

**PRICE RISK MANAGEMENT UNDER GOLD FUTURES TRADING**  
**- A STUDY ON THE PRICE MOVEMENT OF GOLD FUTURES.**

By

**JULIN ALAPPAT**

(03-05-30)

**MONOGRAPH**

Guide :Mr. Jacob Thomas .M



**COLLEGE OF CO-OPERATION , BANKING & MANAGEMENT**  
**KERALA AGRICULTURAL UNIVERSITY**  
**VELLANIKKARA, THRISSUR-680 656**  
**KERALA, INDIA.**  
**2008**

# **PRICE RISK MANAGEMENT UNDER GOLD FUTURES TRADING**

## **- A STUDY ON THE PRICE MOVEMENT OF GOLD FUTURES**

### **ABSTRACT**

The study entitled 'price risk management under gold futures trading' was undertaken to analyze the applicability of price risk management function under gold futures. The study also attempted to identify the trends in gold price and to review the price movement of gold for the past 26 years and find out factors affecting the gold future prices. For the purpose of analysis, secondary data on future prices of gold quoted at the London Bullion market as international price, for a period of 26 years (1982-2007) were used. The monthly average unit price of gold (Rs/gm) for each year is taken into account. The price trend in gold futures is evaluated using the four methods of seasonality indices.

The study reveals that gold futures shows an increasing trend throughout. It is during the fourth quarter of a year (Nov, Dec, Jan) the seasonality is the strongest due to diwali, Christmas and other end of year festivals when jewellery gifts are common. The gold price reached a record price of Rs 1019/gm by the end of December 2007. The prices of gold continued to increase at an increasing rate. The three important reasons for this increase in the price of gold futures are; the weakening of the US dollar, demand and supply dynamics, and the increase in the price of crude oil which has crossed 100 \$ per barrel. Thus the study concluded that volatility in gold markets touched its peak along with its prices in 2007. This year experienced its peak price rise and at the same time the biggest fall in the prices. Such volatilities can hamper the overall planning of the entities dealing in the gold trade, be it jewellers, dealers investors or the common man buying gold. The solution for this is Futures trading. With the Government of India allowing futures trading in Gold and Silver since October 2003, the vibrant domestic bullion market could breathe a fresh air of exuberance due to the emerging avenue for risk mitigation and price discovery discounting for the national market sentiments. Gold has acted as a safe haven. It serves as an effective inflation immunizer for an equity portfolio investments and its role as a currency and inflation hedge have also been recognized. It can be concluded that investment in gold is an effective risk management tool.

# **PRICE RISK MANAGEMENT UNDER GOLD FUTURES TRADING**

## **- A STUDY ON THE PRICE MOVEMENT OF GOLD FUTURES**

### **1.1 INTRODUCTION**

Commodity futures markets have been in existence in India for more than 125 years. Organized futures market evolved in India by the setting up of 'Bombay Cotton Trade Association' in 1875. Futures market in bullion began at Mumbai in 1920. A vibrant future market is very essential for a thriving economy. A healthy future market plays a very important role in the growth of an economy.

A commodity future is an agreement or contract between two parties to buy or sell an asset of a specified quantity and quality at a specified time in future at a specified price through the exchange. Gold futures contracts are firm commitments to make or take delivery of a specified quantity and purity of gold on a prescribed date at an agreed price.

In terms of retail value, the USA is the largest market for gold jewellery, whereas India is the largest consumer in volume terms, accounting for 22% of demand in 2006 (World Gold Council). For thousands of years, gold has been valued as a global currency, a commodity, an investment and simply an object of beauty. Gold is preferred to bank deposits as a savings and investment instrument in India. Indians invest in gold in the form of jewellery. Gold prices are highly unstable prompting most Indian traders to hedge their transactions on the gold futures market. The futures trading is very useful to the exporters/traders as it provides an advance indication of the price likely to prevail and thereby help the exporter/trader in quoting a realistic price and thereby secure export contract in a competitive market. Having entered into a trading contract, it enables a trader to hedge his risk by operating in futures market.

# **PRICE RISK MANAGEMENT UNDER GOLD FUTURES TRADING**

## **- A STUDY ON THE PRICE MOVEMENT OF GOLD FUTURES**

### **1.1 INTRODUCTION**

Commodity futures markets have been in existence in India for more than 125 years. Organized futures market evolved in India by the setting up of 'Bombay Cotton Trade Association' in 1875. Futures market in bullion began at Mumbai in 1920. A vibrant future market is very essential for a thriving economy. A healthy future market plays a very important role in the growth of an economy.

A commodity future is an agreement or contract between two parties to buy or sell an asset of a specified quantity and quality at a specified time in future at a specified price through the exchange. Gold futures contracts are firm commitments to make or take delivery of a specified quantity and purity of gold on a prescribed date at an agreed price.

In terms of retail value, the USA is the largest market for gold jewellery, whereas India is the largest consumer in volume terms, accounting for 22% of demand in 2006 (World Gold Council). For thousands of years, gold has been valued as a global currency, a commodity, an investment and simply an object of beauty. Gold is preferred to bank deposits as a savings and investment instrument in India. Indians invest in gold in the form of jewellery. Gold prices are highly unstable prompting most Indian traders to hedge their transactions on the gold futures market. The futures trading is very useful to the exporters/traders as it provides an advance indication of the price likely to prevail and thereby help the exporter/trader in quoting a realistic price and thereby secure export contract in a competitive market. Having entered into a trading contract, it enables a trader to hedge his risk by operating in futures market.

## **1.2 Statement of the Problem**

There are large price risks in the World gold market. Since mid- August, in December 2007 the gold price has risen more than 24%. Increasing crude oil prices, geopolitical tensions and record weakness in dollar kept the bullion market uncertain and it continues to climb higher. The price of gold depends on a host of factors, which makes it very difficult to predict. The larger, the more frequent and the more unforeseen is the price variability in gold, the greater is the price risk in it .The price risk management function helps those with underlying exposure to commodities (such persons are called hedgers) to insure themselves against adverse price movements in future. Realizing the need for scientific risk management tools to enable commodity based trade and industry to remain competitive, the Government has revived futures trading in commodities.

Futures contracts perform two important functions of price discovery and price risk management with reference to the given commodity. It is useful to all segments of economy. It is useful to trader as he can get an idea of the price likely to prevail at a future point of time and therefore can decide between various competing commodities, the best that suits him. It enables the consumer get an idea of the price at which the commodity would be available at a future point of time. He can do proper costing and also cover his purchases by making forward contracts. The futures trading is very useful to the exporters as it provides an advance indication of the price likely to prevail and thereby help the exporter in quoting a realistic price and thereby secure export contract in a competitive market. Having entered into an export contract, it enables a trader to hedge his risk by operating in futures market.

## **1.3 Objective of the Study**

- To study the function of price risk management under gold future trading.
- To identify the trends in the prices of gold futures.

## **1.4 Methodology**

**Data collection** - The study is based on the secondary data and documents. The study is analytical as analysis of the data collected is involved. Time series data on monthly average prices (Rs/gm) for a period of 26 yrs (1982 -2007) was collected from the official records of the commodity exchanges .The information relating to the organization structure of Karvy, delivery mechanism, technical reports on gold etc was collected from Karvy stock broking Ltd.Data regarding the total production, demand and supply of gold was collected from the official website of World Gold Organization.

**Data analysis** - Appropriate statistical tool is used to analyze the price variations, to understand, isolate and interpret forces influencing time series, also known as decomposition of time series. The trends in price movements are interpreted using graphs.

### **1.4.1 Time Series Analysis**

Time series analysis is one of the quantitative methods used to determine the patterns in data collected over a period of time. Thus a time series consist of a set of chronological observations of a statistical series recorded either at successive points in time or over successive periods of time. It is a group of statistical information collected at regular intervals of time.

A time series is a collection of observations of well-defined data items obtained through repeated measurements over time. For example, measuring the value of retail sales each month of the year would comprise a time series. This is because sales revenue is well defined, and consistently measured at equally spaced intervals. Data collected irregularly or only once are not time series.

### 1.4.2 Models of Time Series

The main purpose of time series is to understand, isolate and interpret forces influencing time series, also known as decomposition of time series. Therefore there must be some type of relationship among the components of time series. For this purpose we suppose that a time series is made up of additive and multiplicative components. The above four variations are generally considered as interacting in a multiplicative and additive model to produce observed values of the overall time series.

**Multiplicative model** In many time series, the amplitude of both the seasonal and irregular variations increase as the level of the trend rises. In this situation, a multiplicative model is usually appropriate. In the multiplicative model, the original time series is expressed as the product of trend, seasonal and irregular components.

$$O=T \times C \times S \times I$$

Where, O = observed value of time series

T = trend component

C = cyclical component

S = seasonal component

I = irregular component.

**Additive model:** According to this model, the simple hypothesis is to separate all component values which are additive and independent of each other. In some time series, the amplitude of both the seasonal and irregular variations do not change as the level of the trend rises or falls. In such cases, an additive model is appropriate. In the additive model, the observed time series (O) is considered to be the sum of three independent components: the seasonal S, the trend T, the cyclical C and the irregular I.

$$O = T+C+S+I$$

## **Fitting of a Trend in Time Series**

Fitting of a trend curve involves assuming that a given time series exhibits a certain trend movement which, were it not for cyclical, irregular and seasonal fluctuations would have been a linear form or non linear form. Therefore , we first assume that the data to be plotted on a graph exhibit a certain trend form (linear ,parabolic or exponential) and then an attempt is made to measure this trend .Measuring a trend actually means computing the constant of the equation that we have chosen to be representative of the trend in the data

### **1.4.3 Components of Time Series**

There are four kinds of changes, or variations, involved in time series analysis. They are.

1. Secular trend
2. Cyclical fluctuations
3. Seasonal variations
4. Irregular variations

### **1.4.4 Secular Trend**

The general tendency of the time series data to increase or decrease or stagnate during a long period of time is called the secular trend also known as the long - term trend. The concept of trend does not include short range oscillations but rather steady movements over a long time .It is not necessary that the increase or decline should be in the same direction throughout the given period.



## **Characteristics of a Secular Trend**

- The secular trend of a series is generally either upward or downward in nature.
- The secular trend of a series usually takes place on account of some forces which are more or less stable over a long time or which change very slowly or gradually.
- It relates to a long period of time.
- It is likely to fluctuate within a particular range.

## **Types Of Secular Trend**

There are various types of secular trend depending upon their nature of increase and decrease.

They are;

- a) **Linear or Straight line trend-** a secular trend is said to be linear when the data relating to a time series plotted on a graph paper give rise to a straight line or cluster around it.
- b) **Non – linear trend or curvilinear trend-** a secular trend is said to be a non linear trend when the data of a time series plotted on a graph paper do not give rise to a straight line but a curve or otherwise.

## **Uses of Secular Trend**

- The trend describes the basic growth tendency ignoring short term fluctuations.
- It describes the pattern of behavior which has characterized the series in the past.
- Future behavior can be forecasted in the assumption that past behavior will continue in the future also.
- Trend analysis facilitates comparison of two or more time series over different period of time and this helps to draw conclusions about them.

## **Method of Measuring Secular Trend**

**Moving Average Method** - Under this method the trend line is fitted to a series on the basis of its moving averages which represent the trend values of the series. It is based on arithmetic mean. In the moving average method, the average value for a number of years or months is taken into account; and placing it at the centre of the time span i.e. period of moving average and it is the normal or trend value for the middle period. It is calculated from overlapping groups of successive time series data.

The steps are :-

- Compute the values of the first four years and place the total in between the second and third years.
- Leave the first year value and compute the value of the next four years and place the total in between the third and fourth year.
- This process must be continued until the last year is taken into account.
- Compute the first two four year totals and place it against the middle year.(third year)
- Leave the first four year total and compute the next four year totals and place in the fourth year. Continue the process until all the four year totals are computed.
- Divide the above totals by 8 (because it is the total of the two four-yearly totals) and put in the next column .This is the trend value.

## **Merits and Demerits**

It is more flexible, as items can be increased or decreased without affecting the moving average. It can also be used for the measurement of cyclical, seasonal and irregular fluctuations.

We cannot get the trend value for all the given observations, as we leave the first and last 2 years. This method is not represented by a mathematical function.

### 1.4.5 Cyclical Variations

The term cyclical refers to the recurrent variation in a time series that usually lasts for two or more years and are regular neither in amplitude nor in length. These variations are otherwise known as oscillating movements which take place due to ups and downs recurring after a period of greater than one year. These variations though more or less regular are not necessarily, uniformly periodic.

#### Uses of Cyclical Variations

- It is used in predicting the turning points in business activity.
- It is used for formulation of policies aimed at stabilizing the business fluctuations.
- It is used for getting an idea about the periodicity of the booms and depression and accordingly one can take timely steps for maintain stable market.

#### Method of Measuring Cyclical Variations

**Residual method** – the irregular nature of fluctuations makes impossible any attempt to find an average cycle that could be used to represent the effect of the cycle on the series. The best approach of measuring the cyclical fluctuations in the series has been the indirect method of removing the variation in the series that results from seasonal forces or secular trend .The remaining fluctuations are considered to be cyclical and erratic movements .This is called the residual method .The following steps are involved.

- By an appropriate method the Trend Value (T) and Seasonal indices are obtained.
- The original values are divided by the respective trend values and the results are multiplied by 100 for each data. This is ratio to trend in percentages.

$$\frac{O}{T} \times 100 \quad \text{or} \quad \frac{TSCI}{T} \times 100 = SCI \times 100$$

- The ratio to trend figure are divided by seasonal indices, to give cyclical variations:

$$\frac{SCI}{S} = CI$$

- The original values can be divided by the product of the trend and seasonal index figures to find cyclical variations :

$$\frac{T \times S \times C \times I}{T \times S} \times 100 = C \times I \times 100$$

### **Merits and Demerits**

It reflects the cyclical behavior accurately if the trend ordinates perfectly present the secular changes and the seasonal indices exactly reflect the seasonal fluctuations.

This method does not provide with the cyclical variations for the extreme periods of a time series. It is based on the assumption that the trend and the seasonal variations can be accurately measured which does not hold well in most of the cases.

### **1.4.6 Seasonal Variation**

Seasonal variation are those forces affecting time series that are the result of man made or physical phenomena .The major characteristics of seasonal variations is that they are repetitive and periodic, the period is less than one year, say a week ,a month or a quarter.

A seasonal effect is a systematic and calendar related effect .Seasonal adjustment is the process of estimating and then removing from a time series influences that are systematic and calendar related. Observed data needs to be seasonally adjusted as seasonal effects can conceal both the true underlying movement in the series, as well as certain non-seasonal characteristics which

may be of interest to analysts. When a time series is dominated by the trend or irregular components, it is nearly impossible to identify and remove what little seasonality is present. Hence seasonally adjusting a non-seasonal series is impractical and will often introduce an artificial seasonal element. Seasonality in a time series can be identified by regularly spaced peaks and troughs which have a consistent direction and approximately the same magnitude every year, relative to the trend. Seasonal index represents the extent of seasonal influence for a particular segment of the year

The object of studying seasonal variation is to determine the effect of seasonal variation on the value of the given phenomenon and to eliminate them i.e. determining the size of the value of the variables.

### **Reasons for Seasonal Variation**

The seasonal component consists of effects that are reasonably stable with respect to timing, direction and magnitude. It arises from systematic, calendar related influences such as:

- 1 **Natural Conditions**-weather fluctuations that are representative of the season (uncharacteristic weather patterns such as snow in summer would be considered irregular influences)
- 2 **Business and Administrative procedures** -start and end of the school term.
- 3 **Social and Cultural behavior**- Christmas.
- 4 **Customs and habits**-man made conventions are the customs, habits, fashion, etc.

It also includes calendar related systematic effects that are not stable in their annual timing or are caused by variations in the calendar from year to year, such as;

- 5 **Trading Day Effects** -the number of occurrences of each of the day of the week in a given month will differ from year to year-There were four weekends in March 2000, but five weekends in March of 2002.
6. **Moving Holiday Effects** -holidays which occur each year, but whose exact timing shifts- Easter, Chinese New Year.

## **Features of Seasonal Variations**

- 1) It is possible to establish the pattern of past changes. This helps us to compare two time intervals that would otherwise be too dissimilar.
- 2) Seasonal variation helps us to project past patterns into the future. In the case of long range decisions, the ability to predict seasonal fluctuations is essential.
- 3) Once the existence of a seasonal pattern has been established, it is possible to eliminate its effects from the time series. This elimination helps us to calculate the cyclical variation that takes place each year.

## **Why is it Necessary to Measure Seasonal Variation?**

1. If one knows in advance that the sales of a specific product are bound to be high in a particular month or week, one may hold a larger stock of it to match the increased demand in that month or week. In the same manner, if one knows that the price of some commodity moves in a particular fashion, one may buy it while the price is low and hold it for subsequent use or sale when the price is high. This will be true for any raw material that goes into the production of finished goods.
2. To adjust the data statistically for such variation. It is easier to interpret seasonally adjusted data as it would reduce the confusion, which might otherwise arise. For instance, if the data on sales of some commodity are not seasonally adjusted, a seasonal upswing in those data may be taken as an improved performance. This would obviously be wrong. Our main concern here is with periodic series that have a period of one year.

## Method of Measuring Seasonal Variation

**The Ratio to Moving Average Method** - This method provides an index that describes the degree of seasonal variation. The index is based on a mean of 100, with the degree of seasonality measured by variations away from the base. The method of ratio to moving average is a procedure whereby the different components in the series are measured and are isolated or eliminated. Subsequently the seasonal effect is identified and expressed in percentage form.

In this method the average value for a number of years, months or weeks is taken into account. The averages are placed at the centre of the time span. It is calculated for overlapping groups of successive time series data.

The steps are:

- a) Compute the moving total for the first one year and place the totals in between the sixth and seventh month (June and July).
- b) Leave the first month value and compute the next 12 month total .And place it between seventh and eighth month (July and Aug).Repeat the same until the last.
- c) Divide each moving total by 12 to get the moving averages.
- d) Compute the 2 term moving total by adding first 2 moving average and place it against the mid month. i.e July. Leave first month moving average and compute next two month moving average total and place it against the next month i.e. Aug. Continue the process till the series is completed.
- e) Compute centered moving average  $\hat{Y}$  by dividing each 2 term moving total by 2 and place it in the mid month.

f) Apply the formula  $S I = \frac{Y}{\hat{Y}} \times 100$

The sum of these indices should 1200 for monthly or 400 for quarterly data. If it is not so an adjustment is made to eliminate the discrepancy. The formula for this adjustment is:

For the monthly series:  $K = \frac{1200}{\text{sum of the indices}}$

For the quarterly series:  $K = \frac{400}{\text{sum of the indices}}$

The adjusted SI is calculated by multiplying each figure by a constant 'K'.

### **Merits and Demerits**

It is widely used and it is the most satisfactory method as it is flexible. If the cyclical fluctuations are regular in periodicity, this will give true seasonal indices.

We cannot obtain seasonal indices for each month. There is loss of trend values in the earlier six months and in the later six months. So we cannot calculate seasonal indices for that period.

### **1.4.7 Irregular Variations**

It is the irregular movements of the data over a period of time. These variations are of irregular and indefinite pattern. They do not repeat in any definite pattern. Irregular variations arise owing to unforeseen and unpredictable forces at random and affect the data. They are also known as random or erratic variation. They are generally mixed up with seasonal and cyclical variations and are caused by purely accidental and random factors like earthquake, flood, famines, war etc.



## **Method of Measuring Irregular Variations**

There is no statistical technique for measuring or isolating erratic influences. Therefore the residual that remains after the elimination of systematic components is taken as representing Irregular or random fluctuations. The irregular variations are measured by dividing the observed values in a time series by the product of its other three components: T, S and C. i.e

$$I = \frac{Y}{TSC} \text{ or } \frac{TSCI}{TSC} \text{ or } \frac{CI}{C}$$

### **1.4 Scope of the Study**

The study assumes greater significance in today's context where the price of gold is showing a tremendous rise. This study has the scope for generating more demand toward gold futures market and increase in investor interest in gold and thereby helps to moderate price fluctuation.

### **1.5 Practical Utility of the Study**

The study helps to avoid the price risk associated with gold futures. Gold prices are used as an instrument against inflation and help the economic planners in planning .It also helps the gold traders in reducing the risk, as it enables a trader to hedge his risk by operating in futures market.

## **1.6 Limitations of the Study**

The study is subject to the influence of demand and supply factors. The influence of various other demand and supply factors in determining the prices of gold are not studied.

Commodity futures will not be always in a trend. Limited time and resources prevented from making a detailed study.

## **1.8 Scheme of the Study**

The report is divided into eight chapters .The second chapter deals with the Theory and Principles of commodity futures trading. The third chapter describes the Organizational profile of Karvy Comtrade Ltd. The fourth chapter is the concept of price risk management under gold future trading. The fifth chapter is the Methodology, theoretical aspects of the study. The seventh chapter includes the actual analysis of the data collected under this study. And the concluding chapter provides summary of findings and conclusions

## **DATA ANALYSIS**

In this chapter an attempt is made to analyze and identify trends in the prices of gold futures. Also an analysis of price movements of gold and the other factors which influence these price movements are looked into.

The analysis is presented in the following sequence .The first section deals with the process of analyzing various forces or components of time series with respect to the prices of gold futures. An attempt is made to identify whether the variation in the gold price is secular, seasonal, cyclical or irregular. Second section analyses the price movements of gold futures during a period of 1982-2007.

### **Section I**

In order to identify the variations in the data, the monthly average unit prices of gold (Rs/gm) quoted at the London Bullion market as international price ( The London afternoon gold price fixing is used as a reference gold price around the world.) is selected for a period of 26 years (1982-2007) .The amount quoted in \$ by the London exchange is converted into Rupees, by taking into account the then exchange rate, adding customs duty (Rs10200/kg) and surcharge (0.1%) to the amount .The tool used for the purpose of study is time series analysis. The various forces that affect the values of a phenomenon in a time series are studied.

**Table 4.1 Components Of Time Series Analysis of Gold Future Prices  
From 1982-2007**

<b>Year</b>	<b>Secular Trend</b>	<b>Cyclical Variation</b>	<b>Seasonal variation</b>	<b>Irregular Variation</b>
<b>1982</b>		28.8137	33.0774	
<b>1983</b>		32.4144	33.9785	
<b>1984</b>	99.6796	29.0781	32.7661	88.4603
<b>1985</b>	88.7023	26.3445	31.8722	73.3186
<b>1986</b>	95.5930	29.5277	34.8647	80.9600
<b>1987</b>	107.4413	34.9466	43.5846	86.1477
<b>1988</b>	102.3242	34.8552	48.3904	73.7033
<b>1989</b>	95.2863	33.8962	49.1655	65.6933
<b>1990</b>	93.823	35.1423	52.7212	62.5394
<b>1991</b>	101.402	41.2424	59.5138	70.2705
<b>1992</b>	95.0032	42.8743	71.7911	56.7368
<b>1993</b>	104.0253	50.8744	80.0518	66.1100
<b>1994</b>	102.9048	53.6301	95.5103	57.7822
<b>1995</b>	100.1805	53.4560	97.9677	54.6634
<b>1996</b>	218.7374	56.8898	108.0720	115.1448
<b>1997</b>	95.8135	48.0220	102.1351	45.0497
<b>1998</b>	98.5014	48.9664	95.5373	48.4236

<b>1999</b>	97.8479	44.9896	97.2658	45.2589
<b>2000</b>	98.4643	45.5399	99.3617	45.1286
<b>2001</b>	93.3397	45.0945	101.1981	41.5928
<b>2002</b>	99.8659	51.5028	114.0082	45.1140
<b>2003</b>	101.36	56.2131	130.2738	43.7368
<b>2004</b>	97.1491	59.9423	143.8084	40.4937
<b>2005</b>	88.8597	61.8471	152.9364	35.9346
<b>2006</b>		84.0217	197.0439	
<b>2007</b>		86.1053	215.7755	

The test is conducted using the four components of time series i.e. secular trend, cyclical variation, seasonal variation and irregular variation .The method used for measuring the secular trend is moving average method. Cyclical variation is measured using residual method. The seasonality in the data is adjusted using the ratio to trend method and irregular variation is removed indirectly by dividing the original value by each component. The findings of the analysis are given below.

In the table above the first component used is secular trend. It is the tendency of the data to increase or decrease or stagnates during a long period of time. Secular trend shows steady movements over a long time. As the prices in the table shows a short range variation, with the prices fluctuating every year, it is difficult to achieve the objective of measuring secular trend.i.e to find out the trend characteristics of the data. Hence secular trend is not suitable to study the trend of gold futures.

In the case of cyclical variations, it refers to the recurrent variation in a time series, that usually last for two or more years. The changes that occur for a period more than one year come under the category of cyclic changes. But in the case of gold futures, the price changes takes place within a year. The period of cyclical variation is not uniform and they differ widely in timing, amplitude and pattern as well which make their study very tough and tedious. They are closely mixed up with erratic or irregular variations which are very difficult to be isolated. As such it is difficult and impracticable to identify the absolute effect of the cyclical and irregular forces.

Irregular variations are irregular, in the sense that, they neither are predictable nor can the extend of their impact be pointed out. This variation is usually short –term one, but it will affect all the components of time series. The data given above is highly irregular and has high price variation. The irregular nature of the fluctuations makes impossible any attempt to find the trend and determine the pattern of the gold futures. It is a very difficult task to measure the irregular variations and there is no well recognized method for the purpose.

Seasonality index is considered to be the best method to study the trend of the gold futures. This is obvious because the changes occurring in a particular period, within a year, every season within a span of one year is considered. Seasonal variations are short term fluctuations. The price of gold depends on the demand for gold, where its demand is seasonal and the price reduces during off season. The gold prices in the data are mainly affected by seasonal variations which occur regularly. The seasonality in the data needs to be identified and adjusted. Seasonal adjustment is the process of estimating and then removing from a time series influences that are systematic and calendar related.

**Table 4.2 Seasonality Index of Gold Future Prices from 1982 -2007**

Month	Seasonality index
Jan	102.7005
Feb	102.3297
March	101.2865
April	101.3428
May	101.9426
June	101.085
July	97.76211
Aug	97.76845
Sept	98.09619
Oct	98.74745
Nov	98.46991
Dec	98.43623

The table above shows the value of adjusted seasonality index for a period of 26 years. The data shows a decreasing trend. Even though there is an increase in the price in Jan and Feb by 2%; it slowly decreases and the increase in price is only by 1% in March, April, May and June. And it continues to decrease by 3% in July and Aug and by 2% in Sep, Oct, Nov and Dec.

It is clear from the table that gold price is at its highest during Jan and Feb. One important reason for this high price that there is more demand for gold for jewellery purpose, as these are the marriage seasons and 'Akshaya Thrithiya' falls during this period. As a result more and more gold is consumed in India irrespective of its high prices.

Jewellery demand is seasonal .The forth quarter (Nov, Dec, Jan) is the strongest quarter due to diwali, Christmas and other end of year festivals when jewellery gifts are common. The long holidays around first May (Labor Day), national day and Chinese New Year in china are also occasions associated with the purchase of gold jewellery.

The first quarter (Feb, Mar, Apr) is normally the second strongest quarter due to the Chinese new year ,the Indian wedding season and to a lesser extend ,valentines day.

The second (May, June, July) and the third quarters (Aug, Sep, Oct) are usually seasonally low with a relative absence of major gold giving occasions.

## **Section II**

As mentioned in the introduction, this section analyses the price movement of gold futures and its causes.



**Table 4.3 Price Of Gold Futures from 1990-2007 (Rs/gm)**

<b>Month</b>	<b>1982</b>	<b>1983</b>	<b>1984</b>	<b>1985</b>	<b>1986</b>	<b>1987</b>	<b>1988</b>	<b>1989</b>
Jan	113	152	128	123	137	171	200	196
Feb	110	156	134	124	135	169	186	190
March	98	135	136	127	137	170	185	194
April	106	139	133	130	136	181	192	194
May	99	141	134	128	137	188	193	192
June	95	133	134	127	139	186	200	195
July	104	137	126	123	140	189	198	198
Aug	112	136	129	127	153	194	198	195
Sept	135	135	130	126	171	193	192	195
Oct	131	129	132	126	175	196	193	199
Nov	130	127	133	126	167	195	203	215
Dec	138	131	127	126	166	203	203	223

<b>Month</b>	<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>
Jan	224	226	295	277	390	382	461	408	366
Feb	228	221	295	277	385	380	476	400	372
March	216	225	287	332	387	389	439	405	376
April	208	230	282	344	381	395	432	396	393
May	206	236	281	370	385	389	441	396	388
June	197	248	284	376	389	391	433	392	397
July	203	302	294	396	389	390	438	372	400
Aug	221	295	285	381	384	390	445	374	391
Sept	223	290	288	358	395	410	440	378	395
Oct	221	298	287	368	393	426	437	378	403
Nov	222	300	279	377	388	430	434	365	401
Dec	220	300	282	387	383	435	425	364	399

Month	1999	2000	2001	2002	2003	2004	2005	2006	2007
Jan	392	398	397	437	549	604	596	782	899
Feb	392	421	392	462	550	588	594	790	944
March	390	401	394	460	521	587	610	796	928
April	388	392	392	475	499	569	603	881	933
May	380	389	411	495	538	557	590	985	876
June	362	411	408	505	534	574	603	882	860
July	356	405	406	490	521	589	594	947	865
Aug	359	403	413	484	530	596	614	946	873
Sept	371	404	434	496	558	600	643	887	924
Oct	434	402	437	492	552	618	677	856	959
Nov	409	400	426	494	570	637	700	905	1,023
Dec	396	408	425	513	595	624	749	904	1,019

Source: World Gold Council

It is clear from the table that there was a high price rise in the year 1996 with a price of Rs 476/gm and followed by a consequent fall in prices and it reached the very same price by 2002. And later on there was a slight variation in the prices moving upward and downward. But the prices kept on increasing from 2006 onwards. A 47 % rise in gold prices during the first half of 2006 resulted in the consumption of the yellow metal in the country declining by 34 per cent, primarily in the jewellery segment. Consumption for industrial and dental purposes also declined to 14 from 18 tonnes, though it was higher compared with 12 tonnes in 2004. In the case of demand for jewellery, the demand was down by almost half to 235 tonnes

from 404 a year ago. It was also lower than the 255 tonnes consumed during the corresponding period in 2004. Globally; jewellery demand declined 23 per cent to 1,090 tonnes.

During the fourth quarter of 2007 (Nov07, Dec07, Jan08) consumers purchased more gold jewellery despite an 11% rise in the gold price (the price increased from an average of \$600.73/oz in first quarter to third quarter (Feb to Nov) of 2006 on the London pm fix to \$665.58/oz in first quarter to third quarter of 2007), supporting the view that price volatility is typically more important in determining short-term jewellery demand trends than the outright price level. However, it also means that the rise in price volatility towards the end of the year, due to the ongoing turmoil in global financial markets, is likely to have hampered jewellery demand in fourth quarter. In India, the world's largest jewellery market in tonnage terms, reports on Diwali, a major gold-buying event, were generally poor. Sales reported to be down substantially from year ago levels, especially in the southern region, which is particularly price sensitive.

#### **4.2 The reasons for the recent gold price rise are:**

- **Inflationary fears as a result, in particular, of high oil prices.** Gold is seen as a hedge against inflation; while its real value can vary in the short term, its purchasing power has remained stable over the centuries. With an increase in the crude oil prices the prices of gold is also increased.
- **Continued weakness in the dollar.** Gold is a statistically proven hedge against fluctuations in the US dollar, the world's main trading currency. As the value of us dollar is depreciated the prices of gold is increased.

• **Unstable financial conditions.** Gold is among only a handful of financial assets that is not matched by a liability. It can help to provide insurance against extreme movements in the value of traditional asset classes that can happen during unsettled times. These short-term factors have, however, occurred on top of longer-term movements in supply and demand fundamentals that have supported the rise in the gold price since 2001.

• **Mine output.** The gradual reduction of mine output in recent years, with only a small number of major gold finds by the mining industry, is constraining supply.

The cost of extracting gold has also increased substantially in recent years.

• **Jewellery demand.** Strong economic growth and sustained promotion in the key gold jewellery markets of India, China and the Middle East are leading to strong demand for gold jewellery.

• **Easier access to investing in gold.** Gold exchange traded funds (ETFs) have been instrumental in providing easy access to investing in gold. ETFs have stimulated demand because it has become as easy to trade gold as it is to trade any stock or share



810172

## **SUMMARY OF FINDINGS AND CONCLUSIONS**

### **5.1 Introduction**

The study focuses on the applicability of price risk management under gold future trading and also to look into the new and existing trends in the price of gold futures. The ability of futures markets to reduce risks associated with price variability and stock holding through hedging is probably their most important role. There are large price risks in the World gold market. Since mid- August, in December 2007 the gold price has risen more than 24%. The larger, the more frequent and the more unforeseen is the price variability in a commodity, the greater is the price risk in it. Investment sentiment towards gold has been positive for several years now. It is because of its favorable demand and supply dynamics, and its ability to hedge against dollar weakness, inflation and the impact of geopolitical and financial risks.

### **5.2 FINDINGS AND CONCLUSIONS**

- 1) The gold price reached a record of \$858.85/oz (on the London PM fix) on the first trading day of the new year 2008, almost \$9/oz ahead of the previous record set on 21 January 1980 (it has increased still further since then). The price was on a firm upward trend for most of the fourth quarter of 2007 i.e. Nov07, Dec07 and Jan 08, rising from Rs 924 /gm at the end of October to Rs 1019 at the end of Dec. Fourth quarter was also marked by a pick up in price volatility. Price volatility increased from 12.4% at the end of Oct, to a quarterly peak of 25.4% on 4<sup>th</sup> December, before easing back to 18.8% by year end.

Heightened price volatility was a common theme across financial markets, due to the ongoing uncertainties surrounding global financial and macroeconomic conditions.

The tipping point for the new year record high seems to have been a combination of safe haven buying, after the assassination of former Pakistan Prime Minister and leader of Pakistan's People's Party, Benazir Bhutto, and inflation-hedge buying, as violence in Nigeria pushed oil prices above \$100 a barrel. This came against a backdrop of disappointing economic indicators, suggesting the impact of the credit crisis on the US economy was spreading.

- 2) Assets which are negatively correlated to the major asset classes and independent of macroeconomic measures should be seen as key portfolio constituents. Gold futures has been shown to hold these properties. In addition, gold bullion has preferred characteristics over other alternative assets which are becoming increasingly used as tools for risk management and differentiation in a low-return world. Gold bullion is liquid, low risk and easy to manage. The above results suggest that gold is a tool which can be used to manage portfolio risk.
- 3) Studies indicate that the price of gold is determined by two sets of factors: "supply" and "macro-economic factors". Supply and the gold price are inversely related. In the case of 'macro-economic factors', the U.S. dollar tends to be inversely related to gold, while inflation and gold tend to move in tandem with each other. Also, high low-interest rates are generally a positive factor for gold. Also, high real interest rates are generally a negative factor for gold. Overall, the impact of the above determinants on the gold price is judged to be neutral-to-slightly-positive at this time.
- 4) A feature of the Indian gold demand is its extreme sensitivity to price volatility and it is this factor which is of most important in affecting gold demand.

- 5) Gold futures are effective diversifier, the other intrinsic qualities that could win points for it as a 'safe haven asset' were its seamless nature (currency without borders), did not require a Government to back it and was the most effective means of raising cash.
- 6) The price of gold depends on a host of factors, which makes it very difficult to predict.
- 7) The higher gold price goes, the more traders are interested in participating in its bull market. The rise in prices, however, has resulted in retail investment rising during the last two years, i.e., higher prices drive higher demand.
- 8) If gold is cheaper to borrow than dollars - which it usually is - then the spot price will be below the future. If gold is more expensive to borrow then gold futures will be at a discount to the spot.
- 9) The economic forces that determine the price of gold are different from the forces that influence most other investment options and that's why its price has always moved in the opposite direction to that of equities.
- 10) Gold has maintained its value in after-inflation terms over the long run buffer stocks can be supplied with perfect elasticity. So, no such upward price pressure will be observed in the gold market in the presence of a positive demand shock.



### 5.3 Conclusion

The study reveals that gold futures are an effective means of risk management. It has acted as a safe haven across the globe especially during times of political or economic calamity. Of the other key drivers of investment demand, one common thread is gold's abilities to insure against uncertainty and instability and protect against risk. It is clear from above that gold future trading is an excellent choice for the investor seeking an asset to hedge against inflation and people trusted gold as a better investment than bonds and stocks. The price of gold shows an upward trend with a continuous increase in its price and with slight variation in its price. These variations are due to high selling of gold futures at the time of price rise. Jewellery demand is seasonal, where it is high during the festival seasons.



810172