

## An Analysis of Volatility in Silver Prices in India

HARSH PUROHIT\*  
NIDHI CHOUDHARY\*\*

---

### Abstract

Precious metals have been a keen area of interest for the investors, media and researchers in India. They are the most traded category of commodity on Indian Exchanges. The volumes have been record high for silver, followed by gold. However, an extensive review of existing literature indicates that the research in case of precious metals has been concentrated on gold prices and there is a wide gap in case of study of volatility in silver prices.

The present study is an attempt to bridge this gap and understand the impact of some Macro economic factors on silver prices in India using some advanced econometric tools. The study finds that investment strategies for silver should not remain consistent. The scope of prices of metal is exhibiting break with passage of time. The metal is more sensitive international events and stock markets.

---

### I. Introduction

PRECIOUS METALS AND gemstones have been an integral part of the Indian civilization since its recorded history. Silver – The White Metal is one of the most popular metals amongst the Indians for an age which has been put to various uses like ornaments and utensils, trade, etc. It also stands as the foundation for several monetary systems worldwide. The value of silver as precious metal is widely acknowledged second after gold. The word ‘silver’ appears in Anglo-Saxon in various spellings, such as seolfor and siolfor. A similar form is seen throughout the Germanic languages (compare Old High German silabar and silbir). The chemical symbol ‘Ag’ is from the Latin word for ‘silver’, argentum (compare Greek ἄργυρος, *argyros*), from the Indo-European root arg-, meaning ‘white’ or ‘shining’.

\* Chair Professor, ICICI Bank Chair for BFSI and Dean, Banasthali Vidyapith, WISDOM, Faculty of Management Studies, Rajasthan 304022 INDIA

\*\* Former Assistant Professor, Banasthali University, The Faculty of Management Studies and IIF MBF Alumni (2009-11Batch), 17590 NW Cornell Road, Apartment 06, Beaverton, Oregon 97006, USA

were relatively stable in early 2012. However, the prices began to fall once again in latter part on 2012. This is attributed to the uncertainty over the policies of Federal Bank, United States as “the policies would have impacted commodities denominated in dollars” (Oberoi, 2013). This led to fall in investment demand of silver. However, the prices again took a U turn with a rise in investment demand as the Government of India, increased the import duty on gold. This made the investors look for another precious metal to park their investments. This led to rise in prices once again. The silver spot and future market has bidirectional causality over the passage of time irrespective of the structural break in the data. The relationship between the two markets is efficient and leaves no scope for any arbitrage opportunity irrespective of changing economic conditions and performance of the metal prices in India. The relationship of silver spot and future prices with sensex has been consistent over the passage of time. The flow of volatility has been bi directional between the variables. The spot and future prices of silver have shared bidirectional causality with sensex. The spot market of silver shares efficient and bidirectional causality with US Dollar exchange rate in a normal phase (part I and part II of data). However, this relationship is disturbed in case of high volatility in silver prices (Part III, Part IV and Part V). The relationship of silver prices in India with International Silver prices is bidirectional and efficient.

#### V. Managerial Implications

The investment strategies for silver should not remain consistent. The slope of the prices of metal is exhibiting a break with the passage of time. The metal is more sensitive to international events. Hence, the investors need to reconsider their investment approach towards silver whenever there is any major international event. Further, the metal is impacted by the movements in the stock markets. The investment strategies need to be active to yield maximum returns from the silver trading.

#### References

- Acosta, F. M., and C. W. Granger, (1995), "A Linearity Test for Near-unit Root Time Series", Discussion Paper no. 95-12 , University of California, Department of Economics
- Acworth, W., (2013), "FIA Annual Volume Survey", *Futures Industry Annual Volume Survey*
- Aggrawal, A., and A. Bhargava, (2011), "Factor Affecting Volatility of Silver Prices", Working Paper, IIM Bangalore June 2011.
- AQM Copper Inc., (2012), "Copper Fundamentals" AQM Copper Inc.
- Bai, J., and P. Perron, (1998), "Estimating and testing linear models with multiple structural changes", *Econometrica* , Vol. 66.

Barnhart, S. W., (1989), "The Effects of Macroeconomic Announcements on Commodity Prices" *American Journal of Agriculture Economics* , Vol.71, No. 2, pp. 389 - 403.

Batten, J. A., C. Ciner, and B. M. Lucey, (2010), "The macroeconomic determinants of volatility in precious metals markets", *Resources Policy* , Vol. 35 No.6, pp. 65-71.

BBC, (2009), "Oil price rises on Gaza conflict", BBC News, January 2009.

Bekiros, S. D., and C. G. Diks, (2008), "The relationship between crude oil spot and futures prices: Cointegration, linear and nonlinear causality", *Energy Economics* , Vol.30, pp. 2673-2685.

Bisbee, F., (2011), "The Law of Supply and Demand - Copper", FC Magazine February 2011

Bjørnland, H, (2009), "Oil price shocks and stock market booms in an oil exporting country", *Scottish Journal of Political Economy*, Vol. 56, No. 2, pp. 232-254

Bova, E., (2008), "Exchange Rate Management for Commodity Booms: Examining Zambia's Copper Exports" *Development Viewpoint* , Vol. 19.

Bretiung, J., (2001), "Rank Test for Nonlinear Cointegration" *Journal of Business & Economic Statistics* , Vol. 19, No. 3, pp. 331-340.

Bretiung, J., (2001), "Rank Test for Nonlinear Cointegration", *Journal of Business and Economic Statistics* , Vol. 19, No. 3, pp. 331-340.

Brock, W. A., W. D. J. A. Dechert, Scheinkman, B. and LeBaron, (1996), "A Test for Independence Based on the Correlation Dimension", *Econometric Reviews*, Vol. 15, pp. 197-235.

Chen, Y. C., and K.S. Rogoff, (2010), "Can Exchange Rates Forecast Commodity Prices?" *The Quarterly Journal of Economics* , Vol. 125, No. 3, pp. 1145-1194.

Chua, J., G. Sick, and R. W., (1990), "Diversifying with Gold Stocks", *Financial Analysts Journal* , Vol. 46, No. 4, pp. 76- 79.

Ciner, C., (2001), "Energy Shocks and Financial Markets: Nonlinear Linkages", *Studies in Nonlinear Dynamics and Econometric* , Vol. 5, No. 3.

Ciner, C., (2001), "On the long run relationship between gold and silver prices A note" *Global Finance Journal* , Vol. 12, pp. 299- 303.

Conerly, B., (2013), "Future Of The Dollar As World Reserve Currency", *Forbes*, October 25, 2013.

Conover, C. M., G. R. Jensen, R. R. Johnson and J. M. Mercer, (2009), "Can Precious Metals Make Your Portfolio Shine" *The Journal of Investing* , Vol. 18, No. 1, pp. 75-86.

Creti, A., M. Joëts, and V. Mignon, (2012), "On the Links Between Stock and Commodity Markets Volatility", Centre d'Etudes Prospectives et d'Informations Internationales Working Paper Series , Workin Paper No pp. 2012 - 20.

Cunado, J., and F. P. Gracia, (2005). "Oil prices, economic activity and inflation: evidence for some Asian countries", *The Quarterly Review of Economics and Finance* Vol. 45, No. 1, pp. 65-83.

Cutler, R. M., (2010), "Why You Should Pay Attention to Copper", OilPrice.com September 14, 2010

Damodaran, A., A. Aggrawal, and A. Bhargava, (2011), "Factors Affecting Volatility of Silver Prices", IIMB Management Review Initiative

Dickey, D. A., and W. A. Fuller, (1979), "Distribution of Estimators for Autoregressive Time Series with a Unit Root" *Journal of American Statistical Association*, Vol. 74, No. 36, pp. 427- 431.

Dwyer, A., G. Gardner, and T. Williams, (2011), "Global commodity markets – Price volatility and financialisation", *Reserve Bank of Australia Bulletin*, June 2011.

Fama, E. F., and K. R. French, (1988), "Business Cycles and the Behavior of Metals Prices", *The Journal of Finance*, Vol. 43, No.5, pp. 1075-1093.

Finfacts, (2007), "Oil Demand Falls in Developed World for First time in 20 years", Finfacts Ireland Business & Finance Portal, January 19, 2007

Forward Market Commission, (2013), "Annual Report 2012-2013", Forward Market Commission.

Garbade, K. D., and S. L. William, (1983), "Price movements and price discovery in futures and cash markets", *The Review of Economics and Statistics*, Vol. 65, pp. 289 - 297.

Ghosh, J., (2009), "The Unnatural Coupling: Food and Global Finance", Presented at Conference on Re-Regulating Global Finance in the Light of Global Crisis held at Tsinghua University, Beijing China, pp. 9-11 April 2009.

Glynn, J., N. Perera, and R. Verma, (2007), "Unit root tests and structural breaks: a survey with applications", University of Wollongong, Faculty of Commerce, Papers (Archive)

Gregorio, J. D., and F. Labbé, (2011), "Copper, The Real Exchange Rate and Macro Economic Fluctuations in Chile", Central Bank of Chile, Working Papers No. 640.

Hammoudeh, S. M., Y. Yuan, M. Michael, and M. A. Thompson, (2010), "Precious metals-exchange rate volatility transmissions and hedging strategies" *International Review of Economics and Finance*, Vol. 19 No. 4, pp. 633-647.

Hiemstra, C., and J. D. Jones, (1994), Testing for Linear and Nonlinear Granger Causality in Stock Price Volume Relation. *Journal of Finance*, Vol. 49, No. 5, pp. 1639- 1664.

Hillier, D., P. Draper, and R. Faff, (2006), "Do Precious Metals Shine? An Investment Perspective", *Financial Analysts Journal*, Vol. 62, No. 2, pp. 98-106.

Hooker, M. A., (2002), "Are Oil Shocks Inflationary? Asymmetric and Nonlinear Specifications versus Changes in Regime", *Journal of Money, Credit and Banking*, Vol. 34, No.2, pp. 540-561.

Hooker, M. A., (2002), "Are Oil Shocks Inflationary?: Asymmetric and Nonlinear Specifications versus Changes in Regime", *Journal of Money, Credit, and Banking*, Vol.34, No. 2, pp. 540-561.

Hoque, H. A., J. H. Kim, and C. S. Pyun, 2007), "A comparison of variance ratio tests of random walk: A case of Asian emerging stock markets", *International Review of Economics and Finance*, Vol. 16, No. 4, pp. 488-502.

Hua, R., Lu, B., and B. Chen, (2010), "Price Discovery Process in the Copper Markets: Is Shanghai Futures Market Relevant?" *Review of Futures Markets*, Vol. 18, No. 3.

IBM (2011), "Market Survey Series", Indian Bureau of Mines, Government of India Ministry of Mines.

Indian Commodity Exchange, (2012), "Silver Leaflet", Indian Commodity Exchange

Indo-Asian News Service, (2013), "Nearly 80 per cent of India's crude oil needs to be imported: Veerappa Moily", *Business Today*, August 27, 2013

India PR wire, (2013). "India Imports of Copper and Copper Articles rise to US\$ 298.31 M in May- 2013", June 25, 2013

Johansen, S., (1988), "Statistical analysis of cointegration vectors", *Journal of Economic Dynamics and Control*, Vol. 12, No. 2-3, pp. 231-254.

Jolly, J. L., (2013), "2013 Technical Report The U.S. Copper-base Scrap Industry and Its By-products", Copper Development Association Inc.

Kabra, K. N., (2007), "Commodity Futures in India", *Economic and Political Weekly*, Vol. XLII, No. 13, pp. 1163-1170.

Kothari, C. R., (2006), "Research Methodology, Methods and Techniques" New Age International Publishers.

Lawrence, C., (2003), "Why is gold different from other assets? An empirical investigation", World Gold Council.

Lazzaro, J. (2010), "Gas Prices Headed Lower as Summer Driving Season Heats Up", *Daily Finance* May 21, 2010

Lo, A. W., and A. C. Mackinlay, (1988), "Stock market prices do not follow random walks: evidence from a simple specification test", *The Review of Financial Studies*, Vol. 1, pp. 41-66.

Lo, A. W., and A. C. MacKinlay, (1989), "The size and power of the variance ratio test in finite samples: a Monte Carlo investigation", *Journal of Econometrics*, Vol. 40, No. 2, pp. 203-238.

Lokare, S. M., (2007), "Commodity Derivatives and Price Risk Management: An Empirical Anecdote from India", Reserve Bank of India Occasional Papers, Vol. 28, No.2, pp. 27- 77.

Mikesell, R. F., (2011), "The World Copper Industry : Structure and Economic Analysis", RFF Press.

Mouawad, J., (2008), "Oil Prices Take a Nerve-Rattling Jump Past \$138", *The New York Times*, June 7, 2008

Naik, G., and S. K. Jain, (2002), "Indian Agricultural Commodities Futures Market: A Performance Survey", *Economic and Political Weekly*, Vol.37, No. 30, pp. 3161- 3173.

Narayan, P. K., and R. Liu, (2010), "Are Shocks to Commodity Prices Persistent?" Deakin University, Australia, Working Paper, Economics Series SWP 2010/02 .

Oberoi, R. (2013), "For The Long Haul", *Business Today*, December 2013.

GOI, (2014), "Year wise Index Files For 2004-05 Series", Office of the Economic Adviser, Government of India

Press Trust of India, (2012), "Govt discontinues weekly WPI release", *Business Standard*, February 2, 2012.

Press Trust of India, (2014), "India to overtake Japan to become third-largest oil consumer: US", *The Mint*, May 13, 2014.

Reuters, (2014), "India overtakes Japan as world's No.3 crude importer" *Reuters*, January 30, 2014

Robles, M., M. Torero, and J. V. Braun, (2009), "When Speculation Matters", *IFPRI*, Vol. 57, pp. 2- 8.

Rudarakanchana, N., (2014), "Silver Jewelry Popular Among US Consumers In 2013: Silver Institute" *International Business Times*, March 19, 2014

Saefong, M. P., (2013), "Here's why copper has lost its indicator role", *Market watch.com*, March 22, 2013

Sharma, A., G. Singh, M. Sharma, and P. Gupta, (2012), "Impact of Crude Oil Prices on Indian Economy", *International Journal of Social Science and Interdisciplinary Research*, Vol. 1, No. 4, pp. 94- 99.

Shenk, M., (2013), "Crude Rises as Fuel-Price Gain Spurs Demand for Oil", *Bloomberg News*, March 25, 2014.

Silvennoinen, A., and S. Thorp, (2010), "Financialization, Crisis and Commodity Correlation Dynamics" University of Sydney, Quantitative Research Finance Center, Research Paper 267 .

Solt, M. E., and P. J. Swanson, (1981), "On the Efficiency of the Market for Gold and Silver", *The Journal of Business*, Vol. 54, No. 3, pp. 453-478.

Susan, T., (2003), "Agricultural Commodity Markets in India; Policy Issues for Growth" Indira Gandhi Institute for Development Research, Mumbai .

Taylor, N. J., (1998), "Precious metals and inflation", *Applied Financial Economics*, Vol. 8, No. 2, pp. 201-210.

Tripathi, L. K., A. Parashar, and R. Singh, (2014), "Global Factors Affecting Exchange Rates in India", *Asian Journal of Research in Business Economics and Management*, Vol. 4, No. 1, pp. 243-254.

U.S. Department of State, "The American Dollar and the World Economy", U.S. Department of State, USA.

Vivian, A., and M. E. Wohar, (2012), "Commodity Volatility Breaks", *Journal of International Financial Markets, Institutions and Money*, Vol. 22, pp. 395-422.

W, Z., (2000), "Research Methods", Paul Chipman Publishing Ltd.

Zapata, H. O., J. D. Detre, and T. Hanabuchi, (2012), "Historical Performance of Commodity and Stock Markets", *Journal of Agricultural and Applied Economics*, Vol. 44, No. 3, pp. 339-357.