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Hedging capabilities of bitcoin. Is it the virtual gold?

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ABSTRACT

This paper sets out to explore the hedging capabilities of bitcoin by applying the asymmetric GARCH methodology used in investigation of gold. The results show that bitcoin can clearly be used as a hedge against stocks in the Financial Times Stock Exchange Index. Additionally bitcoin can be used as a hedge against the American dollar in the short-term. Bitcoin thereby possess some of the same hedging abilities as gold and can be included in the variety of tools available to market analysts to hedge market specific risk.

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1. Introduction

The cryptocurrency bitcoin has posed great challenges and opportunities for policy makers, economists, entrepreneurs and consumers since its introduction by Nakamoto (2008). Bitcoin is different from any other asset on the financial market and thereby creates new possibilities for stakeholders with regard to risk management, portfolio analysis and consumer sentiment analysis. Though as bitcoin is still considered to be mysterious and not very well understood by many stakeholders in the financial market analysis of the capabilities of bitcoin with regard to different financial aspects must be performed.

Generally analysis of the financial capabilities of an asset often considers the liquidity, reactivity to the variance of other assets as well as the hedging abilities of the asset in question. Thereby the analysis will give a detailed view of the interaction of the financial asset in the market and what place it has comparably

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Table 1
Summary statistics.

VARIABLES	N	Mean	sd	Min	max
Time	1,769	885	510.8	1	1,769
Bitcoin Price Index	1,769	170.3	240.1	0.0505	1,147
Ln(price)	1,769	3.145	2.687	-2.986	7.045
USD-EUR Exchange rate	1,769	1.316	0.0796	1.052	1.489
Ln(USD-EUR Exchange rate)	1,769	0.273	0.0629	0.0508	0.398
USD-GBP Exchange rate	1,769	1.591	0.0506	1.464	1.717
Ln(USD-GBP Exchange rate)	1,769	0.464	0.0318	0.381	0.541
FTSE index	1,769	6,150	523.4	4,944	7,104
Ln(FTSE index)	1769	8.721	0.086	8.506	8.868

to other assets. Previous research has investigated the liquidity and means of exchange of bitcoin (Glaser et al. 2014), the diversification possibilities (Briere et al., 2013) and the arbitrage possibilities (Gandal and Halaburda, 2014). However this paper intends to explore the hedging capabilities of bitcoin thereby giving a more detailed view of the asset and its capabilities in portfolio analysis and risk management.

Bitcoin has previously been compared to gold as they have many similarities; the primary value is derived due to scarcity of supply, supply is not controlled by a government but independent agents, both assets have high price volatility and total supply is finite. As gold has well-known hedging capabilities against stocks, bonds and the American dollar bitcoin might exhibit similar correlations. This paper will thereby be modelled after previous research of gold using the same methodology. Thus the results can be compared and contrasted to get a sense of the comparable hedging capabilities of bitcoin.

The paper will be structured as follow. Section 2 will introduce the data, the specification and methodology. Section 3 presents the results and Section 4 concludes.

2. Data and econometric modelling

The data used for this paper is scoured from Datastream and include daily observations from the 19th of July 2010 to 22nd of May 2015 of the dollar-euro and dollar-sterling exchange rates as well as the Financial Times Stock Exchange Index (FTSE) yielding 1769 observations. The bitcoin price data is sourced from the Coindesk Bitcoin Price Index (Coindesk, 2015) with daily observations.

Summary statistics are shown in Table 1 and indicate a large range of fluctuations in each of the series which is common among financial assets and can also be identified in Fig. 1. Consequently logarithms are used throughout the analysis. The KPSS and DF-GLS tests indicated a unit root for the bitcoin price, the exchange rates and the FTSE Index implying nonstationarity which is common in time series as means and variances vary over time.¹ Further investigation showed that first differences of the variables eliminated the nonstationarity so each series was transformed according to the equation $\Delta x_t = x_t - x_{t-1}$.

2.1. Models

Different models will be used to get a detailed view of the hedging capabilities of bitcoin against different assets and portfolios. The papers by Baur and Lucey (2010) and Capie et al. (2005) investigated the hedging capabilities of gold against stocks, bonds and the American dollar. As gold and bitcoin have many similar traits the same methodology and similar explanatory variables will be applied in this paper. Both Baur and Lucey (2010) and Capie et al. (2005) assumed that the errors exhibited conditional autoregressive heteroscedasticity and thereby used asymmetric GARCH models to identify volatility correlations. Engle's Lagrange multiplier test showed high ARCH effects in the residuals of the bitcoin return which makes GARCH modelling suitable for this paper.² In Addition an AR(1) process was identified for

¹ Details of tests and test statistics are available upon request.

² Details of tests and test statistics are available upon request.

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