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# CONTENTS

Sr. No.	TITLE & NAME OF THE AUTHOR (S)	Page No.
1.	THE IMPACT OF PLANNING AND CONTROL ON SERVICE SMES SUCCESS GAD VITNER & SIBYLLE HEILBRUNN	1
2.	CHALLENGES FOR SMALL AND MEDIUM ENTERPRISES IN INFORMATION TECHNOLOGY IN THE CITY OF BANGALORE, INDIA SULAKSHA NAYAK & DR. HARISHA G. JOSHI	9
3.	ROLE OF MANAGEMENT INFORMATION SYSTEMS IN MANAGERIAL DECISION MAKING OF ORGANIZATIONS IN THE GLOBAL BUSINESS WORLD MD. ZAHIR UDDIN ARIF, MOHAMMAD MIZENUR RAHAMAN & MD. NASIR UDDIN	14
4.	EFFECTS OF CALL CENTER CRM PRACTICES ON EMPLOYEE JOB SATISFACTION DR. ALIYU OLAYEMI ABDULLATEEF	19
5.	DETERMINANTS OF CAPITAL STRUCTURE: EVIDENCE FROM TANZANIA'S LISTED NON FINANCIAL COMPANIES BUNDALA, NTOGWA NG'HABI & DR. CLIFFORD G. MACHOGU	24
6.	RELATIONSHIP BETWEEN INTRINSIC REWARDS AND JOB SATISFACTION: A COMPARATIVE STUDY OF PUBLIC AND PRIVATE ORGANIZATION TAUSIF M.	33
7.	NUCLEAR ENERGY IN INDIA: A COMPULSION FOR THE FUTURE DR. KAMLESH KUMAR DUBEY & SUBODH PANDE	42
8.	CONTEXTUAL FACTORS FOR EFFECTIVE IMPLEMENTATION OF PERFORMANCE APPRAISAL IN THE INDIAN IT SECTOR: AN EMPIRICAL STUDY SUJOYA RAY MOULIK & DR. SITANATH MAZUMDAR	47
9.	A STUDY OF CITIZEN CENTRIC SERVICE DELIVERY THROUGH e-GOVERNANCE: CASE STUDY OF e-MITRA IN JAIPUR DISTRICT RAKESH SINGHAL & DR. JAGDISH PRASAD	53
10.	TWO UNIT COLD STANDBY PRIORITY SYSTEM WITH FAULT DETECTION AND PROVISION OF REST VIKAS SHARMA, J P SINGH JOOREL, RAKESH CHIB & ANKUSH BHARTI	61
11.	MACRO ECONOMIC FACTORS INFLUENCING THE COMMODITY MARKET WITH SPECIAL REFERENCE TO GOLD AND SILVER DR. G. PANDURANGAN, R. MAGENDIRAN, L. S. SRIDHAR & R. RAJKOKILA	68
12.	CRITICAL ANALYSIS OF EXPONENTIAL SMOOTHING METHODS FOR FORECASTING UDAI BHAN TRIVEDI	71
13.	COMPARATIVE STUDY ON RETAIL LIABILITIES, PRODUCTS & SERVICES OF DISTRICT CENTRAL CO-OPERATIVE BANK & AXIS BANK ABHINAV JOG & ZOHRA ZABEEN SABUNWALA	75
14.	SECURE KEY EXCHANGE WITH RANDOM CHALLENGE RESPONSES IN CLOUD BINU V. P & DR. SREEKUMAR A	81
15.	COMPUTATIONAL TRACKING AND MONITORING FOR EFFICIENCY ENHANCEMENT OF SOLAR BASED REFRIGERATION V. SATHYA MOORTHY, P.A. BALAJI, K. VENKAT & G.GOPU	84
16.	FINANCIAL ANALYSIS OF OIL AND PETROLEUM INDUSTRY DR. ASHA SHARMA	90
17.	ANOVA BETWEEN THE STATEMENT REGARDING THE MOBILE BANKING FACILITY AND TYPE OF MOBILE PHONE OWNED: A STUDY WITH REFERENCE TO TENKASI AT VIRUDHUNAGAR DISTRICT DR. S. VALLI DEVA SENA	98
18.	VIDEO REGISTRATION BY INTEGRATION OF IMAGE MOTIONS V.FRANCIS DENSIL RAJ & S.SANJEEVE KUMAR	103
19.	ANALYZING THE TRADITIONAL INDUCTION FORMAT AND RE – DESIGNING INDUCTION PROCESS AT TATA CHEMICALS LTD, MITHAPUR PARUL BHATI	112
20.	THE JOURNEY OF E-FILING OF INCOME TAX RETURNS IN INDIA MEENU GUPTA	118
21.	ROLE OF FINANCIAL TECHNOLOGY IN ERADICATION OF FINANCIAL EXCLUSION DR. SARIKA SRIVASTAVA & ANUPAMA AMBUJAKSHAN	122
22.	ATTRITION: THE BIGGEST PROBLEM IN INDIAN IT INDUSTRIES VIDYA SUNIL KADAM	126
23.	INFORMATION TECHNOLOGY IN KNOWLEDGE MANAGEMENT M. SREEDEVI	132
24.	A STUDY OF EMPLOYEE ENGAGEMENT & EMPLOYEE CONNECTS' TO GAIN SUSTAINABLE COMPETITIVE ADVANTAGE IN GLOBALIZED ERA NEERU RAGHAV	136
25.	BIG-BOX RETAIL STORE IN INDIA – A CASE STUDY APPROACH WITH WALMART M. P. SUGANYA & DR. R. SHANTHI	142
26.	IMPACT OF INFORMATION TECHNOLOGY ON ORGANISATIONAL CULTURE OF STATE BANK OF INDIA AND ITS ASSOCIATED BANKS IN SRIGANGANAGAR AND HANUMANGARH DISTRICTS OF RAJASTHAN MOHITA	146
27.	USER PERCEPTION TOWARDS WEB, TELEVISION AND RADIO AS ADVERTISING MEDIA: COMPARATIVE STUDY SINDU KOPPA & SHAKEEL AHAMED	149
28.	STUDY OF GROWTH, INSTABILITY AND SUPPLY RESPONSE OF COMMERCIAL CROPS IN PUNJAB: AN ECONOMETRIC ANALYSIS SUMAN PARMAR	156
29.	DEVELOPMENT AND EMPIRICAL VALIDATION OF A LINEAR STYLE PROGRAM ON 'STRUCTURE OF THE CELL' FOR IX GRADE STUDENTS RAMANJEET KAUR	160
30.	PERFORMANCE APPRAISAL OF INDIAN BANKING SECTOR: A COMPARATIVE STUDY OF SELECTED PUBLIC AND FOREIGN BANKS SAHILA CHAUDHRY	163
	REQUEST FOR FEEDBACK	173

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# MACRO ECONOMIC FACTORS INFLUENCING THE COMMODITY MARKET WITH SPECIAL REFERENCE TO GOLD AND SILVER

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## ABSTRACT

*In this paper, we have made an attempt to predict precious metals market, how it is influenced by the macro economic factors. In order to perform our analysis we extract the necessary information from the secondary source. The data for the study consist of 3 months futures prices and spot prices: Gold - 10<sup>th</sup> January, 2007 to 31<sup>st</sup> March, 2009 comprising 581 observations and Silver – 14<sup>th</sup> July, 2008 to 24<sup>th</sup> March, 2010 comprising 229 observations. We have identified few macro economic factors and tested its influence on the gold and silver prices. We found that the interest rate is important factors to determine the prices of both gold and silver price.*

## KEYWORDS

Commodity market, and macroeconomic factor influences

## INTRODUCTION

Movements in commodity prices are important for the welfare of both developing and developed countries. Perfect market models presume that all investors are equally endowed with knowledge and ability to analyze the available information. Generally investors interested on acquiring particular information and they are not interest rest of it. Another relevant feature of commodity prices is their tendency to co-movements. Understanding such co-movement is important, because of the welfare implications for both commodity importers and exporters. Considering the information exchange and price discovery roles of the futures market, many theoretical as well as empirical attempts have been made and the regulatory bodies, market makers, academicians and practitioners unanimously have agreed upon the common notion that organized futures markets contain significant information for the prospective cash market price.

## REVIEW OF LITERATURE

Earlier research focused on the historical movements of primary commodity prices relative to the price of manufactured goods in the examination of the Prebisch (1950) and Singer (1950) hypothesis, as recently re-examined by Harvey et al. (2010). Attention has also focused on commodity prices on time series properties Cuddington (1992), Deaton(1999), and Cashin, et al.,(2000) changes. Beck (1993), based upon Muths (1961) model of commodity prices with rational expectations, suggests that commodity prices may exhibit conditional heteroskedasticity. Later the researchers made attempt on economic factors determinants of commodity prices. Frankel (2008) and Calvo (2008) have discussed the role of the real interest rate; Wolf (2008) and Svensson (2008) have mentioned the importance of shifts in global supply and demand. Further, Krugman (2008) has argued that the increase in oil prices, providing an incentive to produce biofuels, is responsible for the increase in commodity prices. Akram (2009), for example, uses structural VAR models of quarterly data from 1990 to 2007 to separately look at the impact of real interest rates changes on the real price of crude oil, industrial raw materials, food and metals. Vansteenkiste (2009) has found a dynamic principal component from a large set of monthly commodity prices for the recent period and tests its potential determinants using regressions. She found that co-movement was highest in the 1970s and 1980s, declined in the 1990s and has recovered somewhat during the early years of this century.

## DATA AND METHODOLOGY

This study attempt is a descriptive research one. Data were collected in secondary sources. The data for the study consist of 3 months futures prices and spot prices: Gold - 10<sup>th</sup> January, 2007 to 31<sup>st</sup> March, 2009 comprising 581 observations and Silver – 14<sup>th</sup> July, 2008 to 24<sup>th</sup> March, 2010 comprising 229 observations. All the times series are obtained from NCDEX (National Commodities and Derivatives Exchange) database. Most of the investors prefer to invest in Bullion market not only because it is a safe investment but also it hedges against inflation and political uncertainties and it is easy to liquidate. The macro economic

factors data were obtained from Reserve Bank of India (RBI) official bulletin and official website. Series of data, the regression which was used as a tool to estimate in measuring the influence of various sets of macroeconomic factors that affect the price of gold and silver market. There is one standard model followed by other models, checking for robustness of the results. The table captures the regression estimates for inflation rate, United States (US) dollar exchange, and crude oil price, and Interest rate.

Before constructing the model, important to check if there is any multi-collinearity and for this the Variance Inflation Factor is found.

The Variance Inflation Factor (VIF) measures the impact of collinearity among the variables in a regression model. The Variance Inflation Factor (VIF) is 1 Tolerance, it is always greater than or equal to 1. There is no formal VIF value for determining presence of multi-collinearity. Values of VIF that exceed 10 are often regarded as indicating multi collinearity, but in weaker models values above 2.5 may be a cause for concern. In many statistics programs, the results are shown both as an individual  $R^2$  value (distinct from the overall  $R^2$  of the model) and a Variance Inflation Factor (VIF). When those  $R^2$  and VIF values are high for any of the variables in your model, multicollinearity is probably an issue. When VIF is high there is high multicollinearity

## RESEARCH QUESTIONS AND CONTRIBUTION

- Whether identify macroeconomic factors influence on the price of precious metals?

Many studies first examine this relationship on the basis of price or return. This Study focuses on the model setting for commodity market. This will implicate to make better understanding commodity market in long term aspect.

## RESULTS AND DISCUSSION

### Gold Market (Ref. Table no.01 and 02)

Comparing the R-squared values, in Model 1 is found that when all the four factors, namely Inflation Rate, Dollar Exchange, Crude Oil and Interest Rate are included the value is high; this shows the model is fit. Also, In Model 2, when Interest rate was excluded in building the model, the R-squared values is getting down. Interest rate is the predominantly affect in commodity price determinants gold market. When the inflation rate and US Dollar exchange rate were excluded in the model (Model 4 and Model 5 respectively), does not have much impact. The variables which was selected falls between values 1 to 3 in Variance Inflation Factor (VIF), generally accepted levels in VIF is maximum value of 5. Therefore the model is not having any multicollinearity problem.

### Silver Market (Ref. Table. No. 03 and 04)

Comparing to all other models, Model 1 has the high amount of R Squared values (0.84), this shows the model is fit. Also, when Interest rate was excluded in building the model, it is found that the value of R-square (0.48) is low. And hence we conclude that Interest rate is the major factor. Remaining factors does not have much impact towards price determinants in silver market

## CONCLUSION

Few macroeconomic factors were identified and tested its influence on the gold and silver prices. Interest rate is important factors to determine the prices of both gold and silver. Further research on other commodities will bring the best model, and it will give the better direction both investors and policy makers.

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## TABLES

TABLE NO. 1: MACRO ECONOMIC FACTORS INFLUENCING THE COMMODITY MARKET (GOLD)

VARIABLE	MODEL 1	MODEL 2	MODEL 3	MODEL 4	MODEL 5
Constant	4638.99 (3540.31)	-9719.57 (4464.86)	13722.9 (4237.42)	14097.6 (1589.98)	2965.42 (3793.98)
Inflation Rate	262.907 (99.6000)	555.677 (140.677)	480.123 (124.067)	417.825 (93.6981)	-
Dollar Exchange	204.836 (70.1316)	341.458 (105.101)	4.58482 (80.8895)	-	303.421 (64.6583)
Crude Oil	38.8951 (7.27678)	29.1039 (11.1519)	-	27.5413 (6.83709)	46.7322 (7.23652)
Interest Rate	-1282.66 (186.781)	-	-1087.04 (249.903)	-1437.42 (199.071)	-1493.70 (183.872)
R-squared	0.909051	0.770696	0.825230	0.884023	0.888608
Adjusted R-squared	0.897315	0.749199	0.808846	0.873150	0.878166
Prob (F-statistic)	1.10e-15	2.39e-10	3.20e-12	4.67e-15	2.46e-15



TABLE NO.2::VARIANCE INFLATION FACTOR (GOLD)

VARIABLE	MODEL 1	MODEL 2	MODEL 3	MODEL 4	MODEL 5
Inflation Rate	2.975	2.430	2.480	2.131	-
Dollar Exchange	3.774	3.470	2.697	-	2.704
Crude Oil	1.794	1.725	-	1.282	1.495
Interest Rate	2.755	-	2.649	2.533	2.250

TABLE NO. 3: MACRO ECONOMIC FACTORS INFLUENCING THE COMMODITY MARKET (SILVER)

VARIABLE	MODEL 1	MODEL 2	MODEL 3	MODEL 4	MODEL 5
Constant	30972.5 (35971.8)	38003.7 (64803.2)	49259.6 (33609.0)	21536.5 (3555.67)	61654.1 (27498.1)
Inflation Rate	517.761 (405.921)	442.842 (731.324)	611.326 (408.519)	585.529 (300.648)	-
Dollar Exchange	-174.606 (662.069)	-540.247 (1186.51)	-490.749 (625.883)	-	-709.197 (526.925)
Crude Oil	59.6991 (48.1144)	93.4729 (85.9085)	-	64.5824 (42.4890)	71.1001 (48.6055)
Interest Rate	-2431.90 (479.222)	-	-2514.15 (486.115)	-2445.65 (455.783)	-2409.67 (492.364)
R-squared	0.844700	0.444765	0.820791	0.843620	0.819433
Adjusted R-squared	0.782580	0.293338	0.771916	0.800971	0.770188
Prob (F-statistic)	0.000472	0.008061	0.000203	0.000097	0.000212

TABLE NO. 4: VARIANCE INFLATION FACTOR (SILVER)

VARIABLE	MODEL 1	MODEL 2	MODEL 3	MODEL 4	MODEL 5
Inflation Rate	2.726	2.723	2.632	1.634	-
Dollar Exchange	3.190	3.152	2.717	-	1.911
Crude Oil	1.991	1.953	-	1.696	1.922
Interest Rate	1.099	-	1.078	1.086	1.097

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