in the upstream or downstream deciding to purchase significant silver assets or, on the contrary, trying to sell them off. History also gives testimony to such incidents hunt brothers (1973), warren buffet (1997) etc. driving silver prices substantially which may not be in the benefit of marginal investors.

Facility of Investment

Different modes available for investors to invest in silver which makes it relatively easy to invest in them. Most important forms of investments in silver are Bullion bars, silver coins or Silver round, Silver exchange-traded products (ETPs), Silver certificates, Silver accounts offered by banks, Silver futures and options at commodity exchanges, Contract for Differences (CFD) and Shares in Silver mining companies.

III. OBJECTIVES

- To workout the multiple factors affecting silver prices in India.
- To analyze annual return of silver and gold as well as volatility in gold prices and silver prices in India.
- To evaluate silver supply and silver demand in world.
- To analyze the efficiency& effectiveness of Silver as an investment asset.

IV. METHODOLOGY

The study is based on secondary data. The study period has been taken from 2004-2014. For the analysis of data some statistical tools like simple average, Standard Deviation (SD), variance and percentile method have been used.

V. EXPERIMENT AND RESULT

A. Annual Return of Gold and Silver

Table 1(Part A) Showing comparative analysis of annual changes in prices of Gold and Silver

Year	Relevant Valuation Date	Gold Price(Rs.)	Fall/Rise (%)	Silver Prices (Rs.)	Fall/Rise (%)
1981-1982	01/04/1981	1670	-	2715	-
1991-1992	31/03/1991	3466	107.5	6646	144.8
1992-1993	31/03/1992	4334	25.0	8040	21.0
1993-1994	31/03/1993	4140	-4.5	5489	-31.7
1994-1995	31/03/1994	4598	11.1	7142	30.1
1995-1996	31/03/1995	4680	1.8	6335	-11.3
1996-1997	31/03/1996	5160	10.3	7346	16.0
1997-1998	31/03/1997	4725	-8.4	7345	0.0
1998-1999	31/03/1998	4045	-14.4	8560	16.5
1999-2000	31/03/1999	4235	4.7	7615	-11.0
2000-2001	31/03/2000	4355	2.8	7675	0.8
2001-2002	31/03/2001	4250	-2.4	7200	-6.2
2002-2003	31/03/2002	5010	17.9	7895	9.7
2003-2004	31/03/2003	5310	6.0	7695	-2.5
2004-2005	31/03/2004	6081	14.5	11600	50.7

Source: World Silver Survey, 2014

Table 1(Part B) Showing comparative analysis of annual changes in prices of Gold and Silver

Year	Relevant Valuation Date	Gold Price(Rs.)	Fall/Rise (%)	Silver Prices (Rs.)	Fall/Rise (%)
2005-2006	31/03/2005	6150	1.1	10500	-9.5
2006-2007	31/03/2006	8560	39.2	16800	60.0
2007-2008	31/03/2007	9510	11.1	19500	16.1
2008-2009	31/03/2008	12280	29.1	23350	19.7
2009-2010	31/03/2009	15120	23.1	22230	-4.8
2010-2011	31/03/2010	16320	7.9	27255	22.6
2011-2012	31/03/2011	20775	27.3	56900	108.8
2012-2013	31/03/2012	28040	35.0	56290	-1.1
2013-2014	31/03/2013	29610	5.6	54030	-4.0
2014-2015	31/03/2014	29300	-1.0	43400	-19.7
2014-2015	2011-2014	26566	-9.3	36090	-16.8
		MEAN	+11.7		+14.7

Source: World Silver Survey, 2014

Table 1 shows that average annual return of gold is 11.7 percent while average annual return of silver is 14.7 percent during study period. Silver has given 3 percent more return than gold.

B. Volatility in Gold Prices and Silver Prices

Table 2 Showing volatility in Gold Prices and Silver Prices

Descriptive Statistics								
	N	Minimum	Maximum	Mean		Std. Deviation	C.V.	Variance
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic		Statistic
Gold1	26	1670.00	29610.00	1.0316E4	1.77137E3	9032.25733	159.99	8.158E7
Silver1	26	2715.00	56900.00	1.8284E4	3.32805E3	16969.76809	310.28	2.880E8
Valid N (list wise)	26							

Table 2 shows that variance for gold is 8.16 more than that of silver (2.88), therefore price fluctuations in case of gold is higher than silver.

C. World Silver Supply and Demand

Table 3 showing year wise comparative analysis of World supply and Physical demand of silver

(in moz=1 ton or 1000kg)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Mean
Supply	872.0	954.1	915.6	887.3	905.7	911.7	1,070.7	1037.6	1005.3	978.1	
Physical Demand	917.1	945.9	933.1	952.3	1,076.7	859.5	1,032.6	1068.9	954.4	1,081.1	
Physical Surplus/ Deficit	-45.1	8.2	-17.5	-65.0	-171.0	52.2	38.1	-31.3	51.0	-103.0	-29.98
Physical Surplus/ Deficit (%)	-5.17	0.86	-1.91	-7.35	-18.88	5.72	3.56	-3.02	5.07	-10.53	-3.17

Source: World Silver Survey, 2014

Table 3 Exhibits that the average world physical deficit is 29.98 moz and average World physical deficit percentage is 3.17 during study period between supply and physical demand.

D. Mine Production and Physical Demand of Silver

Table 4 Showing Relationship between Year wise **Mine Production and Physical Demand of Silver**

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	MEAN
Mine Production	613.6	639.7	642.7	666.1	683.1	713.8	750.6	754.6	792.3	819.6	
% of Demand	66.9	67.6	68.9	69.9	63.4	83.0	72.7	70.6	83.0	75.8	
Fall/ Rise		0.7	1.2	1.1	-6.5	19.6	-10.4	-2.1	12.4	-7.2	8.9
MEAN											0.89
Physical Demand	917.1	945.9	933.1	952.3	1,076.70	859.5	1,032.60	1,068.90	954.4	1,081.10	7041.5
Fall/ Rise		28.8	-12.8	19.2	124.4	-217.2	173.1	36.3	-114.5	126.7	149.8
%Fall/Rise		3.14067	-1.353209	2.0298129	13.3319	-22.8079	16.0769	4.223386	-11.0885	11.85331	15.4063
Mean											1.54

Source: World Silver Survey

Table 4 Exhibits that average rise in physical demand of silver is 1.54% which is greater than that of average rise (i.e.0.89%) in mine production in world. The mine production is 67 percent of Physical demand while it is 76 percent during the year 2013. The mine production is more in all years than year 2004.

E. Demand and Use of Silver in the World

Table 5 Showing Demand and Use of Silver in the World

Demand	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Avg.(%)
Jewelry	187.1 (20.40)	187.9 (19.86)	176.0 (18.86)	183.2 (19.24)	178.2 (16.55)	177.3 (20.63)	190.6 (18.46)	183.4 (17.16)	181.4 (19.01)	198.8 (18.39)	19.00
Coins & Bars	53.0 (5.78)	51.5 (5.44)	48.7 (5.22)	51.2 (5.38)	187.7 (17.43)	87.9 (10.23)	146.1 (14.15)	212.6 (19.89)	139.3 (14.60)	245.6 (22.72)	12.06
Silverware	68.1 (7.43)	69.4 (7.33)	63.2 (6.77)	61.3 (6.44)	59.5 (5.53)	54.2 (6.31)	52.6 (5.09)	48.1 (4.50)	44.6 (4.67)	50.0 (4.62)	5.72
Industrial Fabrication	608.9 (66.39)	637.1 (67.35)	645.2 (69.15)	656.7 (68.96)	651.3 (60.49)	540.2 (62.85)	643.2 (62.29)	624.8 (60.61)	589.1 (61.72)	586.6 (54.25)	63.22
Total Physical Demand	917.1 (100)	945.9	933.1	952.3	1,076.7	859.5	1,032.6	1,068.9	954.4	1,081.1	100

Table 5 Exhibits that the average percentage of total physical demand for Jewelry is 19 percent, for Coins& Bars is 12 percent, for Silverware is 6 percent and for Industrial fabrication is 63 percent in world. The least use of silver is for Silverware while the highest use of silver is for industrial fabrication. The use of silver for jewelry is ranked at 2nd position after industrial fabrication.

F. Industrial Demand and Physical Demand of Silver in World

The table shows 66 percent demand of silver for industrial fabrication of total physical demand of silver in world in the year 2004 while the percentage of average demand of silver for industrial fabrication is 63 percent during study period.

Table 6 Showing Industrial Demand and Physical of Silver Demand in World

Demand	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Avg.%
Industrial Fabrication	608.9 (66.39)	637.1 (67.35)	645.2 (69.15)	656.7 (68.96)	651.3 (60.49)	540.2 (62.85)	643.2 (62.29)	624.8 (60.61)	589.1 (61.72)	586.6 (54.25)	63.22
...of which Electrical & Electronics	191.8	211.1	223.1	239.8	245.5	203.1	272.6	260.6	237.0	233.9	
...of which Brazing Alloys & Solders	48.9 (8.03)	52.4	54.4	58.1	61.3	53.3	60.6	62.4	60.3	62.4	
...of which Photography	178.8	160.3	142.2	117.0	100.2	78.4	68.8	61.7	54.4	50.4	
...of which Other Industrial	189.4	213.2	225.4	241.9	244.4	205.4	241.2	240.0	237.4	240.0	
Total Physical Demand	917.1 (100)	945.9	933.1	952.3	1,076.7	859.5	1,032.6	1,068.9	954.4	1,081.1	100

VI. FINDINGS

- It has been found that silver is providing more return than gold during study period.
- The price fluctuations in case of gold is higher than silver.
- It has been observed that there is exists physical deficit silver rather than supply surplus of silver.
- It was studied that the average rise in physical demand of silver is greater than that of average rise in mine production in world during study period.
- It was found that more than 60 percent of total physical demand is used for industrial fabrication while 19 percent is used for jewelry that is 2nd largest after industrial fabrication.
- It was observed that the volatility can be attributed to multiple factors like rarity, high production costs, gold and other precious metal prices, major stock market indices, US dollar, oil, large institutional investors and industrial demand.

VII. CONCLUSION

In view of above study can be concluded that silver may be considered as a future substitute for investment in gold. It is valued as a form of currency and as an industrial metal. Besides, the advantages of higher liquidity, wider marketability, and satisfaction etc it makes it one of the best assets to invest in. However, its high volatility has still remained a question of interest. The volatility can be attributed to multiple factors like rarity, high production costs, gold and other precious metal prices, major stock market indices, large concentrated short position, US dollar, oil, institutional investors and industrial demand.

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