

# Behavioural Financial Theories of Gold Prices during the Financial Crisis, 2007-09 in India

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## ABSTRACT

Gold prices are considered relatively stable than other commodities but during times of crisis, it can be proven to be volatile. This research paper demonstrates the volatility of gold prices in India during the Financial Crisis of 2008 by using coefficient of variation. When comparing the coefficient of variation for the period during the crisis (2007-09) and the normal growth period (2000-02), we observe that the volatility is higher in the crisis period. The Financial Crisis of 2008 affected the Indian economy due to which the growth of the economy slowed down, interest rates were decreased, rupee weakened against dollars, exports and imports reduced. Along with the influence of changing economic factors, investor behaviour also contributed to much of this volatility of gold prices. Behavioural financial theories like prospect theory and heuristic decision process theory have been used to explain the volatility of gold prices during the crisis period.

## 1. Introduction

Every decision made by the human mind has been influenced by a myriad of factors that analyse the position of said human through a logical and subjective lens. Behavioural finance is a branch of financial economics that focuses on why an investor makes an investment decision based on factors that are not rational, or rather based on their emotions and psychological factors. A real time viewing, and analysis of markets displayed that conventional theories formed in the past could not justify or explain the changes occurring in the market. Thus, a study of the cognitive psychology of humans is pursued to understand better the factors that influence a person to make decisions. India's consumption of gold is affected by its economic and monetary policies. Its luxurious nature makes it prove against general rational theories of economics (demand and supply theories) and is therefore a unique asset in times of recession and inflation. The consumption of gold is integrated into the Indian culture, making it one of the most sought-after assets. Gold is considered to be a zero-beta asset, i.e. it is a risk-free asset and bears no market risk. This property of gold provides long-term hedging and mitigates risk for the investors. Gold is also valued as one of the richest metals in the country, therefore providing a security to the investors of gold. The Financial Crisis of 2007-09, also coined as "The Great Recession", was a consequence of the rising housing bubble in the United States. The recession occurred due to the banks lending to sub-prime borrowers. The mortgage lenders sold their existing loans to investment banks. The investment banks in turn sold these loans (together called, collateralized debt obligations) to investors worldwide. Homebuyers began defaulting on their loans which affected the global borrowers.

## 2. Review of Literature

### 1. (Virigineni & Rao, 2017)

This research article is about the concept of behavioural finance. The paper explores the various behavioural financial theories and their developments

over the years to prove that investors are irrational and that the assumption made in the Efficient Market Theory about investors being rational is flawed. The various developments and advances in Human Behavioural theories, Prospect theory and Heuristic Decision processes noticed by many researchers over the years have been analysed to explain that the investor behaviour is not only influenced by economic factors but also psychological and emotional factors.

### 2. (Olsen, 1998)

This article attempts to define behavioural finance whilst also explaining the origin of the concept. It analyses the various explanations given by the economists and non-economists on behavioural finance and the stock price volatility. The article argues that some of the behavioural finance theories like the theories of chaos and adaptive decision making can be used to explain the volatility in stock prices. When under stress or time constraint, an investor makes an emotional decision based on subjective view, whereas the greater the time that the investor has, the more experienced is his/her decision.

### 3. (McCarthy, Solomon, & Mihalek, 2012)

This paper examines the factors causing the financial crisis within the United states financial services sector. The crisis occurred because of the bursting of the housing bubble. This caused something known as the domino effect where the effect of one event causes similar events to occur. A ripple effect was experienced in the entire financial service sector thus leading the whole segment to fall apart. The Efficient Market Theory and behavioural finance theory is used to explain the crisis and the extent to which each of these theories affect the prices is determined.

### 4. (Fan, Fang, & Lu, 2014)

The macro factors affecting gold prices are examined in this paper. The existence of volatility in the gold prices because of various economic factors is proved by using EGARCH and VAR model. Through the application of these models, it is established that the gold prices are driven by three macro-factors - commodity, currency and hedging values. The second finding of the research is that a property of clustering exists in the volatility of gold prices.

5. (Baur, Dirk G.)

This paper researches the effect of positive and negative shocks on the gold prices. It gives a review of the investor interpretation of such shock and its effect on the fluctuation on the gold prices. The paper discusses the nature of gold against the traditional theory of "positive shock and positive future forecasts" and explains how the volatility of gold bullion prices are most affected by the tendency of investors reacting negatively to positive shocks.

The paper links the inverted reaction of investors to the safe haven property of gold, and describes the portfolio constructed by investors buying gold transfers the uncertainty to the gold market. All calculations in the paper are based off the daily gold market prices and empirical and descriptive data analysis, including the GARCH model, and trend analysis.

### 3. Research Design

a. **Title**

"Behavioural financial theories and their relevance to the volatility of gold prices during the financial crisis, 2007-09 in India."

b. **Statement of Problem**

The influencers in the market that are focused on are the external treatment from quantitative and rational factors beyond an entity's control. However, qualitative factors, in particular, investor behaviour, which contribute to gold price fluctuations, are often ignored in investment decision-making. The receding markets push this behaviour further that bring in more volatility to prices during the crisis.

c. **OBJECTIVES**

- To determine the gold price volatility in India during the Financial Crisis, 2008.
- To determine the impact of Financial Crisis on investor behaviour.
- To identify and analyse the influence of investor behaviour on gold prices through behavioural finance theories.

d. **SOURCES OF DATA**

- RBI official website: [www.rbi.org.in](http://www.rbi.org.in)
- World Gold Council
- Index Mundi/commodities webpage

- (Virigineni & Rao, 2017)

e. **HYPOTHESIS**

H0: Investor behaviour has an impact on the volatility of the gold prices in India during the Financial Crisis.

f. **DATA ANALYSIS AND TOOLS**

The type of research included in the study is both quantitative and qualitative study. The gold price data pertains only to the Indian markets between the years 2007 to 2009. The type of data collection method is from various secondary sources such as journals, articles and RBI website.

1. The relation between behavioural finance and fluctuations in gold prices during the crisis will be examined by understanding the different investor behaviour displayed. The behaviour of investors is associated with prospect theory and heuristic decision theories –

- Prospect theory
  - Mental accounting
  - Loss aversion
  - Regret aversion
- Heuristic decision theory
  - Overconfidence
  - Hindsight bias
  - Herd behaviour

2. Analysis of the fluctuations in gold prices is done using covariance.

$$CV = \frac{s}{\bar{x}} * 100\%$$

3. Covariance:

Bar chart is used to view the fluctuating prices of gold from 2007-09.

The effects of the financial crisis on the gold prices will be analysed by identifying and understanding the economic changes that had a direct impact on the investor behaviour.

g. **Scope**

The scope of this research extends to the Indian demographic, during the recession of 2007-09. The Financial Crisis occurring in the United States in 2008 had a worldwide impact. The research paper focuses on one commodity only, i.e. gold.

h. **Limitations**

- The research does not take into consideration other factors which have direct impact on the gold prices.
- The results of this research cannot be generalized to other financial crises.
- Impact of behaviour cannot be quantified.
- A state-wise difference in the prices due to taxation is not taken into consideration in the analysis.

4. Data Analysis

Quantitative Analysis

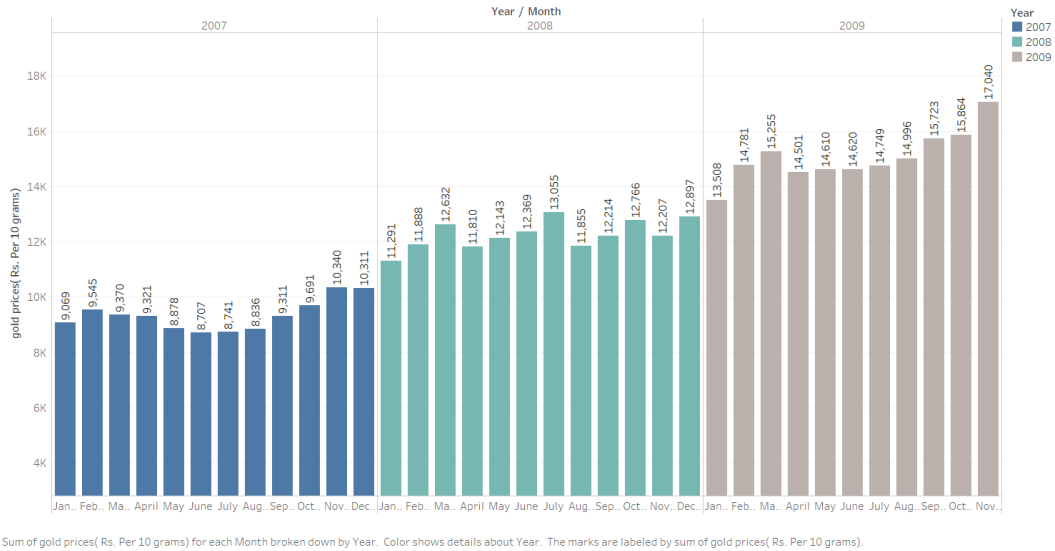


Chart 1: Fluctuating Gold Prices during the Crisis Period (2007-09)

The volatility of the gold prices during the crisis period is higher than the volatility during the pre-crisis period. The rise in volatility can be explained through the behaviour of investors and the reaction to the Financial Crisis 2007-09. The higher volatility is mostly attributed to the frequent fluctuation in the year 2008, when the financial crisis began to materialize.

**Coefficient of variation** - The coefficient of variation (COV) can determine the volatility of gold prices. The COV is a ratio between the standard deviation of a data set to the expected mean.

(Covariance has been calculated based on the average monthly prices for the given time period)

Analysis of the Variance in Gold Prices during Normal Growth (2000-2002):

V13		
N	Valid	36
	Missing	13
Mean	4328.136433	
Median	4117.721800	
Mode	3890.30865 <sup>a</sup>	
Std. Deviation	403.2280769	
Variance	162592.882	
Range	1246.665898	
Minimum	3890.308647	
Maximum	5136.974545	

a. Multiple modes exist. The smallest value is shown

Coefficient of variation 2000-02 =

$$CV = \frac{s}{\bar{x}} * 100\%$$

where s is standard deviation  
 $\bar{x}$  is mean of all observations

$$= (403.228/4328.136)*100$$

$$= 9.32\%$$

Analysis of the Variance in Gold Prices during crisis (2007-2009):

gold prices( Rs. Per 10 grams)		
N	Valid	34
	Missing	2
Mean	12030.29	
Median	12175.00	
Mode	8707 <sup>a</sup>	
Std. Deviation	2387.626	
Variance	5700759.790	
Range	8333	
Minimum	8707	
Maximum	17040	

a. Multiple modes exist. The smallest value is shown

Coefficient of variation (2007-09) =

$$CV = \frac{s}{\bar{x}} * 100\%$$

where s is standard deviation  
 $\bar{x}$  is mean of all observations

$$= (2387.626/12030.29)*100$$

$$= 19.85\%$$

Time	Coefficient of Variation
Normal Growth	9.32%
During Crisis	19.85%

### Analysis of investor psychology towards gold during the Financial Crisis, 2008 – based on economic changes:

#### 1. Financial crisis impact on monetary policies of India –

When the financial crisis came to pass in September 2008 after the Wall Street collapse, the impact was large enough to affect the financial institutions worldwide. In India, the apex bank, the Reserve Bank of India, brought down the interest rates from 9% to 3.25%. If the interest rates fall, borrowings increase and the demand for gold increases as gold is considered a status symbol.

#### 2. Rupee dollar equation in 2009 –

In 2007-08, the rupee to dollar price was Rs 39. The materialization of the financial crisis led to the weakening of the rupee which fell to Rs 50 during the year 2008-09. and recovered only in 2011 and strengthened to Rs 44.

India imports from other nations, the following items among other commodities:

- Crude oil
- Gold
- Diamond
- Electronics
- Coal
- Data processing machines

An importer faces an adverse currency risk if the home currency weakens against the foreign currency, as he needs to pay more for the import. In India, the majority of gold is imported. Thus, when the rupee weakened, the gold prices rose in India. There was a sharp increase in the prices of gold from Rs. 13,508 to Rs. 14,781, within a span of one month (January 2009 - February 2009), led to excessive demand in the country during the financial crisis of 2007-09.

#### 3. Share prices being a driver for gold investment –

The downturn of the US economy led to a negative shock in the Indian economy, especially to those companies which had outsourcing contracts with the US companies. The fear of lower share prices led the shareholders to invest more in gold as it is considered a safe asset.

People are more anxious to stay away from losses than they want to make profits. (Kahneman & Tversky, 1979). Gold being a highly liquid asset, gives a sense of security to the investor that he/she may be able to convert it into cash easily enough when faced with losses, and that they may be able to hedge future losses. In other words, people are averse to losses. Behavioural finance considers this to be one of the common reasons for irrational investor behaviour.

Covariance analysis helps to identify the volatility of the variable, i.e. gold price, with respect to the average of monthly gold prices. This helps us assess the percentage of fluctuation during the period.

When comparing the Indian economy during the normal growth period (2000-02) with the recession/crisis period (2007-09), there is a significant rise in the volatility (approx. 10.53%) between the two periods. The increase in the rate of fluctuation may be attributed to the extreme investor demand of gold during the recession due to the pre-determined notion that gold is a stable asset.

### Findings Based on Economic Changes –

#### 1. Financial crisis impact on monetary policies of India –

Investors are overconfident that even if the interest rates rise in the future leading to increase in interest payments, they would be able to repay using gold as leverage.

In hindsight, if the economy continues to recede, then the investor faces a credit crunch. His/her investment in gold still allows for hedging the credit risk in the future.

Hindsight bias theory dictates that regardless of a decision in the current, the future repayment is still inevitable. Therefore, gold's characteristic of being a secure asset allows the investor to overlook the future consequences of the increased borrowings.

#### 2. Rupee dollar equation in 2009 –

The increase in demand may mostly be due to the investor ideology that when price of gold rises due to depreciating home currency (rupee), the investor will regret not buying the gold at the current lower rate due to future uncertainty of prices. Regret aversion is a concept of behavioural finance which explains this particular investor behaviour. According to Zeelenberg (1996), Zeelenberg and Pieters (2007) and Pompian (2012), the investor makes a decision on current circumstances based on the benefits that they shall receive by avoiding alternatives that he/she shall regret in the long run.

Regret aversion often drives the investors towards a similar decision. Therefore, when there was the possibility of future weakening of rupee and rising gold prices, investors flocked towards purchasing more gold in the current. Those who were new to the market, or did not have adequate information about the commodity, mimicked the decisions of already existing or experienced investors based on the rumours and noise in the market. This behaviour is called herding. The herding theory places emphasis on the imitation of another individual's activity. This leads to overlooking of personal data. Regret aversion is frequently connected to herding behaviour, as the

## 5. Findings and Suggestions

### Quantitative Analysis –

latter is often the consequence of the former. (Singh, 2009) and (Lawlor, 2009)

### 3. Share prices being a driver for gold investment –

Shareholders use the current economic situation to allocate their money to different accounts. Investors invested more in gold market to mitigate their losses from the other equity instruments. The activity of allocating funds to different accounts can be generalized into two segments, (Thaler, 1985)

- A. To capture how results are perceived, and decisions taken, and then assessed. The investors' decision in this event was to balance the losses incurred from the equity instruments.
- B. Investors kept track of the gains and losses from the gold prices and equity, respectively.

An investor mentally segregates his funds based on the advantages received. This phenomenon is

referred to as mental accounting. Since an investor often has a predetermined value assigned, any changes may hinder their perception of results.

### 6. Conclusion

Economic factors can be considered as drivers of investor psychology which in turn influences gold prices. Investor behaviour is a subjective and unpredictable factor. Given the characteristics of gold and historical data relating to its prices, there is reasonable complexity in forecasting the future prices during crisis. Therefore, when faced with crisis, an investor would make quick and frequent changes in his/her decisions based on his/her view of the outcome, subsequently affecting the volatility of gold prices. Through our research, we can conclude that our hypothesis holds true.

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