VALUE AT RISK PERFORMANCE IN CRYPTOCURRENCIES

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Abstract

Due to conclusion could not rely on only one test, in this study, we apply various approaches to verify the actuary of VaR model to find out whether VaR model, especially historical VaR and delta normal VaR model, can provide the accurate risk measurement results for cryptocurrencies risk, especially CRIX, BTC, ETH and XRP. We use Kupiec’s POF test, Independence Test - Christoffersen (1998) and Joint Test that widely use for backtesting VaR model. Performance test results for risk measurement by historical VaR provide a fairly accurate over delta normal VaR when we use Kupiec’s POF-test for the accuracy of VaR model. Christoffersen (1998) independence test, the exceptions (failures) of historical VaR and delta normal VaR model show independence exceptions in accordance with an only high confidence level of critical values (0.99). Otherwise, the low confidence level of critical values (0.90 and 0.95) appears dependence exceptions. For the Joint test, we combine POF-test and independence test because each model has different advantages and disadvantages. The results show that historical VaR model is suitable for measuring cryptocurrency risk over delta normal VaR only high confidence level of critical values.

Keywords: Cryptocurrency, Bitcoin, Value at Risk, Performance, POF test, Independence test, Joint test.
บทคัดย่อ

งานวิจัยนี้ได้ทำการประยุกต์ใช้แบบจำลอง VaR ในหลากหลายวิธีเพื่อทดสอบความแม่นยำในการวัดความเสี่ยงของแบบจำลอง Historical VaR และแบบจำลอง Delta Normal VaR สำหรับสกุลเงินคริปโต (Cryptocurrency) ได้แก่ CRIX BTC ETH และ XRP โดยในงานวิจัยฉบับนี้ได้ประยุกต์ใช้การทดสอบ Kupiec’s POF Test การทดสอบ Independence Test ของ Christoffersen และ การทดสอบแบบ Joint Test ที่นิยมใช้กันสำหรับการทดสอบแบบจำลอง VaR โดยผลการทดสอบแสดงว่าแบบจำลอง Historical VaR สามารถวัดความเสี่ยงได้แม่นยำกว่าแบบจำลอง Delta Normal VaR เมื่อใช้การทดสอบ Kupiec’s POF Test ในกรณีผล  nostalgically ใช้การทดสอบแบบ Joint Test ที่รวมกับทดสอบ POF Test และการทดสอบ Independence Test ซึ่งนั่นก็ได้ผลจากนั่นใช้การทดสอบแบบ Joint Test ที่รวมกับความเสี่ยงสำหรับสกุลเงินคริปโตได้เหมาะสมกว่าแบบจำลอง Delta Normal VaR เฉพาะเมื่อระดับความเชื่อมั่นของค่ากิจวัตรอยู่ในระดับสูง

คำสำคัญ: สกุลเงินคริปโต บิทคอยน์ Value at Risk การวัดผล การทดสอบ POF test การทดสอบ Independence test, Joint test.

1. INTRODUCTION

It is well-known fact that advances in information technology provide unprecedented context emergences of various digital currencies such as Cryptocurrency Index (CRIX), Bitcoin (BTC), Ethereum (ETH), Ripple (XRP), etc. so-called cryptocurrency. The main advantages of such digital currencies are instantaneous transactions and borderless transfer of ownership. Many web services accept payment in the form of cryptocurrencies like Bitcoin, Ethereum, Ripple, etc. These cryptocurrencies are formed in data so you can use it for payment and trade online. Since their physical currency, most people use them with a low cost of transfer from person to person. Due to increase in demand and limited in supply, for instance, the most popular of cryptocurrency name is Bitcoin which was introduced by Nakamoto (2009) and limited number only 21 million in supply as well as no limited in demand. For these occurrences, demand side which is measured by search queries (Kristoufek, 2013) plays an important role in its volatility price over economic factors (Ciaian, et al., 2016). Furthermore, the volatility price of Bitcoin is affected by publicly announce information also (Bartos, 2015). The volatility price of cryptocurrencies is interesting for people related to this market.

There are many risk measurement techniques in finance which can be applied to determine risk level such as beta (volatility of systematic risk), r-square (value represents the correlation between the examined investment and its associated benchmark), standard deviation (data dispersion in regards to the mean value of the dataset), Sharpe ratio (performance as adjusted by the associated risks), etc. One of the most popular risk measurement techniques in finance is value at risk (VaR). VaR was proposed by J.P. Morgan in 1994 and becomes a standard measure that financial analysts use to find how much risk there are. In the past research, VaR was widely used to quantify the risk of investment for financial instrument such as stock, bond, options, futures, etc. and was studied for many different educational objectives, for instance, using VaR to estimate the extreme value theory (EVT) (Maghyereh, Aktham and Haitham, 2006), to examine movements of the stocks market indexes.