ABSTRACT

VOLATILITY ANALYSIS AND FORECASTING CRYPTOCURRENCY RETURN IN THE WORLD USING DYNAMIC CONDITIONAL CORRELATION GENERALIZED AUTOREGRESSIVE CONDITIONAL HETEROSCEDASTICITY(DCC-GARCH)

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The Dynamic Conditional Correlation Generalized Autoregressive Conditional Heteroscedasticity (DCC-GARCH) is one of the multivariate time series method that can be used if residual which produced by a model still had heteroscedasticity. This research had a purpose to do volatility analysis and forecasting using return cryptocurrency in the world data, which is bitcoin, etherum, and tether. Before applying the DCC-GARCH method, the Vector Autoregressive (VAR) method must be applied first to get the residual data that will be used on DCC-GARCH model. Based on the lowest value of AIC, SBC, HQC, and FPEC, the best model for VAR model is VAR(3). The model that be used on this research is VAR(3) – DCC GARCH (1,1). A high volatility and variation movement is happening on return bitcoin, the volatility of return etherum also had a variation movement although in some of period the movement is tend to constant, meanwhile the volatility is kinda low and had a constant movement is happening on return tether. Forecasting the next 7 days ahead on bitcoin return had increasing value in average around 0,086%, meanwhile on etherum return and tether return the value is tend to decreasing around 0,66% and 0,0028%.

Key words: Multivariate Time Series, Volatility, Forecasting, Vector Autoregressive (VAR), DCC-GARCH, Cryptocurrency.

ABSTRAK

ANALISIS VOLATILITAS DAN PERAMALAN *RETURN* MATA UANG DIGITAL (*CRYPTOCURRENCY*) DI DUNIA DENGAN METODE *DYNAMIC CONDITIONAL CORRELATION GENERALIZED AUTOREGRESSIVE CONDITIONAL HETEROSCEDASTICITY* (DCC-GARCH)

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Metode *Dynamic Conditional Correlation Generalized Autoregressive Conditional Heteroscedasticity* (DCC-GARCH) merupakan salah satu metode deret waktu multivariat yang dapat diterapkan apabila residual yang dihasilkan oleh suatu model masih mengandung heteroskedastisitas. Penelitian ini bertujuan untuk melakukan analisis volatilitas dan peramalan pada *return* mata uang digital (*cryptocurrency*) di dunia yaitu bitcoin, etherum, dan tether. Sebelum diterapkannya metode DCC-GARCH, akan diterapkan terlebih dahulu metode *Vector Autoregressive* (VAR) untuk mendapatkan nilai *residual* yang akan digunakan dalam model DCC-GARCH. Berdasarkan nilai AIC, HQC, SBC, dan FPE terkecil, model VAR terbaiknya adalah model VAR(3). Model terbaik dalam penelitian ini yaitu model VAR(3) – DCC GARCH (1,1). Tingkat volatilitas yang tinggi dan pergerakannya bervariasi terdapat pada *return* bitcoin, volatilitas *return* etherum juga pergerakannya cukup bervariasi walaupun pada beberapa periode terdapat pergerakan yang cenderung konstan, sedangkan tingkat volatilitas yang rendah dan pergerakannya cenderung konstan yaitu *return* tether. Peramalan nilai 7 hari kedepan pada *return* bitcoin mengalami kenaikan rata-rata sebesar 0,086%, sedangkan pada *return* etherum dan *return* tether nilainya turun sekitar 0,66% dan 0,0028%.

Kata kunci: Deret Waktu Multivariat, Volatilitas, Peramalan, *Vector Autoregressive* (VAR), DCC-GARCH, *Cryptocurrency*