On the hedge and safe haven properties of Bitcoin: Is it really more than a diversifier?

Elie Bouri [a,*], Peter Molnár [b], Georges Azzi [c], David Roubaud [d], Lars Ivar Hagfors [e]

[a] Holy Spirit University of Kaslik (USEK), USEK Business School, Jounieh, Lebanon
[b] Norwegian University of Science and Technology, Department of Industrial Economics and Technology Management, Trondheim, Norway
[c] Holy Spirit University of Kaslik (USEK), USEK Business School, Jounieh, Lebanon
[d] Montpellier Business School, 2300 Avenue des Moulins, 34080 Montpellier, France
[e] Norwegian University of Science and Technology, Department of Industrial Economics and Technology Management, Trondheim, Norway

ARTICLE INFO

ABSTRACT

This paper uses a dynamic conditional correlation model to examine whether Bitcoin can act as a hedge and safe haven for major world stock indices, bonds, oil, gold, the general commodity index and the US dollar index. Daily and weekly data span from July 2011 to December 2015. Overall, the empirical results indicate that Bitcoin is a poor hedge and is suitable for diversification purposes only. However, Bitcoin can only serve as a strong safe haven against weekly extreme down movements in Asian stocks. We also show that Bitcoin hedging and safe haven properties vary between horizons.

© 2016 Elsevier Inc. All rights reserved.

1. Introduction

Bitcoin is a digital currency and payment system first introduced by Nakamoto (2008). It is fully decentralized and depends on a sophisticated protocol. In this sense, the most unique feature of Bitcoin is that there is no central authority guaranteeing it or having control over it, as central banks are for conventional currencies. Another unique feature is the fact that the supply of Bitcoin is limited by the design of the protocol. The principles of Bitcoin are explained by Dwyer (2015) and at bitcoin.org.

Since its introduction in 2009, the value of Bitcoin grew rapidly to more than US\$6 billion at the end of 2015 (coinmarketcap.com). In parallel, there has been a growing interest in research addressing the economics and finance of Bitcoin. Rogojanu and Badea (2014) compare Bitcoin to alternative monetary systems. Brandvold et al. (2015) and

---

* Corresponding author. Fax: 00961 9 600 801.
E-mail addresses: eliebouri@usek.edu.lb (E. Bouri), peto.molnar@gmail.com (P. Molnár), georgesazzi@usek.edu.lb (G. Azzi), d.roubaud@Montpellier-BS.com (D. Roubaud), lars.i.hagfors@iot.ntnu.no (L.I. Hagfors).

Ciaian et al. (2016) focus on price discovery in the Bitcoin market. Bouri et al. (2016) concentrate on the role of trading volume in explaining Bitcoin return and volatility. Balcilar et al. (2016) model the persistence in the volatility of Bitcoin returns. Yermack (2013) argues that Bitcoin appears to behave more like a speculative investment than a currency because its market capitalization is high compared to the economic transactions it facilitates. Although Bitcoin is highly volatile (Molnár et al., 2015), its inclusion into a diversified portfolio is highly profitable (see, among others, Halaburda and Gandal, 2014; Eisl et al., 2015). Bitcoin is an alternative to mainstream currencies and is often even considered as a part of an alternative economy. If some investors lose trust to mainstream currencies or to the entire economy, they might resort to Bitcoin. This is one of the reasons why Bitcoin has sometimes been called digital gold (Popper, 2015). Interestingly, Dyhrberg (2015a) situates the hedging capability of Bitcoin somewhere between gold and the US dollar, later arguing (2015b) that Bitcoin is a hedge against UK equities and the US dollar. However, prior research has so far ignored the potential role of Bitcoin as a safe haven and has failed to differentiate among its diversification, hedging and safe haven properties. This paper addresses this literature gap by assessing to what extent Bitcoin can act as a diversifier, hedge and safe haven against movements in the prices of various assets (stock indices, bonds, oil, gold, the general commodity index and the US dollar index).

An asset might be suitable for investment from a risk perspective. If the asset is negatively correlated with another asset, putting them together decreases risk significantly. However, we follow Baur and Lucey (2010) and Ratner and Chiu (2013) and differentiate between a diversifier, a hedge and a safe haven. A diversifier is an asset that has a weak positive correlation with another asset on average. A weak (strong) hedge is an asset that is uncorrelated (negatively correlated) with another asset *on average*. A weak (strong) safe haven is an asset that is uncorrelated (negatively correlated) with another asset on average during times of stress. As gold has been traditionally considered a hedge and a safe haven, these concepts have previously been applied mostly to gold (Baur and Lucey, 2010). Also, they were recently applied to credit default swaps (Ratner and Chiu, 2013).

With a more explicit modeling technique, which is based on the dynamic conditional correlation (DCC) model of Engle (2002), our findings are complementary to those presented by Dyhrberg (2015a, 2015b). Particularly, we provide evidence that Bitcoin is an effective diversifier against movements in all the assets under study, whereas it is a safe haven in just few cases. These interesting findings would be helpful for policy makers, investors and Bitcoin users.

The rest of the paper is organized as follows. Section 2 describes the data, Section 3 explains the method, Section 4 presents the results and Section 5 concludes.

2. Data and preliminary analysis

The dataset we investigate consists of price index values for Bitcoin and several financial assets, which include stocks, bonds, currencies and commodities from 18th July 2011 to 22nd December 2015. The timespan is constrained by the availability of Bitcoin prices. We use daily and weekly prices obtained from Thomson Reuters DataStream. For each time series, we have 1133 daily observations and 226 weekly observations. The proxy for Bitcoin prices is the exchange rate of Bitcoin to US dollars from the Bitstamp marketplace (Brandvold et al., 2015). Bitstamp, which represents one of the largest Bitcoin exchanges, is based in the UK and is considered to be a rather safe exchange by market participants around the world. The historical Bitcoin price is plotted in Fig. 1.

The stock market indices for the US, the UK, Germany, Japan and China respectively are the S&P 500, FTSE 100, DAX 30, Nikkei 225 and Shanghai A-share. As a proxy for world, European and Asia Pacific stocks, we use three regional and international benchmarks from Morgan Stanley Capital International (MSCI) indices. The US dollar index, which tracks the performance of the US dollar against a basket of major foreign currencies, is used as a proxy for the currency market. The proxies for the commodity market and the overall bond market respectively are Standard & Poor's Goldman Sachs (SPGS) Commodity Index and the Pimco Investment Grade Corporate Bond Index Exchange-Traded Fund (ETF). We also consider Brent Crude oil and gold spot prices. For each price index, we calculate return as the first difference of the logarithm of closing prices. Table 1 shows summary statistics of the return series for the examined variables. As shown in Panel A of Table 1, Bitcoin has by far the highest levels of daily mean and volatility. All the return series are found to be leptokurtic and have a negative skewness. As for the summary statistics of weekly returns, Panel B of Table 1 shows that the kurtosis of some assets (bond, ETF and gold) is significantly decreased but the kurtosis of Bitcoin remains high.

3. Method

This section describes the econometric modeling procedure we use to assess the hedge and safe haven properties of Bitcoin. First, we provide the bivariate DCC model of Engle (2002), which we use to estimate the correlation between the return series. Then, we present the regression that we employ to assess the hedge and safe haven properties of Bitcoin against stocks, bonds, currency and commodities.

3.1. DCCs

Unlike other multivariate GARCH models, such as the BEKK (Baba-Engle-Kraft-Kroner) and constant conditional correlation (CCC) models, which may experience convergence problems and unreasonable parameter estimates, the DCC model of