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Chapter 1 - Introduction

1.1. Gold - One Metal, several functionalities

Gold is arguably the only precious metal which exercises a multi-dimensional impact on global economy. The most obvious use of gold is Jewellery. This is the form in which gold becomes a significant part of household economy. However, with time, its role as an investment asset has steadily gained prominence. This has been due to the stabilizing effect gold has exhibited on investment portfolios across the globe in times of financial and political crises. It also finds use in industries. Historically gold has been an integral part of economy. 'Gold standard' was the international monetary system which prevailed for over two centuries. Even though it does not exist anymore, gold continues to play a significant monetary function in the form of reserves held by Central Banks. Last but not the least, gold mining industry has been significant generator of employment[1].

As an average of the last 5 years (Q4'05 to Q3'10), the demand flows of gold in the form of jewellery has been more than half of the total (57%) followed by Investment demand (31%). The remaining demand is made up by industrial use. (World Gold Council, 2011(i))

Gold is known for its ornamental value in the form of jewellery. Countries like India and China dominate the demand of gold in the form of jewellery and investment. They accounted for 55% of the world jewellery demand and 52 % of the world demand for bar and coin investment in second quarter of 2011. India, China and Turkey accounted for three-fifth of the global demand for jewellery. Also this demand saw an increase of 6% in volume terms and of 34 percent in terms of value, year on year in this quarter. (World Gold Council, 2011(ii))

Its role as an investment asset is discussed in detail in the next section.

Next, gold continues to play its monetary role. It is the third most-held reserve asset by Central Banks, after dollar and euro. (World Gold Council, 2011(iv)) Central Bank of almost all

[1] Employment for 100 million people is generated by the gold mining industry. (World Gold Council)

countries maintain varying amount of gold reserves, its total volume being 30, 683 tonnes[2] according to International Financial Statistics, 2011. USA holds the first place in terms of volume of gold held by the Central Bank and second place in terms of the percentage of gold in total foreign reserves. (First place in the latter category is held by Portugal, though its reserve in volume terms is much lesser than of USA.) Other countries in the top-ten list holding high volume of gold reserves are Germany, Italy, France, China, Switzerland, Russia, Japan, Netherlands and India[3] in the same order. (World Gold Council, 2011(iii))

But before this role, the 'gold standard era' existed. It started in 1717 in Britain and by 1900, almost all countries (except China notably) had adopted this system. The properties of gold like non-corrosiveness, malleability and high status it enjoyed historically[4], made it the best choice as money.

Its history as a monetary asset dates back to over two thousand years. It has acted as a store of wealth, unit of value and medium of exchange akin to money. (Goodman (1956) & Solt & Swanson (1981)) Around the period of end of World War I in 1914, the relevance of this system started getting diminished, as variations in gold supply caused short-term instability. USA was the most prominent country which continued with gold standard uptil 1971. Official role of gold in international monetary sytem ended in 1978, through an IMF amendment which prohibited countries from linking their exchange rates with gold.

Third source of demand for gold (around 12 percent) (apart from jewellery and investment) is by industries like electronics, dentistry, medicines and chemicals. The properties of gold used here are its non-corrosiveness and high thermal and electrical conductivity among others. (World Gold Council, 2011(i))

The overall demand for gold is primarily met by gold mining (up to three-fifth of total supply). The high recyclability of this metal from existing jewellery, bars or coins acts as the next significant source of the metal (around 35 percent) while the last source comprises net selling of

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[2] Gold held as reserves by Central Banks is roughly one fifth of the above ground stock of the metal. (World Gold Council, 2011(iii))

[3] IMF is excluded in the list, though it is the third highest holder of gold reserves after USA and Germany. (World Gold Council, 2011(iii))

[4] The first gold coins were minted in 564 BC in Lydia, Turkey by King Croesus. . (World Gold Council, 2011(iv))

the metal by Central Banks (recent trend is mainly from advanced countries to developing countries, as the latter have been showing an increasing appetite of gold reserves.) It may be mentioned here that while demand of the metal is price-elastic, supply of the metal does not vary significantly with the price, reason being new mines take a long time to start regular production. The annual production of gold is almost stable and roughly around 2.5% of the existing above ground stocks.[5] (World Gold Council, 2011(i))

1.2. Gold as an Investment Asset

Use of gold for investment has been gaining significance over the last few years (see section 1.2.1). Being 'real' asset as other commodities, it is considered to be of lower risk than assets like equities, bonds, real estate etc. in times of crisis, economic or political. Moreover, it is considered better than other real assets due to its high liquidity. Hence it has emerged as a stabilizing and profitable inclusion in the investment portfolio.

1.2.1 Gold for Investment – Reasons and statistics

Gold is a good asset to diversify one's investment portfolio. (Carlson, 2010) This can be defended given its traditionally low correlation with other assets like equities, real estate etc. which in turn, can be due to lower sensitivities to factors like industrial demand. As the investment preferences switch from other assets to gold in crisis situations, its prices rise making the metal even more attractive. Those who are invested in it reap rich returns. During the latest recession, gold prices broke records "...with prices roughly doubling since the global financial crisis began in mid-2007." (Oxford Economics, 2011)

Another factor that goes in its favour as an investment asset is its high liquidity. According to Draper, Faff, & Hillier, (2006) et al, London Bullion Market Association clears transaction worth the annual production of gold every 2.5 days. Also in events of political or economic collapse, while other assets risk freeze or devaluation, gold can be redeemed fully. (Vuyyuri & Mani, 2005)

In the current precarious economic scenario which manifests as increased money supply by government to boost their economies, higher incomes and savings in countries like China and

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[5] The above ground stocks were nearly 1, 65,600 tonnes, end 2009. (World Gold Council, 2011(i))

India which drive demand of gold and the increased use of Gold Exchange-traded funds increasing convenience of trading, investment in gold has become more lucrative. (Carlson, 2010)

Investment has been the strongest source of gold demand in recent years. The growth in investment has increased by a phenomenal 119 percent in value terms in the five years ending 2009. (World Gold Council, 2011(i)) The Y-O-Y growth in investment as in first quarter of 2011 has been a remarkable 26 percent. (World Gold Council, 2011(ii))

Given this background, apart from the traditionally accepted physical exposure to gold, several other investment tools are in practice. Gold coins and bars are suitable for small direct exposure. If only exposure to gold price movements is required, it can be done through ETFs or Exchange Traded Commodities (ETCs). Other tools of investment in gold include warrants, futures and options (derivatives), Gold mining stocks, Gold accounts, gold certificates, Gold oriented funds and structured products. (World Gold Council, 2011(vi))

Apart from high liquidity and low risk, it has also manifested itself as a high-return asset. Reason behind this is the trend of rising prices, especially in the last five years or so.

1.2.2 Gold prices – Trends

When we are concerned with the investment potential of an asset, we are as much concerned with the related risk aspects as with the returns from the asset. The latter is a function of prices. Gold prices have been subject to volatility as is true for all assets. However, when seen over a long-run, the prices have been following an upward trend. News like downgrading of credit rating of US in August 2011 by Standard and Poor, the Credit Rating Agency has seen gold prices reach all-time high. (MarketWatch , 2011)

The percent increase in prices with respect to different currencies is different based on their relative strength in a given period, even if the price fundamentals remain the same. For instance, by September'11, the gold price in US dollars (USD) has risen by a spectacular 48 percent year on year whereas the same in terms of Euro has been 35 percent. The relatively higher percent increase in terms of USD is an indication of the weakness of USD vis-a-vis Euro during this period. (Goldprice.org, 2009)

From 1978 onwards, when gold entered the free market situation and was delinked from other currencies, the prices have followed an upward trend (Chart 3.1 in Chapter 3). Specific statistics point towards the same. In the last decade (between Dec 2000 and October 2010), an increase of 394 percent in gold price was registered. As many as 35 new highs have been recorded in 2010 alone. (World Gold Council) This provides a good argument to consider a place for gold in the investment portfolio.

Gold prices commonly take as their benchmark the London Fixing Price. The price is fixed daily in the London market, by 5 members via a conference facility. The time of fixing is 10 am and 3 pm London time. The latter is more important as it coincides with the US market opening time. The current 5 members are Barclays Capital, HSBC, Deutsche Bank AG London, The Bank of Nova Scotia - Scotia Mocatta, and Societe Generale Corporate & Investment Banking, all in London. This process dates back to 1919 when Bank of England first signed an agreement with seven South African mining houses for procuring their gold for refining. Five of them agreed on a price of selling their produce to the banking house N.M. Rothschild. (World Gold Council, 2011(vii))

1.2.3 Gold prices – Risk factors

As has been stated earlier, gold prices show a fair amount of volatility. What are the factors that cause the gold prices to fluctuate? To understand the risks faced by gold prices, it is pertinent to focus our attention on the factors that decide and impact gold prices. These factors can be roughly grouped into micro-economic factors, market sentiment and macroeconomic factors.

In the first category comes the demand and supply aspect. According to the general economic principle, as the demand surges, so does the price (keeping supply constant). As discussed earlier in section 1.1, supply of the metal is rather price inelastic and takes time to adjust to variation in prices. So in short-run, demand for gold is the main microeconomic driver of its demand.

To add to market demand and supply is another variable – gold buying and selling by Central Banks. (Haubrich, 1998) The price of the metal falls by net selling of the metal and vice-versa.

Being a metal prolifically exchanged in commodity exchanges as well as stock exchanges, the market sentiments also impact the prices, just as they do in case of equities.

In today's globalized era, macroeconomic variables are impacted by not only domestic but global phenomena. This change is transmitted to all assets including gold.

There are several macroeconomic factors which impact gold prices.

Some of the significant macroeconomic factors are inflation and interest rates, currency fluctuation, Central bank demand and weakness in financial markets. (Rediff news, 2009).

The directions of relationship are generally considered to be the following – While gold prices move in the same direction as inflation, they move inversely with interest rates and USD. Historically, gold has performed well in inflationary periods. Also as interest rates are low; the debt products lose their charm as investment tools. This makes gold as an alternative worth considering pushing up its price. With respect to USD, not only does gold replace dollar as a reserve asset at times of a weakened dollar, more dollars are required to purchase the same amount of gold, meaning higher gold prices. A higher Central Bank demand means higher pressure on the existing gold stocks, manifesting itself as a price hike. Any instability raises fears of lower economic growth and inflationary conditions, lower industrial demand, fear of devaluation of currencies and loss of wealth. Gold is arguably least susceptible to these conditions among all assets or if affected, it is in the inverse direction (as with respect to inflation). This leads to a flight of investment from other assets to gold, pushing up its prices.

All these factors can impact the rise and dip of gold prices. All the above factors may also constitute elements of an economic crisis, individually or collectively. Hence it can be interesting to examine the response of gold prices to economic crises.

As has been argued, gold is one of the most resilient of all assets in these times, with its prices surging in some of the instances like during the most recent global economic turmoil (2008 onwards) manifesting as recession, falling stock prices and higher inflation.

This is the subject matter of the current study. The rise and dip of gold prices are compared vis-a-vis several economic crises that hit the world. The scope of these crises has been vast and varied, as is discussed at length in Chapter 3.

1.3. Motivation for this Study

Gold is a metal of great historical relevance which is continuing up to the present times. It has multiple functionalities and investment is one of its most important roles in today's world. Its price has been rising in the last decade. However, it has experienced its share of dips as well. The question in an investor's mind is that whether gold really plays a stabilizing role in an investment portfolio. In other words, in times of economic turmoil, when returns from assets like equities, bonds and real estate dip, can gold ensure positive returns? This hypothesis is becoming increasingly relevant given the high frequency of these crises the world in the globalized set-up is facing.

Several studies exploring inter-linkages between gold price and factors impacting it have been made. Feldstein (1980) and Geoffrey (1990) reported that gold prices moved with expected inflation. Tulley and Lucey (2007) averred that gold prices rose when dollar weakened. Several other such studies have been conducted which are discussed in Chapter 2.

However, a study with an intense focus on the analysis of performance of gold prices at times of economic crises has not been done. One study came close to exploring behaviour of gold prices in crisis situations. Oxford Economics (2011) by means of scenario testing, concluded that gold showed the maximum resilience among assets like equities, cash, bonds and real estate during high inflation scenario and is better than at-least a few of these during deflation. However, this study was conducted for UK so need for a study with a global perspective remained.

Also the returns analysis needs to be conducted to judge gold in a completely different way as an investment asset.

The specific objectives are discussed below.

1.4. Objectives

Specifically, the two objectives for conducting this study are as follows:

- Exploring the link between gold prices and economic crises which hit the world in the late 20th and 21st century till now

- Quantification of gold price variations in the study period so as to draw inferences about the investment potential of gold

Details of the gold price data and economic crises are given in Chapter 3.

The general hypothesis is that either the gold prices will remain unaffected or will actually see a positive spike, justifying its role as a stabilizing inclusion in the portfolio.

1.5. Organisation of this Study

The dissertation has been divided into five parts. The second chapter discusses the literature on different aspects of gold, its price and factors affecting it. Chapter 3 has details about the Methodology and Data. Results of analysis conducted to fulfil the above two objectives are discussed and interpreted in Chapter 4. Finally, Chapter 5 summarizes the procedures carried out and results drawn in this Dissertation.

Chapter 2 - Literature Survey

As discussed in Chapter 1, Gold has evolved itself as the most privileged metal on the global scale. It is primarily due to the multiplicity of roles it plays in today's world. Historically, gold has been considered as a safe haven for all investors. The glitter has considerably increased due to the remarkable upward trend gold prices have followed in recent years. In this chapter, therefore, firstly, literature exploring its investment role is discussed. In this context, its price movements as documented in literature are also discussed. Further the relationship of gold prices with different macroeconomic factors, which singly or together form the elements of the economic crisis, is analyzed in detail in terms of research work already conducted. Together, the literature survey aims to provide a basis of gauging direction and magnitude of response of gold prices to economic crisis.

2.1. Gold – General Perspective

Gold is in great demand all over the world. Regions of East Asia, Middle East and Indian sub-continent accounted for about 70 percent of total demand for gold in the year 2009. (World Gold Council, 2011(i))

There are innumerable studies related to the significance of gold for global economies. Gold has been considered as a commodity and also as a monetary asset.

Core demand related to gold are due to the noted applications–industrial use, jewellery and investment, as well as Government stocks. Being a commodity, it has been used for jewellery and industrial works. However, its uses for investment and government stocks are related to its manifestation as a monetary and financial asset.

Certain features suggesting role of gold as an investment asset are as follows:

1. Gold is highly liquid in comparison to other commodities in condition of financial crisis, like *"…high global inflation or political turbulence*" (Vuyyuri & Mani, 2005) Gold can be readily sold or bought in very large denominations. (Draper, Faff, & Hillier, 2006)

2. Further, "*in the long run, the price of gold has shown a very low and even a negative correlation with the dollar and with US treasuries. Gold is not affected by the policy decisions of any individual country and cannot be frozen or repudiated as can be the case for foreign securities*" (Vuyyuri & Mani, 2005).
3. Gold also represents security against any kind of loan needed by Governments for international borrowings.

"Another reason for the economic significance of gold is the ease it offers in hoarding unaccounted wealth. Black money has been maintained in terms of gold bars, jewellery etc."(Vuyyuri & Mani, 2005)

2.2. Gold prices Analysis – Major macroeconomic determinants

Like any other commodity price, gold prices have shown considerable volatility in the past years. However trends for 10 years and 5 years (till year 2010) in terms of many currencies, specifically USD and INR indicate that the prices have shown a marked upward trend. This is discussed in detail in section 4.2. This asserts the potential gold has in terms of returns to the investor. However, it is also important to assess the impact of changes in macroeconomic factors on gold prices. This can in turn guide the investors in terms of expected response in the event of an economic crisis, which is usually manifested as a combination of one or more macroeconomic phenomena.

As discussed in the Chapter 1, among the main determinants of gold prices are the currency fluctuations, changes in interest rates and inflation, demand by Central Banks, weakness related to financial markets (bond/real/equity estate) etc. When one or more of these factors counter an imbalance, the economy experiences financial stress in the form of inflation, stagnation and recession, currency devaluation etc. Some of the economic crises examined later in this study manifest in similar ways as mentioned above.

Gold prices and inflation have been shown to have a relationship in various studies. Price of gold is closely connected to inflation (Haubrich, 1998). Prices of gold with a year lag moved with US inflation (CPI) during 1981-1997. However, direction of causality was not established.

Ghosh, Levin, Macmillan, & Wright (2002) utilised monthly price of gold and techniques of co-integration regression during 1976-1999 and declared gold as a long-run inflation hedge in US context.

In terms of interest rates, Diba & Grossman (1984) found a connection among properties of time series of relative gold price and the real rates of interest. Fortune (1987) argued for an inverse relationship between gold prices and expected rates of interest.

Further, prices of gold are globally affected by the fluctuation in European currencies (Sjaastad & Scacciavillani, 1996).

Still, dollar affects prices of gold the most.

According to Sherman (1983), log of gold price was found to be inversely related to US weighted exchange rate. Baker & Van-Tassel (1985) conducted a study related to US for the period 1973–1984 and found out that changes in gold price depends mainly over two variables, inflation (change in US prices) and changes in dollar.

A multi-variable study was conducted by Tully & Lucey (2007). The aim was to find the response of gold prices to changes in these macroeconomic variables. Variables tested were dollar and the pound effective exchange rate, prices of oil, equity indices – cash and futures, FTSE cash, general price level of US and UK (CPI), interest rates, unemployment and industrial production indices.

The methodology used was application of Asymmetric Power Generalized Auto-Regressive Conditional Heteroskedasticity Model (APGARCH model). Both cash and futures Gold price series were employed for the period 1983 to 2003. The most unequivocal finding was the inverse relationship of dollar with the gold prices. All other variables including stock price indices did not show any significant relationship; latter was in lines with the hypothesis that gold price remain unaffected with the variations in stock market.

Oxford Economics (2011) conducted a multi-variable analysis to explore determinants of gold prices for the period 1976-2010. They specifically aimed to understand response of gold prices to crisis situations like high inflation, deflation, growth stagnation etc. They looked at all the

variables like current inflation rate, World income, dollar value, real interest rate, Gold's Beta[6] , credit risk premium to quantify financial stress, Political instability and Official sector activity. They used the Error-Corrected Model for this purpose. The variables that came out to be significant were effective dollar exchange rate, credit risk premium, real interest rates, US monetary base and US CPI inflation.

2.3. Current Study

As can be seen in this chapter, gold has acquired a privileged position among metals not only because of the status it commands in global markets but also because of the extensiveness of research work it has attracted.

Gold prices have appreciated over the last few years with the fastest growth rate in at-least its 30-year history. To quantify this trend, a focussed study is required. Moreover, the response of gold prices to several macroeconomic factors have been researched and documented. However no specific study has been conducted focussing on the gold's response to prominent economic crises that hit the world.

To fill up this gap, the present study has been conducted.

2.4. Concluding remarks

The approach that has been pointed out in the previous section is actually the risk and returns analysis to explore the investment potential of gold. In the next chapter, the approach is discussed in detail. Also the data, their frequency and duration and sources is elaborated.

[6] Gold's Beta was calculated as a moving average of the correlation between movements in the gold price and the Wilshire 5000 index. Gold can be a good diversification tool in investment if returns on holding gold are unrelated to the stock market) – a fall in this parameter will push gold prices up.

Chapter 3 - Research Methodology and Data

As discussed in the last chapter, gold has attracted researchers to conduct work on different aspects of its use, its price and its relationship with several factors. However no specific study has been conducted exploring gold price vis-a-vis prominent economic crises at a global level. To fulfil the objectives specified in the first chapter, a preliminary gold price analysis has been made. Two-pronged approach has been used to scrutinize the investment potential of gold – First is related to 'risk' and second to 'returns'. The methodology employed and data used in this analysis are discussed in detail in this chapter.

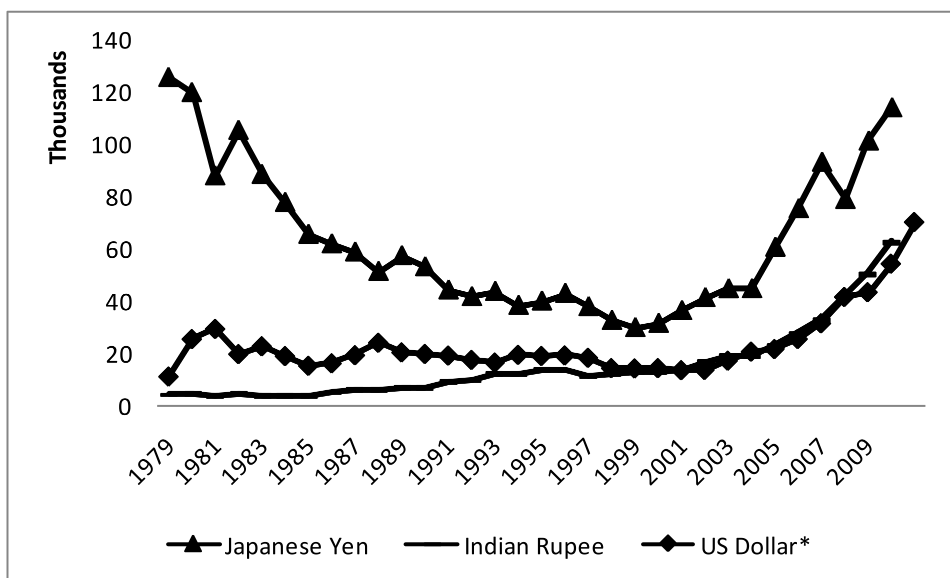
3.1. Methodology

This section comprises of two subsections – first dealing with risk analysis and second with returns analysis.

For both the analyses, the time series of gold prices need to be scrutinized.

Here it may be mentioned that gold price trends in different currencies may be different. The difference in price trends can be visualized in Chart 3.1.

Chart 3.1: Trend of Gold prices in different currencies for the period 1979 to 2010



* indicates that prices in US Dollars have been up-scaled 50 times to fit in a common frame as the other currencies.

3.1.1 Preliminary Risk Analysis – Gold prices Vs Economic crises

Since we need to study gold price in relation with economic crises, we generate gold price graphs in relevant currencies. Highs, lows and general trends around the crisis period are scrutinized vis-a-vis individual crisis.

Several economic crises with different causalities have hit different parts of the world in the late 20th and 21st century till now. They had different causes and consequences. Some were specific in nature, i.e. related to currencies or stock markets while others were general concerning the whole banking sector or the macroeconomic variables of country(s).

The details of economic crises used in our study are given below.

Economic Crises of the 20th and 21st Century – In Chronological order

Several crises shook the local and global economy in this period. Prominent among them have been included in the study.

I. Latin American Debt Crisis, 1980s

The crisis began in Mexico in *August, 1982*. Several Latin American countries including Mexico incurred debt from big international financial organisations between the period 1976 and 1981. However, the level and pace of incurring debt was unsustainable and eventually resulted in default. (Devlin & Davis, 1995)

Specifically, in *August 12, 1982*, the crisis manifested itself when the Mexico declared its inability to service debt worth $80 Billion (mainly dollar denominated, hence impact on gold prices quoted in USD is expected). It became a full blown crisis by *October 1983* when 27 countries joined the wagon. 16 of these countries were from Latin America. A prospect of doom hovered over 8 large US Banks, 147 percent of the capital and reserves of which were in the form of debt to 4 large Latin American countries. (FDIC, 2000)

Causes:

Lending Rules were relaxed by the banks and also by World Bank and the International Monetary Fund. In 1982, the external funding was suddenly stopped. This caused

macroeconomic imbalances in the Latin American economies and retardation of economic growth for over a decade (also called the 'lost decade').

Consequences:

Domestic spending in these countries was subsequently needed to be curbed to service external debt resulting in Negative 'Net Financial Transfers' or NFTs. This manifested as loss of productivity, employment and wages and decrease of tax revenue. Further, there was a flight of domestic capital, out of fears of devaluation. Overall, both government spending and private investment were reduced retarding growth of economies.

II. 1987 Black Monday

This happened in between *October 14 and October 19, 1987* in major US stock markets. The indices bore the maximum beating in a single day (19 October 1987) till then. (Itskevich, 2002)

Causes:

Certain reasons which together would have been responsible were:

- Failure of synchronisation between stock markets and derivative markets
- Computer-programmed trading which meant automatic large orders of stock trades given particular market conditions
- Announcement of US trade and budget deficits – Fears of a lower dollar resulted in flight of investment from dollar denominated assets
- High yield of long-term bonds making them an attractive alternative to stocks

Consequences:

While stock markets in other countries also crashed, US stock markets witnessed 30 percent drop in market valuation. While the Dow Jones Industrial Average fell by 508 points or 22.5% of its value, the S&P 500 plummeted 20.4%. Due to panic selling in the Wall Street, world stock markets also crashed.

In London, there was a £50 Bn loss in valuation in the FT 30-Share Index. (BBC News UK, 1987)

Canada 's Toronto Composite index fell by a record 407.2 points and it took two years for the index to regain the pre-crash levels. (CBC, 1987)

III. Japanese Banking Crisis of the 1990s

This crisis manifested in *1997* as a failure of many high-profile financial institutions in Japan as fallout of systemic banking system weakening and bursting of asset bubble in the late eighties**.** The crisis duration was lengthened due to 'weak corporate governance' and 'regulatory forbearance'. This crisis is also believed to be behind Japanese economic stagnation in the 1990s. (Kanaya & Woo, 2000)

Causes:

Accelerated pace of financial liberalization and deregulation – Created price competition and put pressure on the profit margins of Banks pushing them towards riskier portfolio

Bursting of asset price bubble – Bubble created as banks increased their lending to the real estate, and that too, with lesser monitoring

The overvalued stock market collapsed in 1990. This along with Government move to limit real estate lending leading to a fall in real estate prices severely weakened banking health.

Consequences:

- Downgrading of Japanese banks by credit agencies
- Banking and financial institutions took a hit as domestic and euro bond markets emerged as better alternatives.

IV. 1992 Black Wednesday

On *16 September, 1992,* the British Pound Sterling crashed out of the Exchange Rate Mechanism. (ERM) Britain had joined this system two years ago as a cornerstone of its anti-inflation policy. (Elliot & Hutton, 1992)

Causes:

Massive sell-off of pound - Pound tumbled in New York trading below its former permitted ERM floor against the German Mark; other markets followed cue; further, investors shifted preference to dollar.

Consequences:

Treasury documents revealed the total cost of the "Black Wednesday", 1992 may have been around £3.3bn. (Tempest, 2005)

V. Asian Financial Crisis, 1997

This crisis started on *2nd July, 1997* in Thailand as a currency crisis which spread to other East Asian countries and then to the world. (Richardson, 1998) These were the model countries till the beginning of the crisis and hence received massive foreign investment. However due to currency issues and policy and institutional limitations, the investor sentiment was hit deepening the crisis. For more on what hit investor sentiment, see IMF Staff (1998).

Causes:

- Currencies of most East Asian economies excluding Japan had overvalued currencies being pegged to the US Dollar resulting in loss of export competitiveness and external imbalances
- Speculation into real estate and property development resulting in asset price bubble in countries like Thailand, Philippines and Malaysia
- Indonesia hit the worst, reason behind which being its own structural deficiencies like domestic trade regulations, lack of transparency etc

Consequences**:**

Thailand 'baht' fell sharply by around 20 percent against $US on the above mentioned day due to shift from a fixed exchange rate system to managed float system. This being the trigger, currency crisis soon spread over to Philippines and Malaysia. Taiwan, Hong Kong, Singapore and others followed suit due to 'regional contagion' or domestic structural inefficiencies or both, though the level of impact varied. Impact could be felt not only on currencies but on stock markets as well. This was due to deteriorating sentiment of investors, foreign and domestic. By 27th October, the crisis showed global repercussions as Dow Jones registered the biggest point fall in history.

VI. Financial crisis 2007-2010

It is arguably the biggest global economic crisis after the 'Great Depression'.

The crisis started as sub-prime mortgage crisis in 2007 in US and soon spread to Europe and other parts of the world. Latest manifestation of the continuing crisis was the downgraded debt rating of US on *5th August 2011*. (Elliot L. , 2011)

Causes:

A series of events exacerbated the crisis which is still not over despite efforts by governments at both collective and individual level.

It started with BNP Paribus ceasing activity in three hedge funds dealing in US mortgage debt (*9 August 2007*), reflecting the inherently weakened banking system

Lehman Brothers was declared bankrupt on *15 September 2008*

Mainly, due to extensive fiscal packages for bail out of financial institutions, the budget deficits of countries became unsustainable. The first in line to receive international help was Greece. (*9 May 2010*)

Consequences:

Vast sums of capital were spent by governments to save the banks with risky mortgage assets, globally *(2008-09*). Banks were saved, however, global economic recession set in. On one hand, credit flow to private sector was choked, on the other, investor and business confidence collapsed; this was a time of high prevailing interest rates as well.

The Greece solvency crisis which was the first in a list of several countries, mainly European, prompted governments to initiate strong austerity moves.

Recently US sovereign debt rating was downgraded by Credit Ranking Agency, S & P.

Response of gold prices to all the above economic crises is explored. The currencies in which the analysis is undertaken are listed in Data section.

3.1.2 Returns Analysis

For an asset to possess high investment potential, it should not only display least susceptibility to risks but also high returns. With respect to the latter, returns are calculated in terms of price appreciation or depreciation, gold has experienced over certain periods of time. The periods are

Yearly, 5-Year, Decade, 3 decades and last four years (2007 – 2011). A new gold price series is constructed by employing Moving Average for 4 and six months. This is done to make the data points more reflective of the trend and reduce impact of outliers. Growth rates in percentages are then calculated between start and end points of newly constructed MA series for the period in question. This exercise is done for two currencies – US Dollar, which is the primary currency in which gold is priced and transacted and INR, which is the currency of India which happens to be one of the main drivers of gold demand.

3.2. Data

Data on gold prices have been sourced from World Gold council website, www.gold.org[7]. Gold prices available through this source are London PM Fix. Data is in terms of various currencies. The unit of Gold prices is National currency per troy ounce. Currencies considered are US dollar, Great Britain Pound Sterling, Canadian Dollar, Indian Rupee, Japanese Yen, Indonesian Rupiah, and Thai Baht. The choice of the currencies is governed by two factors: prominence of currency in general and with respect to gold trading; and, relevance of currency vis-a-vis economic crises under consideration. All series' are indexed to 01/01/1999.

3.2.1 Period of study and frequency of data

The data on gold prices is available for the period between 29th December 1978 and 29th July 2011. This period is particularly relevant as gold prices reflect the free-market situation, after gold's association with international monetary system officially ended in 1978.

For risk analysis vis-a-vis each crisis, a relevant section of the data is considered. The frequency of the data is daily. This is taken so as to capture the immediate impact that the economic crises might have had on gold prices.

For returns analysis, data on monthly average of prices between the period 31/01/1979 to 30/06/2011 have been used. The reason behind using monthly frequency and not yearly is to take into account, high volatility in gold price data. Also it is better than daily frequency since growth rates are calculated between two points and a monthly averaged price is a more representative data point than a day's price.

[7] The exact URL of website from where 'Gold Price' data is procured is http://www.gold.org/investment/statistics/

3.3. Concluding Remarks

The methodology elaborated is employed on the available data. The objective in general is to explore the investment potential of gold. The results of the analysis are presented and discussed in the next chapter.

Chapter 4 - Results and Discussion

In the last chapter, methodology and data used in the analysis were discussed in detail. The two-pronged approach employed for conducting the risk as well as returns analysis was elaborated. Consequently, results have been obtained which are discussed in this chapter. Interpretations are made to support or reject the hypothesis that gold prices actually increase in response to economic crises or else remain unaffected. Further, the overall increase in the gold prices over the study period is quantified for various time-periods. This is to gain a perspective of the potential of returns in gold investment.

4.1. Risk Analysis: Gold prices in response to Economic Crises

Firstly, the gold prices in the study period are charted. The scrutiny is done one by one for the six economic crises under consideration. The gold prices examined are in US Dollar (USD, widely accepted currency for gold pricing and transactions) and in currency relevant to the area where the particular economic crisis hit.

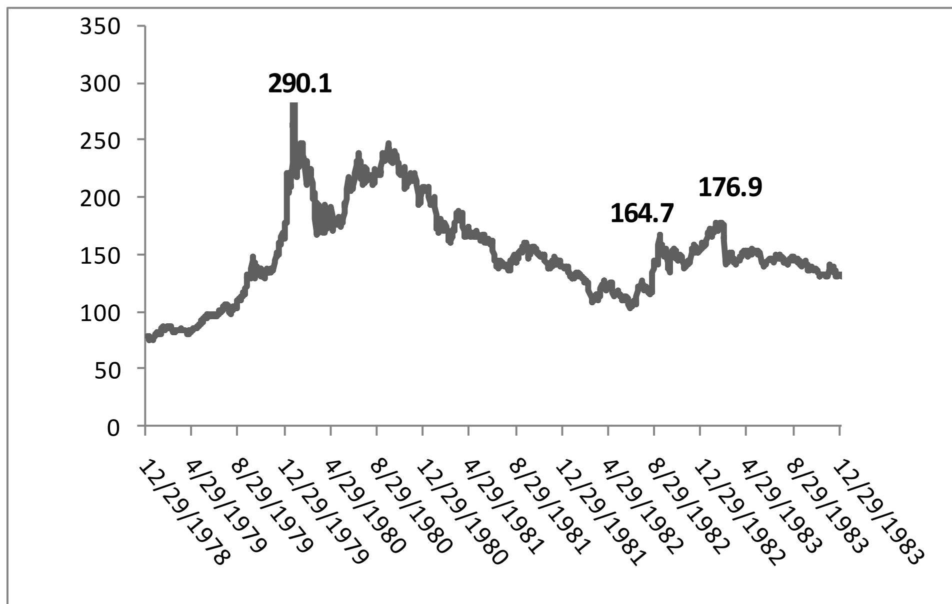
The general hypothesis is that either the gold prices will remain unaffected or will actually see a positive spike, as mentioned in the first chapter.

The first crisis under consideration is the *Latin American Debt crisis of the 1980s*. The impact on gold prices may be felt before or after the crisis starting 12 August 1982 and achieving full scale by October 1983.

The gold prices in terms of USD are examined. Looking at the period starting from 1978 end to 1983 end, we find no unusual spikes in gold prices around 1982. (Chart 4.1) Spikes were however seen on 21st January 1980 when the gold stood at a high of $290 followed by another smaller spike on 8th July 1980 and 22nd September 1980 ($240 and $246 respectively). Though it does not relate directly to crisis, it may have some correlation with the deteriorating debt conditions in these countries, which owed mostly dollar-denominated debt. It has been mentioned that the 1982 crisis was a culmination of process starting 1976, of massive inflow of foreign funds to these countries as LDC (Least Developing Countries) loans.

Small spikes (rise in prices) were again seen on 7th September 1982 (164.7) and 1st February 1983 (176.9). This is the period in which actually crisis sustained and deepened and hence these spikes can be plausibly linked to the crisis. Also it is reasonable to examine the impact in dollar prices of gold and not any other currency since US banks were significant lenders to the affected countries (discussed in Chapter 3).

Chart 4.1: Gold price in US Dollars per troy ounce in relation to Latin American Debt crisis, 1980s in the period 29 December 1978 to 29 December 1983



At the end, with fair amount of conviction, it can be said that gold prices did see a rise; albeit small, in the face of this particular crisis. However, the impact at best, can be described 'fleeting' because the prices did not sustain a level of more than mean (151.3) or median (145.4) in this 5 year period.

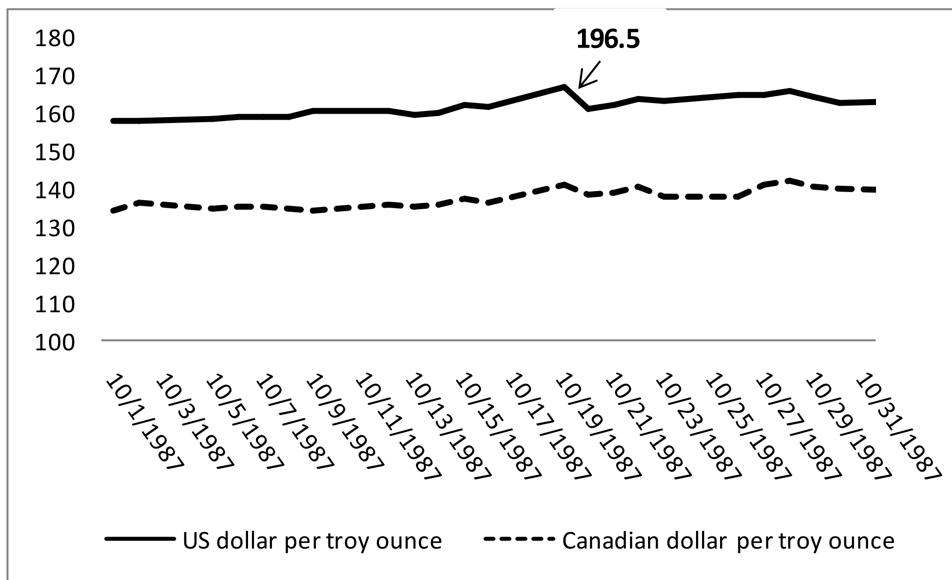
The second crisis is the 'Black Monday' (October 19) witnessed by US stock markets between October 14 and October 19, 1987. So the Gold response could have been around this period only (October 1987). However since the impact of the crash was felt on stock markets around the world, the gold prices of certain other currencies are also expected to have responded to it. Hence price of gold in USD, Canadian Dollar and Pound Sterling are observed.

Gold prices remained nearly unaffected by this crash and the trends in both USD (Pound Sterling nearly mirrored USD graph and hence is not shown separately) and Canadian Dollar remained

stable. Only in terms of USD, on that fateful day, the prices rose to 196.5 USD per troy ounce against the October monthly average of 162.7. (Chart 4.2)

This reveals that gold prices may react but not significantly and every time, in response to stock market crash.

Chart 4.2: Gold price in US Dollars and Canadian Dollar per troy ounce in relation to Black Monday, 1987 in the period 1 October 1987 to end October 1987



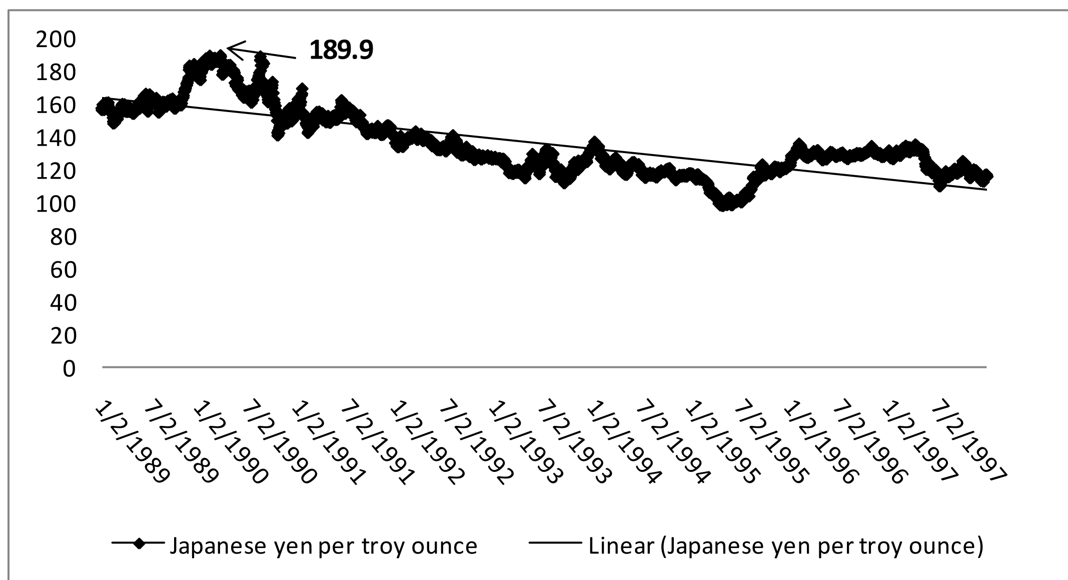
The third crisis was the Japanese Banking crisis of the 1990s. It was an extended crisis as discussed in Chapter 3. It precipitated in the second half of the eighties, stock market collapsed in 1990 and the banking crisis manifested in 1997. Hence the period to look out for a response by gold prices is from beginning 1989 to end 1997 (9 year period).

The prices are scrutinized in terms of Japanese Yen as well as $US (given that the crisis had global repercussions)

The trend related to USD prices followed a mild negative linear trend (in Appendix 1) and did not show any spikes whatsoever. That related to Yen prices also followed the same trend, though more pronounced, however there was more fluctuations than the former. It spiked to more than 185 Japanese Yen per troy ounce 2-3 times around March 1990. (Around the time of stock market collapse) Chart 4.3 shows the trend of gold prices in terms of Yen.

In general, though, gold price seems to be unaffected by this particular crisis in Japan around that period. This again can be argued to be a point in favour of gold as an investment asset. That is, when stock markets collapsed, major banks failed and economy slowed down, gold did not show any remarkable behaviour and continued with its medium term trend.

Chart 4.3: Gold price in Japanese Yen per troy ounce in relation to Japanese Banking crisis, 1990s in the period 1 January 1989 to 1 January 1998



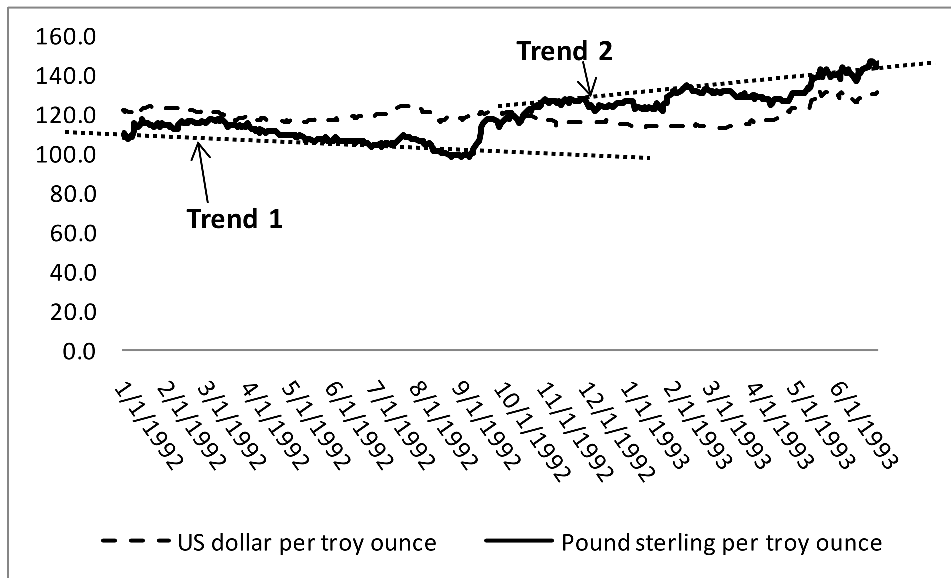
The fourth crisis is the second stock market crisis under consideration. It is called the 'Black Wednesday' dated 16 September 1992 when Britain had to come out of the ERM due to fall in Pound Sterling (GBP). Two things are worth mentioning in this particular context– while Pound tumbled, US dollar may have strengthened given the shift in preferences of investor from Pound to Dollar. As a result, while gold prices in terms of GBP may have risen in response, those in terms of USD may have seen a dip. So gold prices are examined in two currencies, that are, GBP and USD. It was a short-duration crisis in terms of causalities hence gold response is expected from the start of 1992 to the mid of 1993 specifically around 16 September 1992.

The results are interesting. In terms of GBP, there is a shift in trend lines at around 16 September 1992 (marked as a 'star' in the Chart 4.4). The mildly negative linear trend is converted to mildly positive linear trend at around that break point. This is on expected lines.

No significant change was registered in gold prices in terms of USD, though in this period.

Hence it can be taken as the best example so far, to demonstrate that gold prices appreciate in response to stock market crisis.

Chart 4.4: Gold price in USD per troy ounce and GBP per troy ounce in relation to Black Wednesday, 1992 in the period 1 January 1992 to 30 June 1993



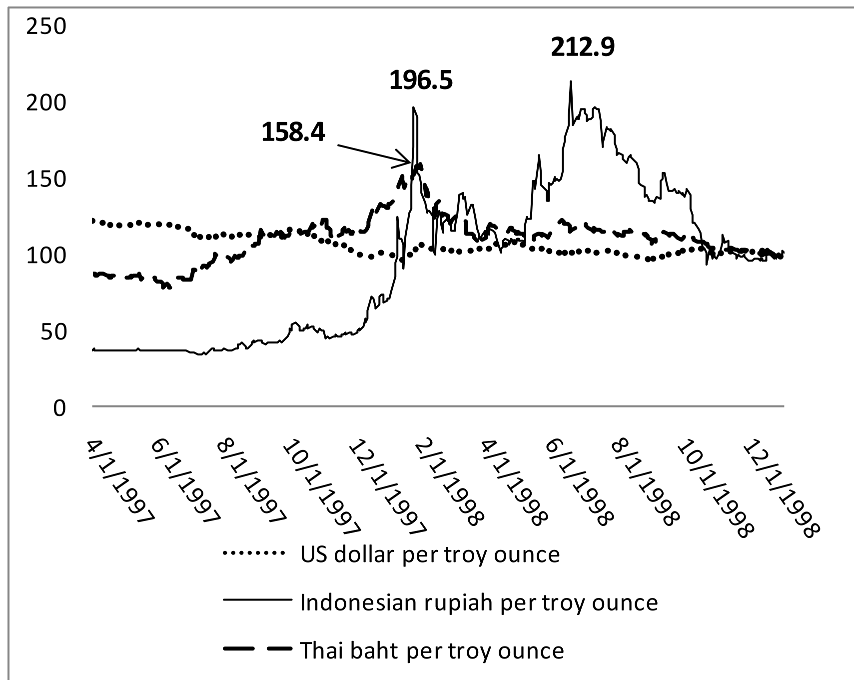
Fifth crisis is related to Asian Financial crisis of 1997. It started as a currency crisis but went on to affect stock markets and other economic activities as well. While it started with East Asian countries on 2nd July 1997, by October of the same year, it had global repercussions. On 27th October, the US Dow Jones index registered the biggest point fall in history as a consequence. Hence the period of impact on gold prices is expected to be from beginning of 1997 to end 1998 with focus on period July-October 1997. The gold prices in currencies of USD, Indonesian Rupiah (which was the worst hit among East Asian countries) and Thailand Baht are expected to have responded to the crisis.

The results show wild fluctuation in gold prices in 1998 in the Indonesian and Thailand currencies. This could be reasonably attributed to the after-effects of the crisis (which lasted across 1998). Specifically, in January 1998, gold prices in terms of both the currencies saw a spike. This could be seen in perspective of sharp fall in rupiah between December 1997 and January 1998 after a temporary boost in response to adjustment programme. This was because as current account of trade improved, capital outflows increased and reserves declined sharply. The

devaluation was mainly seen a result of poor implementation of the programme. (Konac, 2000) For Thailand and some other countries also, the steepest decline in currency was seen in January 1998. (Dua & Sinha, 2007) This could explain the steep rise in gold prices. However, steepest rise of the period was registered in prices in terms of Rupiah (212.9 Rupiah per troy ounce) which can be seen as a culmination of upward trend starting May 1998 up to 17th June 1998. This was the period of political instability in the country when President Suharto had to resign after 30 years in power (21 may 1998) as a result of wide-spread rioting in the country.

Prices in terms of USD however remained stable in the specified period. (Chart 4.5)

Chart 4.5: Gold price in USD, Rupiah and Baht per troy ounce in relation to East Asian Crisis of 1997 in the period 1 April 1997 to end 1998



The sixth and the final crisis considered, is the recent Global recession and economic turmoil (2007 to 2010).

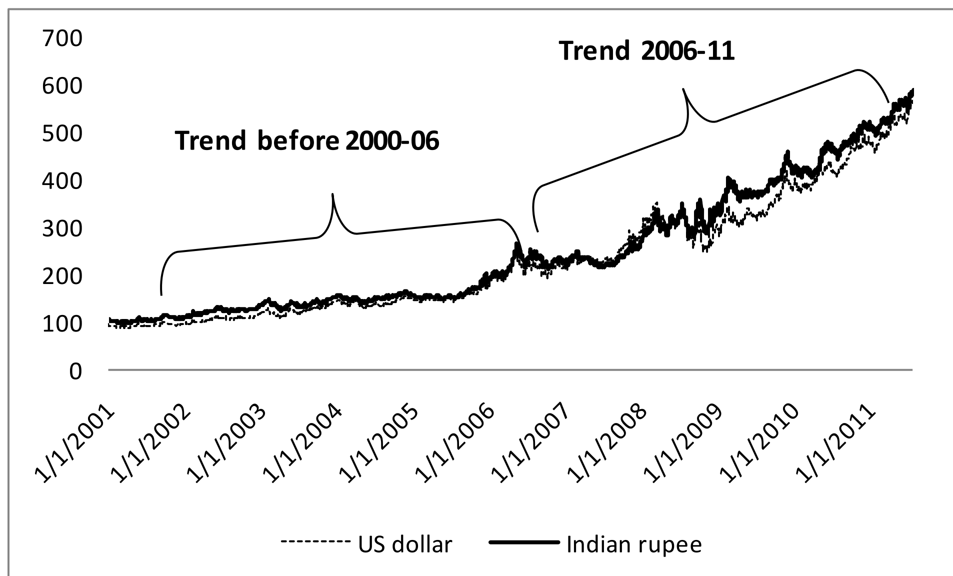
As mentioned in Chapter 3, dates to watch out for possible response of gold prices are 9 August 2007, when BNP Paribus ceased activity in three hedge funds dealing in US mortgage debt, 15 September 2008 when Lehman Brothers was declared bankrupt, 9 May 2010 when Greece government was given international help to maintain solvency and the whole of year 2008-09

when massive fiscal packages were rolled out by several government to prop up domestic and global economies. The study period is from 1 January 2007 onwards.

Since this crisis was of a global magnitude, hence gold prices in all prominent currencies are expected to be affected.

Before moving on to specific scrutiny, it may be seen here that trend of the gold prices has been starkly different in the first half and second half of the previous decade. The prices were showing a gradual increase in terms of USD and INR (country having the highest demand of gold for jewellery and investment) till 2006; however, since then, they have taken a steep upward trajectory. (Chart 4.6(i)) The latter trend can be argued to be mainly fallout of the crisis. This is also supported by calculations made in Table 4.1, ahead.

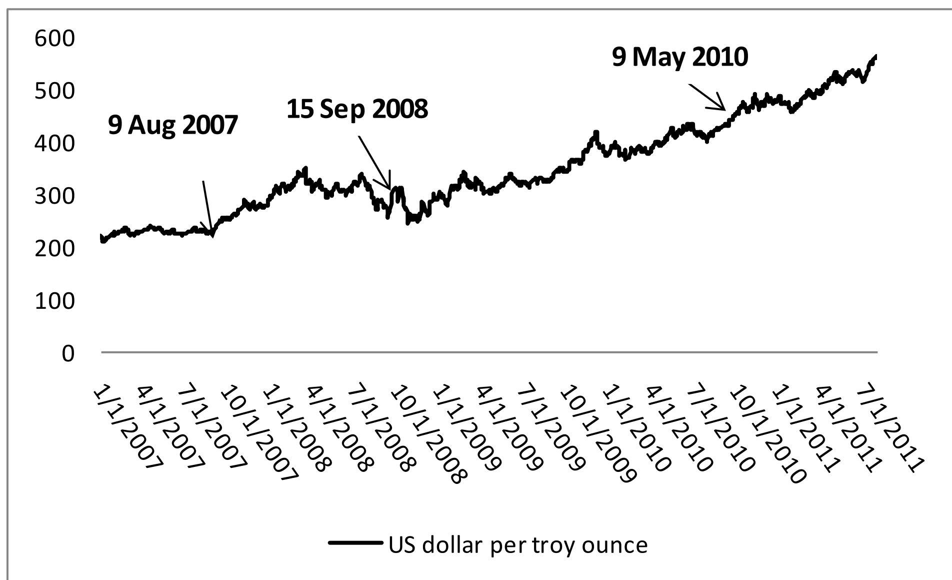
Chart 4.6(i): Trend of Gold prices in USD and INR per troy ounce in the period 2000-11



First gold prices in USD per troy ounce are examined in context of the crisis. Although the entire trend is in synchronization with deepening crisis, specific dates also show relevant responses. As is pointed in Chart 4.6(ii), from 9th August 2007, the upward trend set in. Small peak can also be seen just after 15 September 2008. Further, no specific peaks are observed, though the upward trend is maintained. It may be because after a point, it may have become clear that the crisis is not going to end in a hurry. The upward trend continues up to the present date. In the period 2008-09, however the prices remained stable despite fluctuations. It may be explained in the way

that the period was a 'wait and watch' period when government were making concerted efforts to prop-up economies. When the results were far from satisfactory, gold prices experienced another bout of steep rise.

Chart 4.6(ii) Gold price in USD per troy ounce in relation to Global financial Crisis (2007-2010) in the period 1 January 1997 to present

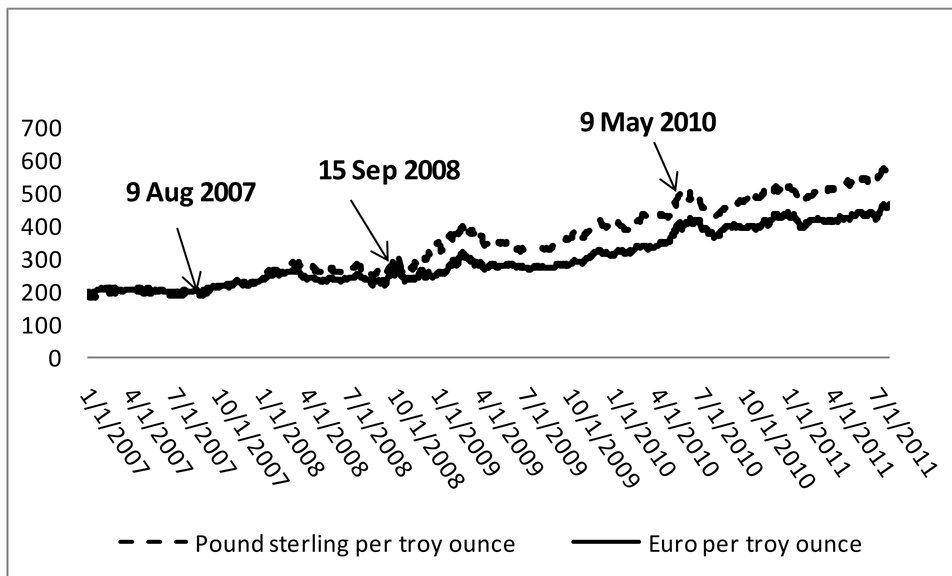


Europe was next to US in terms of bearing the brunt of the crisis. Hence, next gold price in European currencies, Euro and Pound Sterling, are examined vis-a-vis crisis. (Chart 4.6 (iii))

Here again gold price showed a positive trend all through the study period, right since the crisis precipitated on 9th August 2007. However, the response as on 9th May 2010 was starker in case of gold prices in European currencies than in terms of USD. This is on expected lines as around this date, crisis made Europe its second base. Greece was the first country which was given assistance. This was reflected as an appreciation of gold prices.

Hence it can be inferred that gold has shown to respond to a full-blown crisis like the recent one, with a price rise in terms of USD and some European currencies analyzed.

Chart 4.6(iii) Gold price in Euro and Pound Sterling per troy ounce in relation to Global financial Crisis (2007-2010) in the period 1 January 1997 to present



As a summary of results of the overall risk analysis conducted above, it may be inferred with a reasonable level of conviction that gold prices do show upward trend and spikes in response to most economic crises; otherwise they stay unaffected as in the Japanese crisis, 1990s (though the latter inference should be treated with caution) and 'Black Monday' stock market crisis of 1987.

Interestingly, it can be postulated that response of gold prices to economic crises has been higher towards the second half of the study period. However this theory needs more research.

The above inferences support the case of gold being a necessary asset in the investment portfolio as a cushion in times of political and economic uncertainty.

4.2. Returns Analysis

The second aspect that needs to be examined in determining the investment potential of an asset is 'Returns'. 'Returns' of an asset is a function of its prices. As the gold prices are touching new highs, those invested are reaping rich returns. To quantify the variation in prices (mainly increase) over specific periods, this exercise has been conducted.

Gold price in terms of two currencies, USD and INR, are examined for this purpose. The periods for which growth calculations are made are year-on-year, 5 –Yearly, decade-wise, 3-decade wise and the 4 years (31/01/2007 - 30/06/2011, to account for the recent trend as well as impact of recession) Two underlying data-sets have been created – 4-month Moving Average (MA) and 6-month MA of the raw data. The procedure has been discussed in Chapter 3.

The periods and their average rate of growth are given in table 4.1.

Table 4.1: Period-wise growth of gold prices in terms of USD per troy ounce in the period 1979-2011

Year	Year on Year Growth		5 Year Growth		Decade growth		3 Decade Growth		Growth in the past 4 Years (Recession)	
	4 Month MA	6 Month MA	4 Month MA	6 Month MA	4 Month MA	6 Month MA	4 Month MA	6 Month MA	4 Month MA	6 Month MA
1980	152.8%	136.5%								
1981	-14.9%	-15.1%								
1982	-29.9%	-30.2%								
1983	26.8%	28.2%								
1984	-16.0%	-14.5%	60.6%	53.4%						
1985	-19.7%	-18.5%								
1986	11.3%	10.3%								
1987	20.9%	24.9%								
1988	9.5%	5.8%								
1989	-13.7%	-15.1%	2.2%	0.8%	64.1%	54.6%				
1990	1.8%	0.5%								
1991	-7.8%	-5.3%								
1992	-5.3%	-5.6%								
1993	-4.4%	0.0%								
1994	15.0%	11.0%	-2.3%	-0.3%						
1995	-0.1%	0.2%								
1996	4.2%	3.0%								
1997	-12.3%	-12.1%								
1998	-14.8%	-14.4%								
1999	-4.0%	-5.7%	-25.3%	-26.8%	-27.0%	-27.1%				
2000	0.6%	1.8%								
2001	-8.6%	-6.9%								
2002	11.7%	13.6%								
2003	18.0%	15.9%								
2004	17.6%	14.7%	42.5%	43.1%						
2005	5.1%	6.6%								
2006	32.8%	38.3%								
2007	15.7%	11.5%								
2008	40.3%	38.3%								
2009	-2.0%	0.4%	122.1%	128.3%	216.4%	226.7%	278.3%	266.6%		
2010	23.8%	25.9%								
2011	25.7%	25.3%							123.5%	117.3%

It may be mentioned here that Growth rate for Year 1980 for a 4 Month MA would correspond to the period 30/04/1979 to 30/04/1980. Similarly for a 6 Month MA, it would correspond for 30/06/1979 to 30/06/1980. This is because the first four (or six observations) have been averaged leading to observations starting from the fourth (or sixth) month.

The following observations can be made based on above calculations for gold prices in USD.

The high fluctuation in year-on-year growth rates (range from 152.8% to -29.9%) confirms the high volatility inherent in the time series. (Table 4.1) The highest year-on-year growth rates were seen in the year 1980 followed by the high growth rates in the midst of recent recession. The latter has been despite an already high base level reached in the year 2006 (same level as in

1980) indicating the steep trajectory of gold prices followed in this period. The latter argument is also supported by the fact that growth rates in the 4 years of recession have been around 120%.

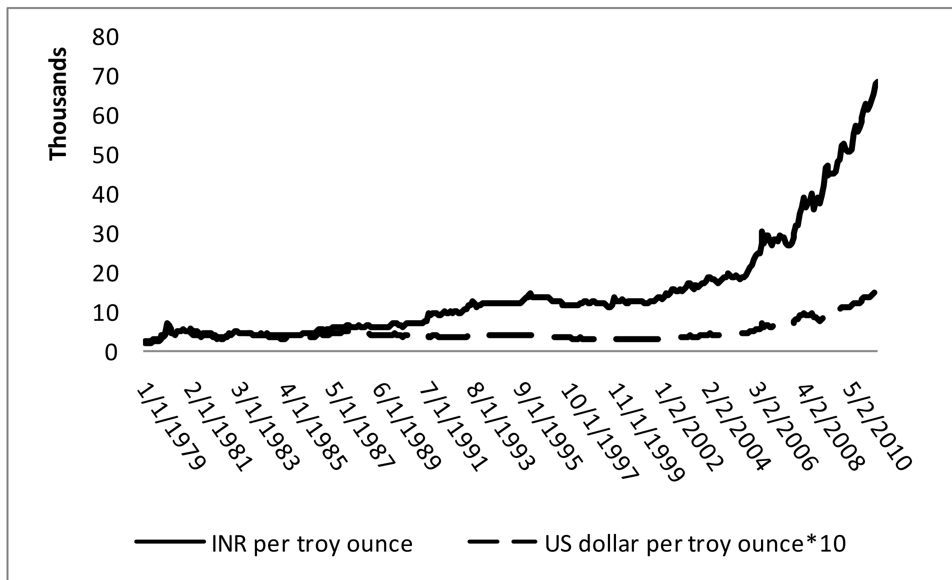
If we look at 5-year periods, the highest growth has been made in the period 2004 - 2009 of more than 120%. This implies that prices in 2009 more than doubled 2004 prices. And this trend has continued till the present date. The actual gold price on 30/06/2011 stood at 1,528 USD per troy ounce which is more than three times of gold price on 30/06/2005 (latter was 430.7 USD per troy ounce). This shows the remarkable appreciation in recent times, adding to the glitter of gold and enhancing its charm as an investment asset. The same is asserted by the decadal growth rate. The period 2000-2009 registered a spectacular growth rate of more than 200 percent or the prices nearly tripled in this period. The period 1990 to 1999 was a period of slow (and mostly negative growth in the gold prices). One reason may be the already high base levels achieved by gold prices in the first half of eighties.

In the three decades (1979 - 2009), the growth rate is a little less than 300% which means prices have nearly quadrupled in this period.

Similar exercise is done for gold prices in INR. As is evident from Chart 4.7, appreciation in gold prices in terms of INR, especially in the recent few years have been more remarkable as compared to in terms of USD.

The general observations in terms of year-on-year growth rate are the same as for gold prices in USD. (Table 4.2) In terms of 5-Year period, all the periods except 1995 – 99 period show high positive rate. Each of the three decades showed spectacular growth contrary to trend in terms of USD. The highest growth was in the last decade similar as in terms of USD.

Chart 4.7: Trend of gold prices as a monthly average between 1979 and mid 2011 in terms of USD as well as INR per troy ounce



The most spectacular growth of all, however, is the one seen across three decades, i.e., more than 2000 percent. Another incredible statistic is that the gold prices have risen from 2248 on 29/6/1979 to 5996 on 30/6/1989 to 11,273 on 30/06/1999 to 45,177 on 30/6/2099. The rise in prices in the last 4 years, however, is as high as in terms of USD.

Seeing at the remarkable trend of price rise in terms of INR, and to a lower extent, in terms of USD, gold has already proved its potential as an investment asset.

It remains to be seen whether gold prices continue to unprecedented upward trend. Seeing the 30 year history, it can be argued that gold prices would continue to rise, although not as remarkably as they did in the last 5 years. This is more so because the globalized world has a higher susceptibility to economic and political uncertainty. In such conditions, gold has shown to play a stabilizing role according to the Risk analysis conducted in section 4.1.

Table 4.2: Period-wise growth of gold prices in terms of INR per troy ounce in the period 1979-2011

Year	Year on Year Growth		5 Year Growth		Decade growth		3 Decade Growth		Growth in the past 4 Years (Recession)	
	4 Month MA	6 Month MA	4 Month MA	6 Month MA	4 Month MA	6 Month MA	4 Month MA	6 Month MA	4 Month MA	6 Month MA
1980	147.7%	130.8%								
1981	-13.4%	-11.9%								
1982	-20.6%	-21.7%								
1983	36.3%	37.5%								
1984	-9.2%	-7.0%	110.8%	103.5%						
1985	-5.5%	-5.6%								
1986	8.1%	8.5%								
1987	26.9%	29.8%								
1988	10.7%	8.8%								
1989	1.7%	0.6%	46.1%	45.4%	207.9%	195.9%				
1990	13.2%	10.2%								
1991	3.2%	8.5%								
1992	34.9%	32.6%								
1993	7.1%	11.6%								
1994	18.5%	13.1%	99.9%	100.2%						
1995	0.1%	0.4%								
1996	16.7%	15.1%								
1997	-10.7%	-10.3%								
1998	-6.6%	-4.5%								
1999	3.8%	0.7%	1.3%	-0.5%	102.5%	99.2%				
2000	3.1%	4.6%								
2001	-2.3%	-0.8%								
2002	16.6%	18.5%								
2003	15.6%	12.7%								
2004	10.7%	8.9%	50.3%	50.9%						
2005	2.3%	3.3%								
2006	35.2%	42.3%								
2007	13.5%	6.0%								
2008	28.3%	32.1%								
2009	22.7%	21.6%	147.0%	150.2%	271.2%	277.6%	2261.4%	2145.4%		
2010	12.9%	16.9%								
2011	24.3%	23.1%							138.8%	135.7%

Hence the hypothesis that "either the gold prices will remain unaffected or will actually see a positive spike" in the face of economic crisis is supported by the Risk analysis. This fulfils the first objective. The second objective was to quantify gold price variations to draw inferences about investment potential of gold which has been done by the Returns analysis. Hence the aim of conducting this dissertation has been achieved.

Chapter 5 - Conclusion

Gold has multiple roles to play in the present-day economy. Investment is one of the most relevant roles. Gold is considered a better investment asset as compared to both commodities and risky assets like equities. This can be defended given its traditionally low correlation with other assets like equities, real estate etc. which in turn, can be due to lower sensitivities to factors like industrial demand. Another factor that goes in its favour is its high liquidity. Also in events of political or economic collapse, while other assets risk freeze or devaluation, gold can be redeemed fully.

In terms of returns also which is a function of prices, it has been showing a near consistent upward trend of the latter, particularly in the last decade or so.

Factors affecting its prices mainly constitute its demand, market sentiments and macroeconomic factors like inflation and interest rates, currency fluctuation, Central bank demand and weakness in financial markets.

All the above factors may constitute elements of an economic crisis, individually or collectively. Hence it can be interesting to examine the response of gold prices to economic crises. Gold is considered one of the most resilient of all assets in these times. This is explored in a focussed way in the current study. Also returns analysis is conducted.

The aim is to explore the investment potential of gold. Specifically, objectives are – Firstly, to explore the link between gold prices and economic crises which hit the world in the late 20th and 21st century till now and secondly, to quantify gold price variations in the study period.

Two-pronged approach has been used to scrutinize the investment potential of gold – First is related to 'risk' and second to 'returns'. In the first approach, highs, lows and general trends around the crisis period are scrutinized vis-a-vis individual crisis. With respect to the latter, price appreciation or depreciation is calculated over specific periods - Yearly, 5-Year, Decade, 3 decades and last four years (2007 – 2011). Data on gold prices have been sourced from World Gold council website. Currencies considered are US dollar, Great Britain Pound Sterling, Canadian Dollar, Indian Rupee, Japanese Yen, Indonesian Rupiah, and Thai Baht. The data on

gold prices is available for the period between 29th December 1978 and 29th July 2011, only the relevant period of which is used for Risk analysis. For returns analysis, data on monthly average of prices between the period 31/01/1979 to 30/06/2011 have been used.

Firstly, the risk analysis is conducted. The first crisis considered is the Latin American Debt crisis of the 1980s. The gold prices in terms of USD have been examined. It can be said that gold prices did see a rise; albeit small, in the face of this particular crisis. However, the impact at best can be described 'fleeting' because the prices did not sustain at that level.

The second crisis is the 'Black Monday' witnessed by US stock markets between October 14 and October 19, 1987. Gold prices remained nearly unaffected by this crash and the trends in both USD and Canadian Dollar remained stable except for a small spike in prices in terms of USD on 19 October 1987. This reveals that gold prices may react but not significantly and every time, in response to stock market crash.

The third crisis is the Japanese Banking crisis of the 1990s. In general, gold prices in terms of both USD and Japanese Yen seemed to be unaffected by this particular crisis in Japan around that period.

The fourth crisis is the 'Black Wednesday' dated 16 September 1992 when Britain had to come out of the ERM due to fall in Pound Sterling (GBP). Gold prices did show a marked appreciation in terms of Pound Sterling in response to the crisis while remaining stable in terms of USD.

Fifth crisis is Asian Financial crisis of 1997. The graphs showed wild fluctuation in gold prices in 1998 in the Indonesian and Thailand currencies confirming an appreciation in gold prices in response to currency (followed by general) crisis.

The sixth and the final crisis considered, is the recent Global recession and economic turmoil (2007 to 2010). The prices showed a steep increase in terms of USD and INR in the recession period which can be argued to be fallout of the crisis. Also response of gold prices on crucial dates of the crisis could also be noticed.

Hence as a response to two full-blown crises and one stock market crises, gold prices appreciated. In case of the rest, gold prices remained unaffected. In either case, it could be argued as a case for gold as a stabilizing inclusion in investment portfolio.

Second analysis is related to 'Returns'. Here variations in prices in terms of USD and INR have been quantified. In terms of USD, the main findings are high fluctuation in year-on-year growth rates; highest year-on-year growth rates being in the year 1980 followed by the high growth rates in the midst of recent recession; growth rates in the 4 years of recession being around 120%; highest growth being in 5 yearly period, 2004 – 2009, the decade 2000-2009 registering a spectacular growth rate of more than 200 percent, and prices quadrupling in the three decades (1979 – 2009).

In terms of INR, except for the period 1995-99, the entire 30 year period has seen high positive growth. The most remarkable growth however is in the recession period 2007-11.

The growth in prices has been unprecedented. However, it can be argued that the trend will continue.

The overall analysis satisfies the two objectives. Also, on both counts of risk and returns, gold has emerged as an attractive investment asset.

Directions for further research

The focus of the study has been novel. However, the analysis could have been made econometrically more rigorous**.** Advanced regressions including economic crisis as the 'Break point' can be conducted to capture their impact on gold prices.

Rigorous scenario testing and simulations is another technique of gauging responses to specific macroeconomic/geo-political conditions.

Also there is scope of making price growth calculations more representative of the trend.