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Bitcoin Bubble Trouble

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Abstract

We present a dynamic Rational Expectations (RE) bubble model of prices with the intention to evaluate it on optimal investment strategies applied to Bitcoin. Our bubble model is defined as a geometric Brownian motion combined with separate crash (and rally) discrete jump distributions associated with positive (and negative) bubbles. The RE condition implies that the excess risk premium of the risky asset exposed to crashes is an increasing function of the amplitude of the expected crash, which itself grows with the bubble mispricing: hence, the larger the bubble price, the larger its subsequent growth rate. We use the RE condition to estimate the real-time crash probability dynamically through an accelerating probability function depending on the increasing expected return. We examine the optimal investment problem in the context of the bubble model by obtaining an analytic expression for maximizing the expected log of wealth (Kelly criterion) for the risky asset and a risk-free asset. Using our bubble model on Bitcoin from 8-Jul-2013 until 19-Dec-2017 would have generated a CAGR of 140% with a maximum drawdown of 69% giving a Calmar Ratio of 2.03. It would have moved out of Bitcoin gradually since 25-Apr-2017 to be completely out on 19-Dec-2017, three days before the crash. The outperformance of the Efficient Portfolio over just investing in Bitcoin was 265%, accomplished over 117 rebalances from 08-Jul- 2013 to 20-Dec-2017. This strategy could thus afford a cost of 2.27% at each rebalancing period and still outperform investing only in Bitcoin.

Keywords: bitcoin, financial bubbles, efficient crashes, positive feedback, rational expectation, Kelly**JEL Classification:** C53, E47, G01, G17[Suggested Citation](#) >[Show Contact Information](#) >[Download This Paper \(Delivery.cfm/SSRN_ID3198685_code623849.pdf?abstractid=3143750&mirid=1\)](https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=723104&abstractid=3143750&mirid=1)[Open PDF in Browser \(Delivery.cfm/SSRN_ID3198685_code623849.pdf?abstractid=3143750&mirid=1&type=2\)](https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=723104&abstractid=3143750&mirid=1&type=2)

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