Finance in Montana
William Igoe
Feb 28 2021

Bitcoin a Trillion Dollar Competitor

I begin this blog with a Milton Friedman and Anna Schwartz quote from their seminal book, 'A Monetary History of the United States'. The topic is the acceptance of the U.S. Dollar as a credible medium of exchange.

The short answer—yet the right answer—is that each accepts them because he is confident others will. The pieces of green paper have value because everybody thinks they have value, and everybody thinks they have value because in his experience they have had value. Our economy could not operate at more than a small fraction of its present level of productivity without a common and widely accepted medium of exchange; yet that common and widely accepted medium of exchange is, at bottom, a social convention which owes its very existence to the mutual acceptance of what from one point of view is a fiction.

So what is the 'value' of a bitcoin or any crypto currency? The correct answer is, 'around $50,000 give or take a 10 percent daily standard deviation'. One trillion dollars total BitCoin value is a sizeable monetary validation. Yet, Bitcoin's standard deviation is 10 times that of a normal national currency. No nation could withstand those daily price swings. My question is why and what might be the 'value' of BitCoin?

Let us review the basic equation discussed in my previous blog:

MoneySupply * Money Velocity = Price Index * Real GDP

The current estimate for total world money supply is just short of $100 trillion (and rising). The limit on the number of bitcoin that can be mined is 21 million. Thus, we have a maximum value of bitcoin:$100 trillion divided by 21 million -- or $4,761,904.76 per bitcoin. Bitcoin's last value is $46,360.17. In other words, should investors tire of the inflationary aspects of coin clipping Central Banks(taxable!), then investors might rewrite contracts using bitcoin as 'boot' for future transactions. The ease of use in apps such as Coinbase, Kraken, Stellar et al will only get better. Chase Bank finally read the 'memo' and will be come involved. More compelling is crypto yields offered by these sites are very attractive -- 4.5 percent for Bitcoin and 6.5 percent for Ethereum.

So what might the $46,360.17 value for bitcoin represent? Perhaps Bitcoin's value represents the probability that Bitcoin becomes the dominate currency for financial transactions -- or 0.974 percent. Again review the equation above: in the off chance that Bitcoin becomes the dominate currency, then world economies will live in a deflationary world.

That one percent probability is a tail risk event. Estimates of tail risk are highly volatile. Derivative traders have a greek for teenie options-- Lambda. Lambda is a measure the massive leverage effect of that low probability events becoming reality. The presence of Lambda helps to explain the high daily volatility of any major crypto currency - tail probabilities are very hard to quantify. That said, good derivative traders are never short lambda. If not short then options traders are sure to be square or tiny long Lambda.

Another curious aspect of high volatility (78.075 and 63.817 percent for the past 90 and 180 days respectively) is delta. At such high volatilities the delta on a at-the-money forward option well exceeds 50 percent. Why? The zero bound conditions of price movements warns traders the upside is nearly unlimited in the early stages of a logistic power function. Traders (the Fed?) short bitcoin are well advised to obtain upside coverage-- Gamestop shorts take note!

As hard as bitcoin's promoters might try, owning Lambda is not the same as owing an asset that stores value. Cautious Polonius might have died hiding behind a curtain but a least he was debt free.

Still, is Bitcoin a logical investment?

That 70s' Show Revisited

Let's look at the yields, volatilities and price correlations of a few currency assets (2016-02-29 to 2020-12-02).

Symbol	Position	Mid Point Rate	Daily Vol	AnnualizedVol	XAU	BTC	EUR	INR	AUD	CNY	GBP	ZAR	SPX
XAU	$0.00	0.375%	0.866%	13.83%	1	0.077	0.23	-0.113	0.249	-0.175	0.133	-0.173	0.091
BTC	$0.00	4.5%	4.09%	65.315%	0.077	1	0.055	-0.033	0.083	-0.02	0.03	-0.043	0.155
EUR	$0.00	-0.25%	0.437%	6.975%	0.23	0.055	1	-0.292	0.538	-0.428	0.549	-0.352	0.044
INR	$0.00	3.625%	0.35%	5.593%	-0.113	-0.033	-0.292	1	-0.392	0.359	-0.27	0.36	-0.203
AUD	$0.00	1.2%	0.596%	9.514%	0.249	0.083	0.538	-0.392	1	-0.411	0.497	-0.542	0.27
CNY	$0.00	3%	0.257%	4.098%	-0.175	-0.02	-0.428	0.359	-0.411	1	-0.345	0.336	-0.167
GBP	$0.00	0.5%	0.643%	10.268%	0.133	0.03	0.549	-0.27	0.497	-0.345	1	-0.318	0.187
ZAR	$0.00	3.88%	1.024%	16.347%	-0.173	-0.043	-0.352	0.36	-0.542	0.336	-0.318	1	-0.284
SPX	$0.00	7%	1.207%	19.28%	0.091	0.155	0.044	-0.203	0.27	-0.167	0.187	-0.284	1
Return	$0.00												
Std Dev(255 day)	$0.00												

I also include gold and the SP500 as potential currencies. Note the daily price correlations for these currencies are weak(less than 0.75). There is little opportunity for creating spreads on yield income between two currencies. In the case of SPX, the true dividend rate is 1.58 percent. The true Net Income Yield is closer to 7 percent. For this analysis we use dividend yield only. So why the 70s show? Between 1975 and 1993, interest rate arbitrage between European countries operating within the European Monetary System was common. The cross-volatilites were low relative to national interest rate differentials. Each nation was obligated to 'stabilize' currency fluctuation within a defined band. In fact, the interest rate differentials often exceeded than currency cross volatilites. George Soros' wealth is the product of an unsustainable system promoted by academics.

Are investors using the same techniques of 30 years ago with crypto-currencies? When I learned that Bitcoin and Ethereum now offer substantial yields on balances within the CoinBase app, I dusted of optimization code from 30 years ago. Let's take a look

The Result

We assume a U.S. investor has $100 thousand in dollar balances. Not happy with the one year treasury yield of 0.09 percent against a target inflation rate of 2 percent, our investor assembles a portfolio of currency positions where the yield is at least 200 basis points over target inflation -- or 4 percent. What currency mix might pique investor's interest? Using the R quadratic optimization routine 'quadprog' we can assemble a potential long only portfolio (short dollars of course).

Item	Value
Solution	422.133,0,4,837.932,26,162.088,12,801.243,44,053.592,1,922.174,3,485.772,6,315.066
Return	$3,000.00
Standard Deviation	$159.81
1 Year Std. Dev	$2,551.98
1 year Ratio	1.176
2 year Ratio	1.662
3 year Ratio	2.036

or

Symbol	Position	Mid Point Rate	Daily Vol	AnnualizedVol	XAU	BTC	EUR	INR	AUD	CNY	GBP	ZAR	SPX
XAU	$422.13	0.375%	0.866%	13.83%	1	0.077	0.23	-0.113	0.249	-0.175	0.133	-0.173	0.091
BTC	$0.00	4.5%	4.09%	65.315%	0.077	1	0.055	-0.033	0.083	-0.02	0.03	-0.043	0.155
EUR	$4,837.93	-0.25%	0.437%	6.975%	0.23	0.055	1	-0.292	0.538	-0.428	0.549	-0.352	0.044
INR	$26,162.09	3.625%	0.35%	5.593%	-0.113	-0.033	-0.292	1	-0.392	0.359	-0.27	0.36	-0.203
AUD	$12,801.24	1.2%	0.596%	9.514%	0.249	0.083	0.538	-0.392	1	-0.411	0.497	-0.542	0.27
CNY	$44,053.59	3%	0.257%	4.098%	-0.175	-0.02	-0.428	0.359	-0.411	1	-0.345	0.336	-0.167
GBP	$1,922.17	0.5%	0.643%	10.268%	0.133	0.03	0.549	-0.27	0.497	-0.345	1	-0.318	0.187
ZAR	$3,485.77	3.88%	1.024%	16.347%	-0.173	-0.043	-0.352	0.36	-0.542	0.336	-0.318	1	-0.284
SPX	$6,315.07	7%	1.207%	19.28%	0.091	0.155	0.044	-0.203	0.27	-0.167	0.187	-0.284	1
Return	$3,000.00												
Std Dev(255 day)	$2,551.98												

I am a little surprised at the result. Why? The portion allocated to SPX is relatively low and more monies are allocated to China, India and Australia. No monies are allocated to BitCoin. The volatility level of both the SPX and BitCoin is just too high --- Bitcoin's yield is too weak to entice potential investors. The portfolio annualized standard deviation of $2,551.98 is nearly equal to the required return of $3,000.00. In a trading operation, I expect that ratio to be a least 2.0 over a one year time period. A long term investor would not partake in such a position.

There is another nefarious aspect to crypto currency investing. I asked how is BitCoin able to generate a yield? Who is the heck is borrowing $1 trillion in BitCoin? 'Yield Farming' seems to be the answer. Or in a layman investors term a 'honey pot yield trap'. A crypto investor is actually placed on a waiting list to before receiving receive an advertized yield. Buyer are also enticed with 'rewards' to earn crypto fractions. I never visited Las Vegas but I understand the experience is entertaining with lots of games with flashing lights. Never did I hear a Las Vegas returnee say 'I spent a fortune and just got my ass kicked'. Instead, I hear a lame 'Oh, I broke even. I then ask... 'if everyone breaks even then how are casino owners so rich'? 'Dunno' is the sheepish response.

Stay healthy and safe investing.