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Bitcoin Prices (Statistical Analysis)

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ABSTRACT

In this paper with the help of mathematical tools, I will analyse how Bitcoin prices have fared over the span of 3 years from January 2017 to December 2019. The tools will help to forecast future value of bitcoin but the values forecasted do not consider any external factors just makes an estimate according to the previous values. We will also use times series tools like moving averages to find a general trend of the prices of bitcoin.

Keywords— Bitcoin

1. INTRODUCTION

Bitcoin is currency which is in digital form created on January 2009. Bitcoin helps in transactions because it offers low transaction fees compared to other online payment platforms. Bitcoin is a decentralized network and does not come under the control of government or any other authorities.

“Bitcoin is a type of crypto currency. Balances of Bitcoin tokens are kept using public and private "keys," which are long strings of numbers and letters linked through the mathematical encryption algorithm that was used to create them. The public key (comparable to a bank account number) serves as the address which is published to the world and to which others may send bitcoins. The private key (comparable to an ATM PIN) is meant to be a guarded secret and only used to authorize Bitcoin transmissions.

Bitcoin keys should not be confused with a Bitcoin wallet, which is a physical or digital device which facilitates the trading of Bitcoin and allows users to track ownership of coins. The term "wallet" is a bit misleading, as Bitcoin's decentralized nature means that it is never stored "in" a wallet, but rather decentrally on a blockchain.” - *investopedia.com*

2. DATA

Table 1: Data

Month	Date	Price (Y)	5 Monthly Moving Average	X= Month- 18.5	Trend Line
1	Jan-17	\$965.50		-17.5	\$3,715.57
2	Feb-17	\$1,189.30		-16.5	\$3,861.52
3	Mar-17	\$1,079.10	\$1,377.82	-15.5	\$4,007.46
4	Apr-17	\$1,351.90	\$1,680.84	-14.5	\$4,153.40
5	May-17	\$2,303.30	\$2,019.64	-13.5	\$4,299.34
6	Jun-17	\$2,480.60	\$2,750.84	-12.5	\$4,445.29
7	Jul-17	\$2,883.30	\$3,352.58	-11.5	\$4,591.23
8	Aug-17	\$4,735.10	\$4,182.16	-10.5	\$4,737.17
9	Sep-17	\$4,360.60	\$5,675.40	-9.5	\$4,883.12
10	Oct-17	\$6,451.20	\$7,868.82	-8.5	\$5,029.06
11	Nov-17	\$9,946.80	\$8,974.88	-7.5	\$5,175.00
12	Dec-17	\$13,850.40	\$10,169.54	-6.5	\$5,320.95
13	Jan-18	\$10,265.40	\$10,266.94	-5.5	\$5,466.89
14	Feb-18	\$10,333.90	\$10,126.60	-4.5	\$5,612.83
15	Mar-18	\$6,938.20	\$8,857.04	-3.5	\$5,758.77
16	Apr-18	\$9,245.10	\$8,083.74	-2.5	\$5,904.72
17	May-18	\$7,502.60	\$7,562.84	-1.5	\$6,050.66

18	Jun-18	\$6,398.90	\$7,581.96	-0.5	\$6,196.60
19	Jul-18	\$7,729.40	\$7,059.98	0.5	\$6,342.55
20	Aug-18	\$7,033.80	\$6,832.64	1.5	\$6,488.49
21	Sep-18	\$6,635.20	\$6,360.80	2.5	\$6,634.43
22	Oct-18	\$6,365.90	\$5,556.80	3.5	\$6,780.38
23	Nov-18	\$4,039.70	\$4,837.48	4.5	\$6,926.32
24	Dec-18	\$3,709.40	\$4,273.76	5.5	\$7,072.26
25	Jan-19	\$3,437.20	\$3,821.04	6.5	\$7,218.20
26	Feb-19	\$3,816.60	\$4,077.26	7.5	\$7,364.15
27	Mar-19	\$4,102.30	\$5,047.04	8.5	\$7,510.09
28	Apr-19	\$5,320.80	\$6,523.32	9.5	\$7,656.03
29	May-19	\$8,558.30	\$7,776.40	10.5	\$7,801.98
30	Jun-19	\$10,818.60	\$8,874.82	11.5	\$7,947.92
31	Jul-19	\$10,082.00	\$9,467.52	12.5	\$8,093.86
32	Aug-19	\$9,594.40	\$9,586.38	13.5	\$8,239.81
33	Sep-19	\$8,284.30	\$8,931.98	14.5	\$8,385.75
34	Oct-19	\$9,152.60	\$8,354.86	15.5	\$8,531.69
35	Nov-19	\$7,546.60		16.5	\$8,677.63
36	Dec-19	\$7,196.40		17.5	\$8,823.58
Forecast →				18.5	\$8,969.52
				19.5	\$9,115.46
				20.5	\$9,261.41
				21.5	\$9,407.35

3. ANALYSIS

3.1 Moving Averages

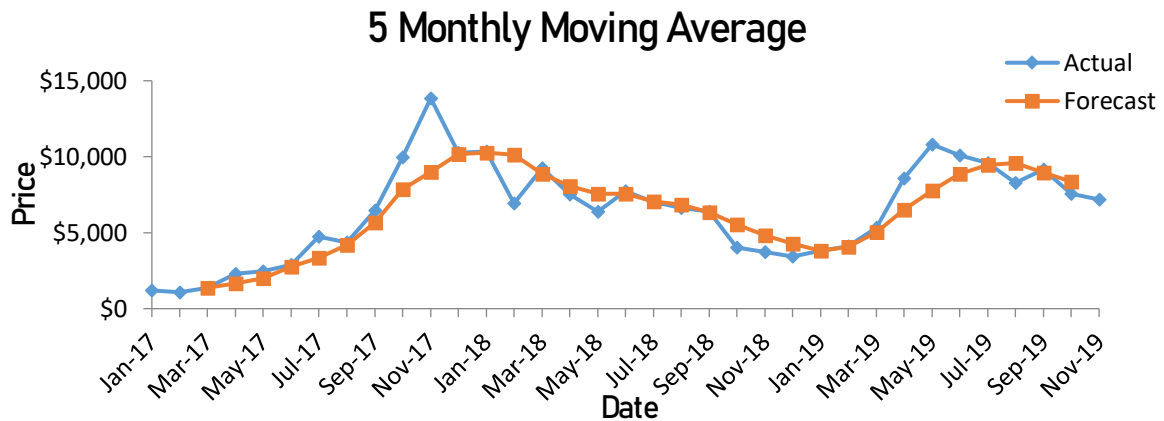


Fig. 1: Analysis of moving averages

The graph above indicates moving averages of 5 months of bitcoin prices from Jan 2017 to Dec 2019. The graph shows the trend, During November 2017 the prices were highly above its 5 monthly moving average. From January 2018 to Jan 2019 the prices were mostly at or below its 5 monthly moving average. From August 2019, the moving average shows a downward trend making it less of choice to invest in it during that time as trend shows it is expected to fall further.

3.2 Trend Line

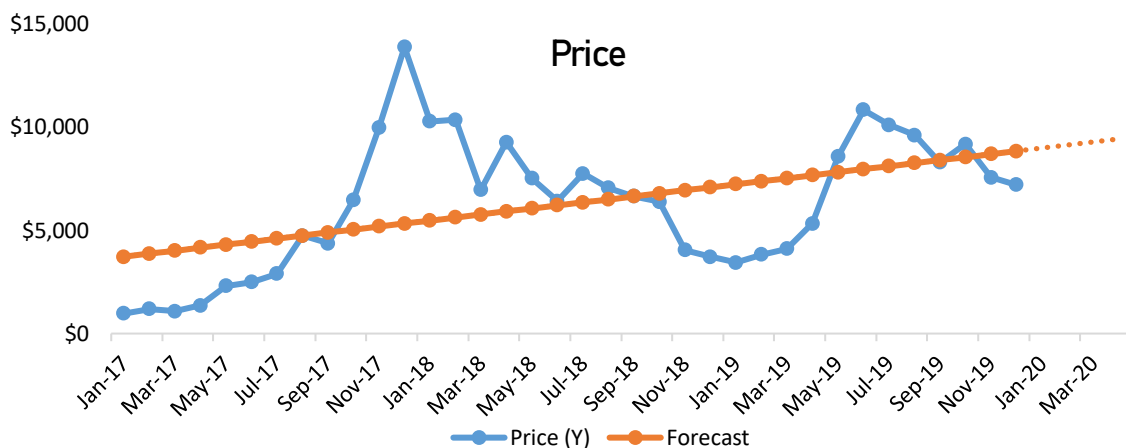


Fig. 2: Analysis of trend line

“A trendline is a line drawn over pivot highs or under pivot lows to show the prevailing direction of price.”- *investopedia.com*
 The trendline forecasts the price to rise in long term, the line shows a gradual increase in far future.

Finding the trendline using least square method:

**SUMMARY
 OUTPUT**

<i>Regression Statistics</i>	
Multiple R	0.475
R Square	0.225
Adjusted R Square	0.202
Standard Error	2893.312
Observations	36.000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>	
Regression	1	82747980.0	82747980.0	9.88	0.00	
Residual	34	284622729.0	8371256.7			
Total	35	367370709.0				

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	6269.58	482.2	13.0	0.00	5289.59	7249.56
X= Month- 18.5	145.94	46.4	3.1	0.00	51.61	240.28

4. CONCLUSION

To conclude, the paper analyses how bitcoin prices have fluctuated during the past 3 years. The simple mathematical tool of moving averages and trendline have been used to predict the future value. These does not consider any external factors just predicts the value according to the previous trend.

5. REFERENCES

- [1] investopedia.com
- [2] investing.com