



The Cryptocurrency Participation Puzzle

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The motivation

- Many investors do not invest in cryptocurrencies – adding cryptos to portfolio with market portfolio
- With Bayesian investors
 - **Prior means** – what priors can justify non-participation
 - Need large negative priors to justify zero weights
 - Thin wedge between positive and negative positions
 - **Positive portfolio weights** – with reasonable priors
 - **Certainty equivalent** – generally positive with positive and negative weights
 - **Transaction costs** – Annual Costs = 28%-34% with prior=0

Results – monthly excess returns

(sample period May 2013-Feb 2022)

Panel A: Descriptive Statistics

	BTC-RF	ew100-rf	vw100-rf	mkt-rf	smb	hml	umd	MSCI-rf
count	106	106	106	106	106	106	106	106
mean	0.110	0.201	0.113	0.011	0.000	-0.002	0.001	0.002
std	0.494	1.020	0.532	0.041	0.026	0.034	0.037	0.041
min	-0.382	-0.462	-0.407	-0.134	-0.059	-0.139	-0.124	-0.147
25%	-0.091	-0.145	-0.112	-0.009	-0.020	-0.020	-0.021	-0.021
50%	0.035	0.039	0.029	0.014	0.003	-0.005	0.004	0.007

Panel B: Correlations

	BTC-RF	ew100-rf	vw100-rf	mkt-rf	smb	hml	umd	MSCI-rf
BTC-RF	1.000	0.915	0.978	0.165	0.031	-0.014	0.003	0.133
ew100-rf	0.915	1.000	0.953	0.108	0.026	-0.014	-0.013	0.094
vw100-rf	0.978	0.953	1.000	0.164	0.016	-0.021	-0.001	0.143

Results – Prior Cutoffs

average monthly return

All priors are negative

Panel A: Snapshot Non-Investment

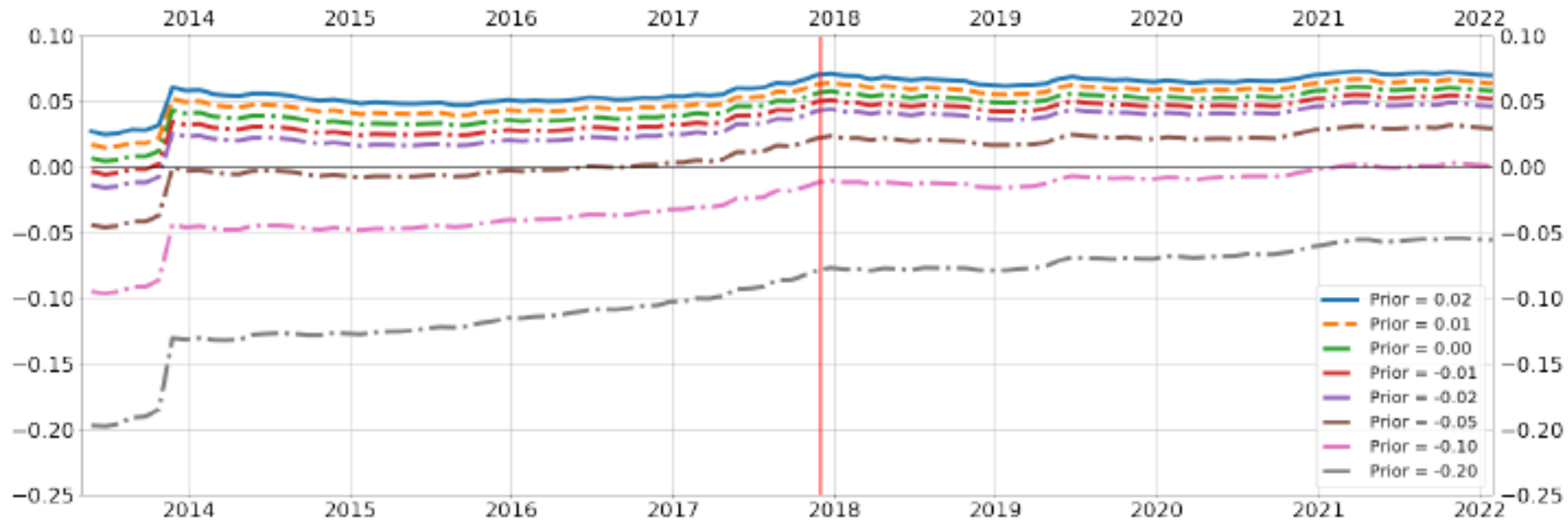
	2013	2014	2015	2016	2017	2018	2019	2020	2021	End of Sample
Btc-rf	-0.047	-0.042	-0.047	-0.055	-0.085	-0.076	-0.085	-0.098	-0.104	-0.103
ew-rf	-0.095	-0.091	-0.093	-0.102	-0.171	-0.161	-0.163	-0.173	-0.195	-0.192
vw-rf	-0.049	-0.045	-0.049	-0.056	-0.091	-0.081	-0.086	-0.098	-0.109	-0.107

Assumes –

- zero correlation with market but correlation is not zero and increases with market decline (as in 2022)
- Investors observe 10 years of data but BTC created in 2009
- Bitcoin variance = 150 times market variance but this is ex-post variance – what about uncertainty about this variance? VOV
- Also, short sales were possible only after 2017

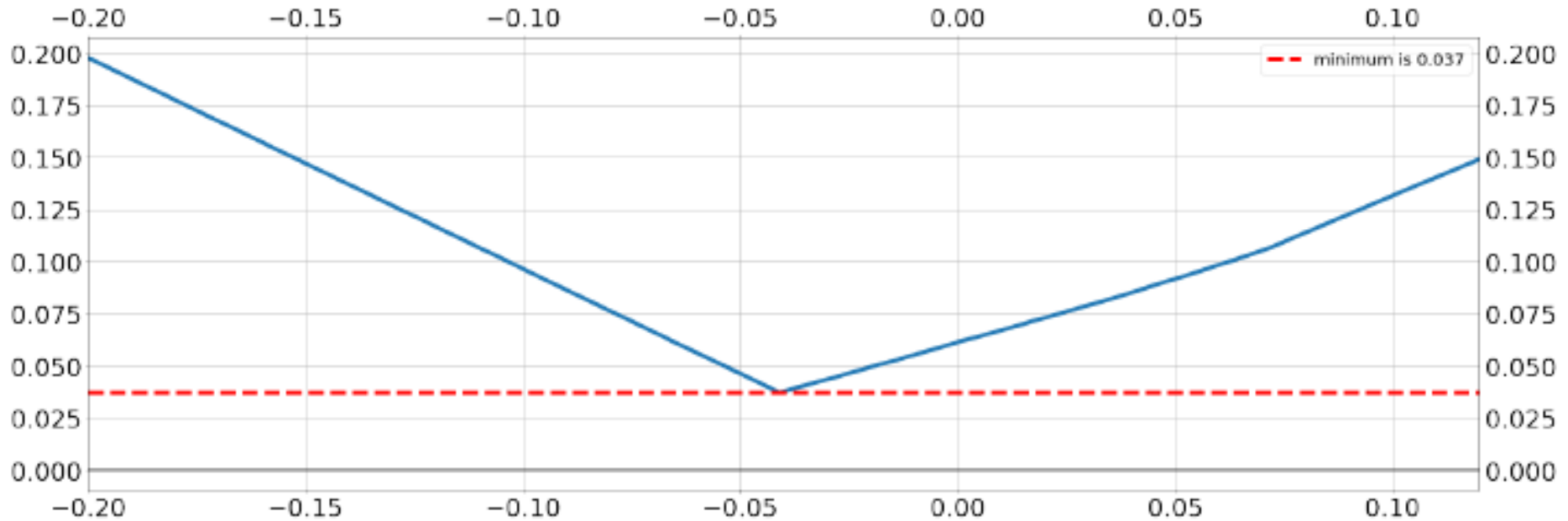
Results – Portfolio weights

Panel A: Bitcoin



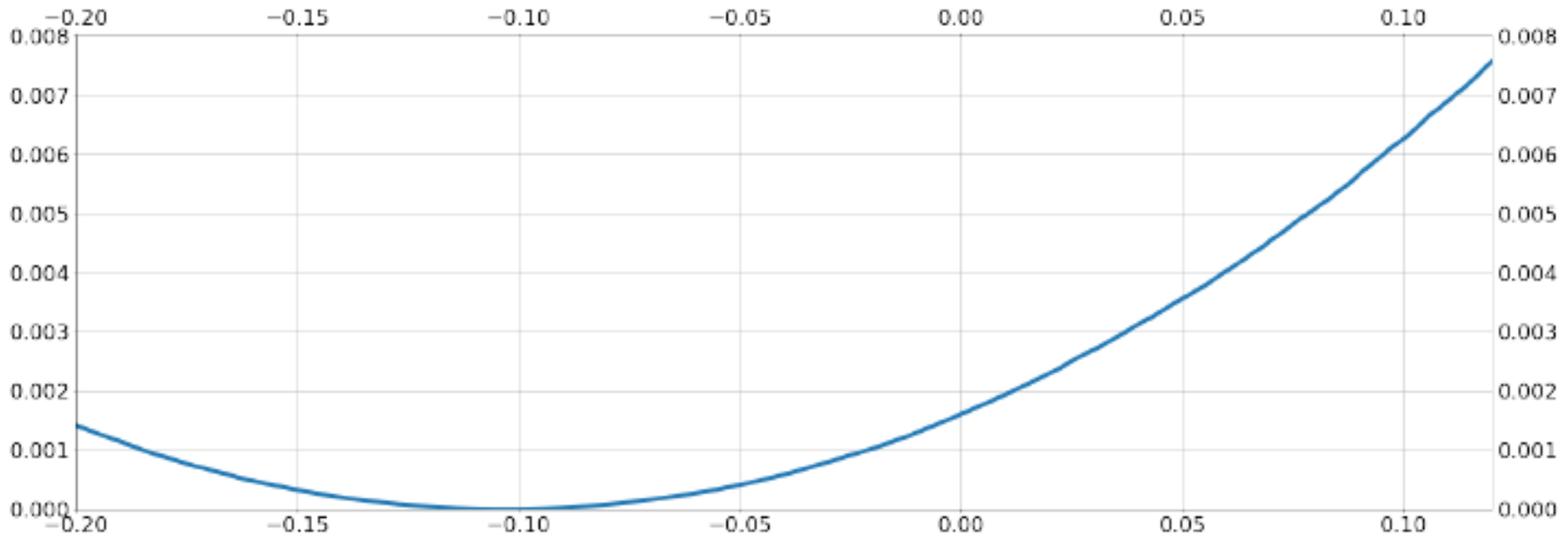
Results – Portfolio weights

Panel C: Maximum absolute weights of BTC



Results – Ex-ante CE gains

Panel A: Bitcoin





Non-Participation Literature

- There is low participation in markets in general. Is non-participation in Cryptos different?

- Equity premium puzzle (with CRRA utility)

$$E_t[R_{t+1} - R_{t+1}^f] = -\frac{\text{cov}_t[m_{t+1}, R_{t+1}]}{E_t[m_{t+1}]} = \frac{\gamma \text{cov}_t[\Delta \log c_{t+1}, R_{t+1}]}{1 - \gamma E_t[\Delta \log c_{t+1}]}$$

- Need relative risk aversion $\gamma \approx 30$ or higher
 - But the CE gains are computed using $\gamma = 3$
 - Risk free rate is too low
- Home bias
 - Information related



Crypto Features

- **Privacy**

- But FBI has traced ownership in some cases

- **Low cost to transfer funds**

- **Smart contracts** using Ethereum

- Bitcoin cannot be **debased** - **inflation hedge?**

- But it is a highly volatile currency that pays no interest

- How to value? **Discounted cash flows?**

- **Gold**

- But gold has some uses, e.g., jewellery

- Used as store of value in India - no trust in fiat money

- Gold standard – may be useful for Zimbabwe, Venezuela, etc



Reasons to not use Cryptos

■ Who uses Cryptos?

- Drug dealers, Money launderers, and Ransomware hackers
- Speculators – stimulus checks were invested in Cryptocurrencies
- El Salvador

■ Not really a good **inflation hedge** as we saw in 2022

■ Returns from Crypto investing can be -100%

- Between 1700 and 2500 Cryptos have failed
- Stablecoins are not stable – Terra, Luna
- High profile hacks – Ronin Network, Poly Network, Binance, Coincheck, Mt. Gox, etc.

The Elephant in the Room





Reasons to not use Cryptos

- **FTX fraud** - \$8 billion
 - November 2022
 - Sample in this paper ends in February 2022
- **Peso Problem**
 - It is when the tide goes out that you find who is naked
- **But should you short Cryptos?**
 - The market can remain irrational longer than you can remain solvent



Suggestions

- Extend data to include FTX failure
- In Table 2 build in transaction costs – get a range of priors for non-participation – not really knife edge

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ew-rf	-0.095	-0.091	-0.093	-0.102	-0.171	-0.161	-0.163	-0.173	-0.195	-0.192
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Final Thoughts

- **Important** to focus on non-participation
 - Participation has increased - Robinhood & stimulus checks
 - Median retirement account savings of US residents in 2019 was \$65,000
 - High volatility. What if cryptos crash when you retire?
- Cryptos are based on technology (Blockchain, Distributed ledgers) that can have interesting applications
- Do Cryptos need more regulation to increase participation?