Virtual currency, tangible return: Portfolio diversification with bitcoin

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Abstract

Bitcoin (BTC) is a major virtual currency. Using weekly data over the 2010–2013 period, we analyze a BTC investment from the standpoint of a US investor with a diversified portfolio including both traditional assets (worldwide stocks, bonds, hard currencies) and alternative investments (commodities, hedge funds, real estate). Over the period under consideration, BTC investment had highly distinctive features, including exceptionally high average return and volatility. Its correlation with other assets was remarkably low. Spanning tests confirm that BTC investment offers significant diversification benefits. We show that the inclusion of even a small proportion of BTCs may dramatically improve the risk-return trade-off of well-diversified portfolios. Results should however be taken with caution as the data may reflect early-stage behavior that may not last in the medium or long run.

Notes

1. Yet, alternative investment goods, such as artworks, deliver mixed financial results (David et al, 2013; Renneboog and Spaenjers, 2013).

2. In contrast to hard currencies, BTCs pay no interest.

3. Arguably, this could imply that BTC has no intrinsic value. Things are changing fast, however. According to the regulation issued by the US Financial Crimes Enforcement Network on 18 March 2013, BTC exchanges and miners are required to register as Money Services Businesses and comply with anti-money laundering regulations (fincen.gov/statutes_regs/guidance/html/FIN-2013-G001.html). Furthermore, Germany recognized BTC for legal and tax purposes in August 2013 (Gotthold and Eckert, 2013).

4. Stolen BTCs are never recoverable. A recent cyber-attack against a BTC exchange resulted in the theft of the equivalent of USD 9 million (ECB, 2012).

5. Daily number of transactions and daily traded volumes can be retrieved from bitcoincharts.com.

6. We use the following indices. (i) Equities: developed and emerging (MSCI World, MSCI Emerging); (ii) Bonds: developed and emerging government bonds (JPMorgan GBI Broad, JPM EMBI+), World inflation linked bonds (Barclays Global Inflation World) and World corporate bonds (Merrill Lynch Global Broad Market Corporate and High Yield); (3) Commodities: gold and oil (gold bullion and WTI); (4) Hard currencies: money market investments in Euro and Yen; and (5) Alternatives: hedge funds (HFRX Hedge Fund Index) and listed World real estate (FTSE Global NAREIT). Data come from Datastream. Working with weekly returns, we are unable to account for art investments, where indices are computed on an annual basis.

7. Other important risks are liquidity risk, legal risk and the risk of security breaches in electronic portfolios. Moreover, like cash transactions, BTC settlements are irreversible.

8. The use of realized returns for studying expected returns is debatable. There are, however, few alternatives. As pointed out by Elton (1999), 'Almost all of the testing (…) involves using realized returns as a proxy for expected returns'. Therefore, this article follows the traditional approach.

9. The asymmetry to the left of a return distribution means that prices tend to fall sharply during crashes. Besides volatility derivatives, there are few assets exhibiting such characteristics.

10. In addition, BTC investment achieves a Sharpe ratio of 2.12, which is particularly attractive compared with asset classes.

11. Whereas the Sharpe ratio performance indicator divides the portfolio excess

return over the risk-free rate by its volatility, the Sortino ratio replaces the volatility by the standard deviation of negative asset returns.

12. The adjusted Sharpe ratio is an alternative to the standard Sharpe ratio when returns are not normally distributed. The measure is derived from a Taylor series expansion of an exponential utility function.

13. The current development of virtual currencies is impressive. More than 50 new ones have been created recently following BTC and its little brother, Litecoin (www.cryptsy.com/).

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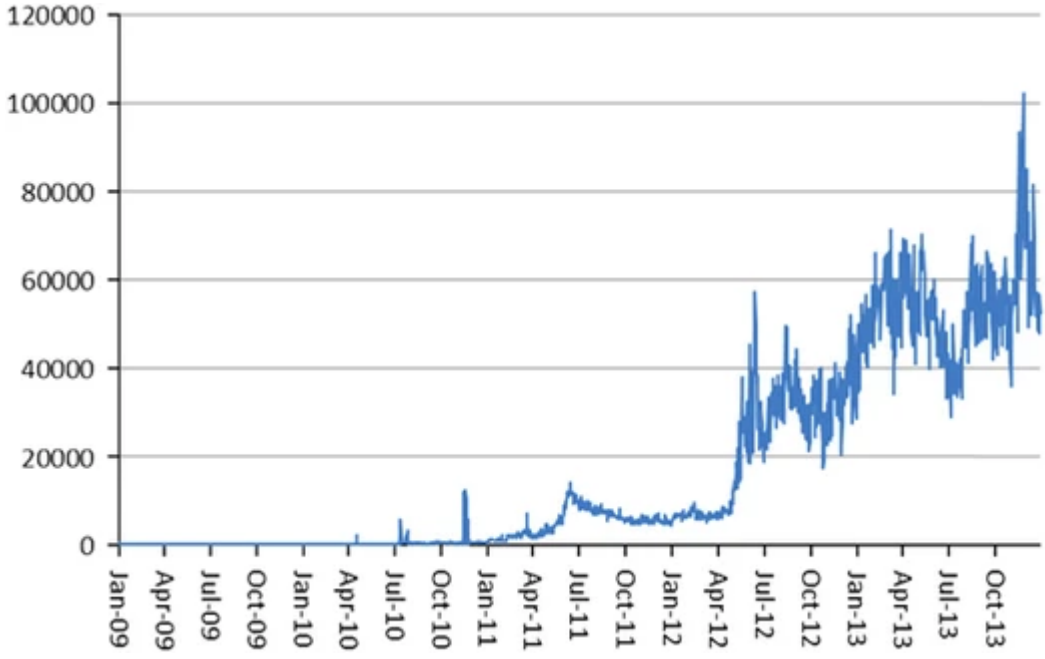
Appendix

Figure A1 gives the daily number of BTC transactions over the sample period: January 2009–December 2013. Figure A2 draws the BTC/USD weekly exchange rate on a logarithmic scale.

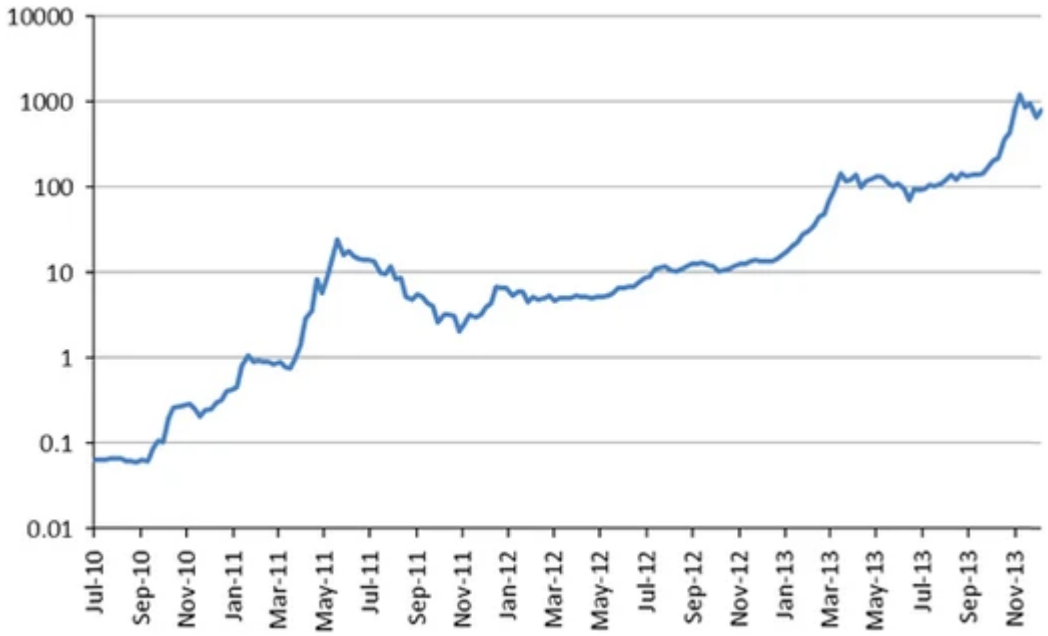
Figure A1



Daily number of BTC transactions (January 2009–December 2013).

Source: blockchain.info.

Figure A2



Weekly BTC/USD exchange rate (January 2009–December 2013).The figure uses a logarithmic scale. Data are sourced from the *Bitcoincharts* Website.

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