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Study of movement of gold price rates in terms of USD and INR

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ABSTRACT

For many centuries now, gold is preferred as the one of the major investment options especially by the Indian investors. The prices of the gold are increasing and the price of the gold is affected by multiple various factors like exchange rate of US dollar with INR, Crude oil prices, repo rate and inflation rate. This paper is mainly focused on the factors like exchange rate of US dollar with INR. Each of the factors is studied with the gold prices. The relationship between the factors and the gold prices is emphasized in this paper. There exists an inverse relation between the USD and gold prices. In other words, when the value of the dollar increases relative to other currencies around the world, the prices of gold tends to fall in terms of dollar. This is because gold becomes more expensive in other currencies. As the price of a given commodity like gold moves higher, demand of that commodity recedes.

Keywords— Gold Price Rates, USD, INR

1. INTRODUCTION

Tracking gold price movement in terms of USD and INR is a simple but intuitive way to understand the comparative position of our economy. These are dynamic rates and change every day. Though Indians are not the largest producer of gold, we are habituated to save by possessing and investing in gold. It is a really big question whether we should be worried about big import of gold which adds to our otherwise large import deficit and continuous devaluation against USD or we should feel happy that saving or possession of gold provides a real shield to saving oriented Indian families whose savings in fixed deposits are otherwise being devalued against USD and other international currencies.

2. OBJECTIVES

- To understand and analyze the relationship between USD INR price movement with gold prices in India.
- To study the movement of price rates that will help in comparing the actual gold INR growth rate with the ideal gold INR growth rate.
- To study what grew more during the study period, USD or gold price.

3. DATA ANALYSIS

3.1 Descriptive statistics

USD INR	
Mean	66.85334
Standard Error	0.078943
Median	66.75
Mode	64.86
Standard Deviation	2.787703
Sample Variance	7.771286
Kurtosis	-0.51336
Skewness	0.381801
Range	12.982
Minimum	61.358
Maximum	74.34
Sum	83366.12
Count	1247

Interpretation of USD INR: The mean of the data is 66.85. The median of the data is 66.75. The mode of the data is 64.86. Minimum value of data is 61.35. Maximum value of data is 74.34. Sum of data is 83366.12. Count of data is 1247. Data is platykurtic. Data is positively skewed.

<i>Gold USD per troy ounce</i>	
Mean	1255.456
Standard Error	2.545688
Median	1257.2
Mode	1131.35
Standard Deviation	89.89558
Sample Variance	8081.216
Kurtosis	1.066792
Skewness	0.452654
Range	496.7
Minimum	1049.4
Maximum	1546.1
Sum	1565554
Count	1247

Interpretation of gold USD per troy ounce: The mean of the data is 1255.456. The median of the data is 1257.2. The mode of the data is 1131.35. Minimum value of data is 1049.4. Maximum value of data is 1546.1. Sum of data is 1565554. Count of data is 1247. Data is leptokurtic. Data is positively skewed.

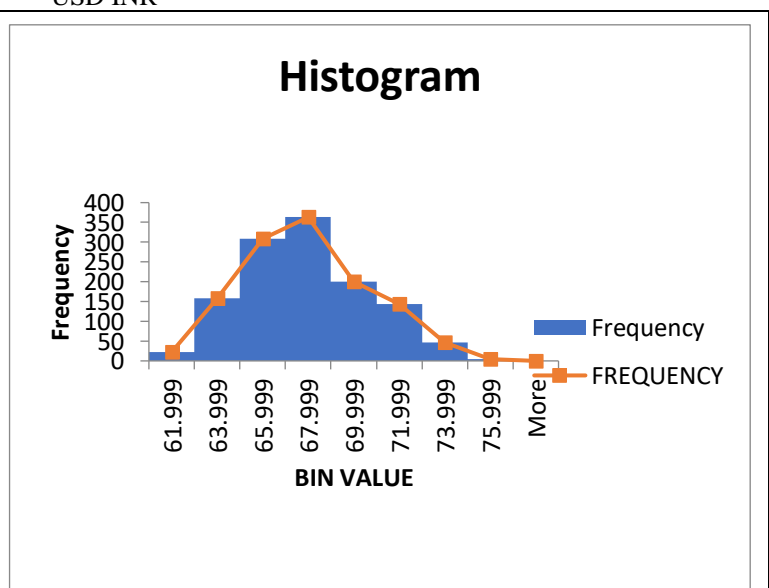
<i>Gold INR per troy ounce</i>	
Mean	84023.12792
Standard Error	221.4875011
Median	83649.49
Mode	70734.17
Standard Deviation	7821.363136
Sample Variance	61173721.31
Kurtosis	1.427653463
Skewness	0.810020733
Range	42339.33
Minimum	69171.19
Maximum	111510.52
Sum	104776840.5
Count	1247

Interpretation of gold INR per troy ounce: The mean of data is 84023.12792. Median of the data is 83649.49. Mode of the data is 70734.17. Minimum value of data is 69171.19. Maximum value of data is 111510.5. Sum of data is 104776840.52. Data is leptokurtic. Data is positively skewed.

3.2 Histogram

USD INR

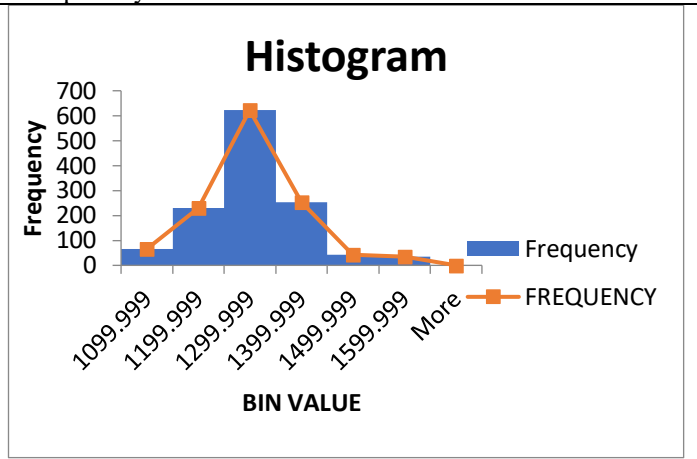
Class intervals	Bin value
60-62	61.999
62-64	63.999
64-66	65.999
66-68	67.999
68-70	69.999
70-72	71.999
72-74	73.999
74-76	75.999
Bin value	Frequency
61.999	22
63.999	159
65.999	308
67.999	363
69.999	201
71.999	143
73.999	47
75.999	4
More	0



The highest frequency is 363 in class 66-68.

Gold USD per troy ounce

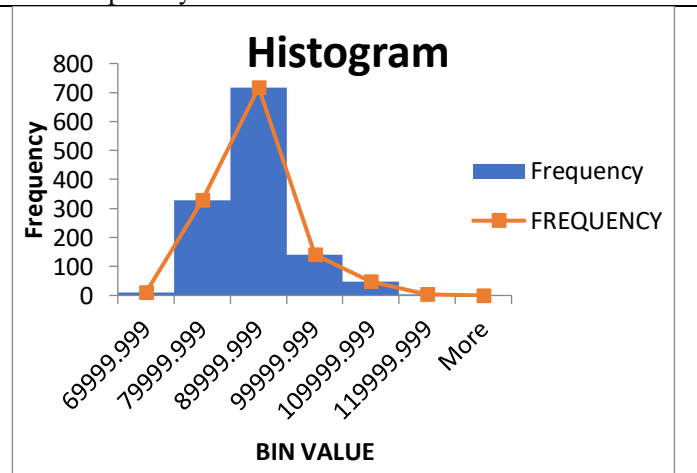
Class Intervals	Bin Value
1000-1100	1099.999
1100-1200	1199.999
1200-1300	1299.999
1300-1400	1399.999
1400-1500	1499.999
1500-1600	1599.999
Bin value	Frequency
1099.999	65
1199.999	230
1299.999	622
1399.999	254
1499.999	42
1599.999	34
More	0



The highest frequency is 622 in class 1200-1300.

Gold INR per troy ounce

Class intervals	Bin value
60000-70000	69999.999
70000-80000	79999.999
80000-90000	89999.999
90000-100000	99999.999
100000-110000	109999.999
110000-120000	119999.999
Bin value	Frequency
69999.999	11
79999.999	328
89999.999	717
99999.999	140
109999.999	47
119999.999	4
More	0



The highest frequency is 717 in class 80000-90000.

4. CORRELATION

USD INR and Gold INR per troy ounce

	USD INR	Gold INR per troy ounce
USD INR	1	
Gold INR per troy ounce	0.658715	1

Interpretation: The correlation between USD INR and Gold INR per troy ounce is 0.658715. There is a positive correlation between USD INR and GOLD INR.

Gold USD per troy ounce and Gold INR per troy ounce

	Gold USD per troy ounce	Gold INR per troy ounce
Gold USD per troy ounce	1	
Gold INR per troy ounce	0.901516	1

Interpretation: The correlation between Gold USD per troy ounce and Gold INR per troy ounce is 0.901516. There is a positive relation between Gold USD and Gold INR.

5. REGRESSION

USD INR and Gold INR per troy ounce

Regression Statistics	
Multiple R	0.658715447
R Square	0.43390604
Adjusted R Square	0.433451346
Standard Error	5887.095163
Observations	1247

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-39530.92044	4003.092816	-9.87509	3.4E-22	-47384.47313	-31677.4	-47384.47313	-31677.36775
USD INR	1848.135671	59.82677416	30.89145	5.1E-156	1730.763243	1965.508	1730.763243	1965.508099

The regression equation is $Y = -39530.92044 + 1848.135671 X$

Gold USD per troy ounce and Gold INR per troy ounce

Regression Statistics	
Multiple R	0.901516272
R Square	0.812731588
Adjusted R Square	0.812581171
Standard Error	3386.016419
Observations	1247

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-14450.35604	1343.083239	-10.7591	7.08E-26	-17085.31243	-11815.39966	-17085.31243	-11815.39966
Gold USD per troy ounce	78.4364019	1.067066982	73.50654	0	76.34295387	80.52984993	76.34295387	80.52984993

The regression equation is $Y = -14450.35604 + 78.436 X$

6. CONCLUSION

PERIODIC FINDING		
USD INR	GOLD USD	GOLD INR
0.11947	0.226493	0.380065
12%	23%	38%

- This gives the change in the rates from 01-01-2015 to 11-10-2019.
- Now the addition of USD INR and GOLD USD rates is $12+23= 35\%$.
- So ideally the rate increase in GOLD INR should be equal to 35% as the value of gold should be the same in the international market. For example, if 1-gram gold is \$1 in US, it has to be Rs.70 in India, assuming the current rate to be \$1= Rs.70.
- But in this case, we observe that the rate increase in GOLD INR is up to 38%, which is much higher than the equated 35%.
- Thereby it complies that while there is complete dependency on USD and INR price of gold, other independent variables like USD INR price also has an impact.
- The unreconciled difference in impact could be due to Taxes or Indian Speculation in price.

7. REFERENCES

- [1] <https://in.investing.com/currencies/usd-inr-historical-data>
 [2] <https://freefincal.com/gold-price-movement-usd-vs-inr/>

APPENDIX

The data collected is secondary data and is sourced from investing.com. The link for the same is attached in *References*. A screenshot of the data set is attached below.

	A	B	C	D	E	F
1	DATE	USD INR	Gold usd per troy ounce	Gold inr per troy ounce		
2	01-01-2015	63.355	1,206.0	76,125.7		
3	02-01-2015	63.285	1,172.0	74,187.6		
4	05-01-2015	63.345	1,200.0	76,014.0		
5	06-01-2015	63.575	1,210.3	76,996.1		
6	07-01-2015	63.28	1,210.5	76,570.2		
7	08-01-2015	62.675	1,215.5	76,260.5		
8	09-01-2015	62.355	1,217.8	75,969.3		
9	12-01-2015	62.075	1,226.5	76,331.2		
10	13-01-2015	61.98	1,231.5	76,519.3		
11	14-01-2015	62.095	1,235.0	76,786.1		