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PREDICTIVE MODELING OF BITCOIN PRICES

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ABSTRACT

Bitcoins are traded securities. But they do not have a set of known variables that can define their price stability. Bitcoin markets are also inefficient, providing a lot of opportunities for those who are able to determine the inherent value. As the markets are inefficient, the first level of available information – historical trade data, that includes the price and volume data, are also not fully subsumed in the price. Chances are very high that the pricing of bitcoins are imperfect and there lies huge potential for abnormal gains. On the other hand, there are econometric models built to predict the next value of a time series data. These models, do not just consider the pattern or trend or the slope, they also consider the volatility. When the goal of the study is to analyze and forecast volatility, models like ARCH and GARCH have assumed greater importance, especially, time series financial data. (Engle, 2014). The problem this paper addresses is assuming bitcoin prices follow a pattern or a random walk, can a predictive model be built using ARCH, GARCH models to model the volatility of the bitcoin prices? Daily closing prices of bitcoins, collected from the official bitcoin website (https://bitcoin.org/en/) for the period between January-2010 to December-2018. Firstly, volatility of the price series has been measures and exhibited. The Bit Coin returns, then have been modeled using both symmetric and asymmetric GARCH techniques - GARCH, EGARCH and TGARCH. Further, the volatility has been forecasted for out of sample period while estimating various error coefficients. It was concluded that indicate that the asymmetric GARCH (1.1) model do perform better in forecasting conditional variance of the Bit Coin returns rather than the Asymmetric GARCH model, although confirming the presence of leverage effects.

Keywords: Bitcoins, Predictive Modeling, GARCH, EGARCH, TGARCH, Volatility Modeling, Market Efficiency.