

Estimating Profitability of Alternative Cryptocurrencies

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Paper link: <https://cs.princeton.edu/~yuxingh/altcoin-report/>



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Bitcoin alternatives

	market cap
	Bitcoin \$10 B
1,400+ Altcoins	Litecoin \$200 M
	Dogecoin \$22 M
	Auroracoin \$2 M
	WBB Coin \$75 K
	...

Most altcoins are volatile

	relative stdev of price
(USD/EUR)	2.5%
(GOOG)	6.8%
Bitcoin	106%
Litecoin	116%
Dogecoin	126%
Auroracoin	534%

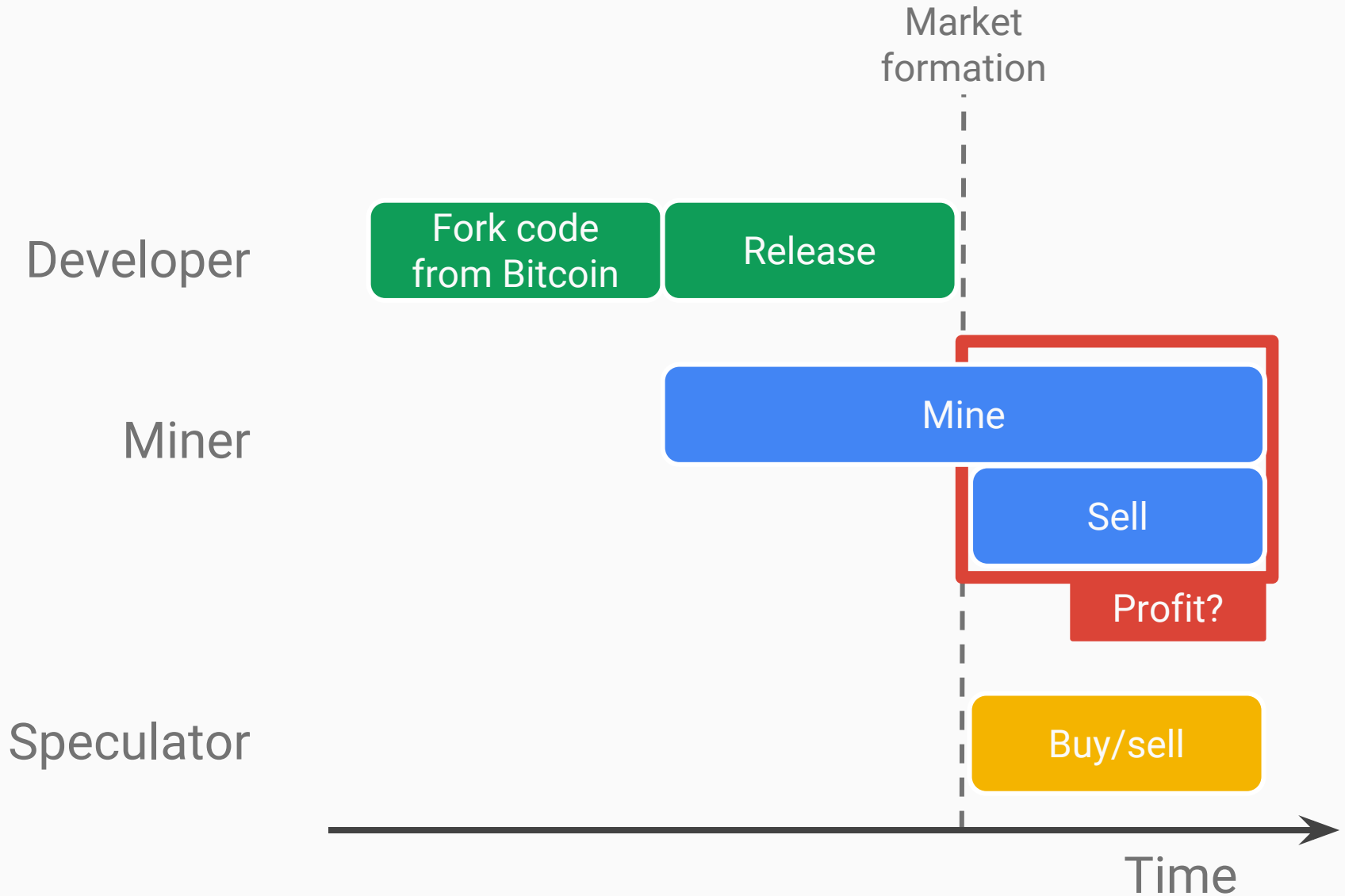
Use of altcoins

Few altcoins are used in commerce

... unlike Bitcoin

Potentially used as investment vehicles

Investing in altcoins



Methodology for estimating profitability

Profit = Revenue - Cost

Estimate Cost of Mining

- Gather historical trade data (CryptoCoinCharts)

- Gather historical blockchain data (18 altcoins)

- Compute opportunity cost

Estimate Revenue of Mining

- Simulate a rational miner using historical data

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Estimating Cost of Mining

Opportunity cost

Opportunity cost of altcoin mining
= Revenue from doing the same work
in mining bitcoins

Mining Bitcoin

(bigger market, less volatile)

Compute N hashes

Mined bitcoins;
sold at X dollars today

Rational;
 $X \geq$ all cost

Mining Altcoin

(smaller market, more volatile)

Compute same N hashes

Mined altcoins;
sold at Y dollars today

Rational;
 $Y \geq X =$ **Opp Cost**

Calculating opportunity cost

Opportunity cost of altcoin mining
= Revenue from doing the same work
in mining bitcoins

Opp cost of mining 1 altcoin

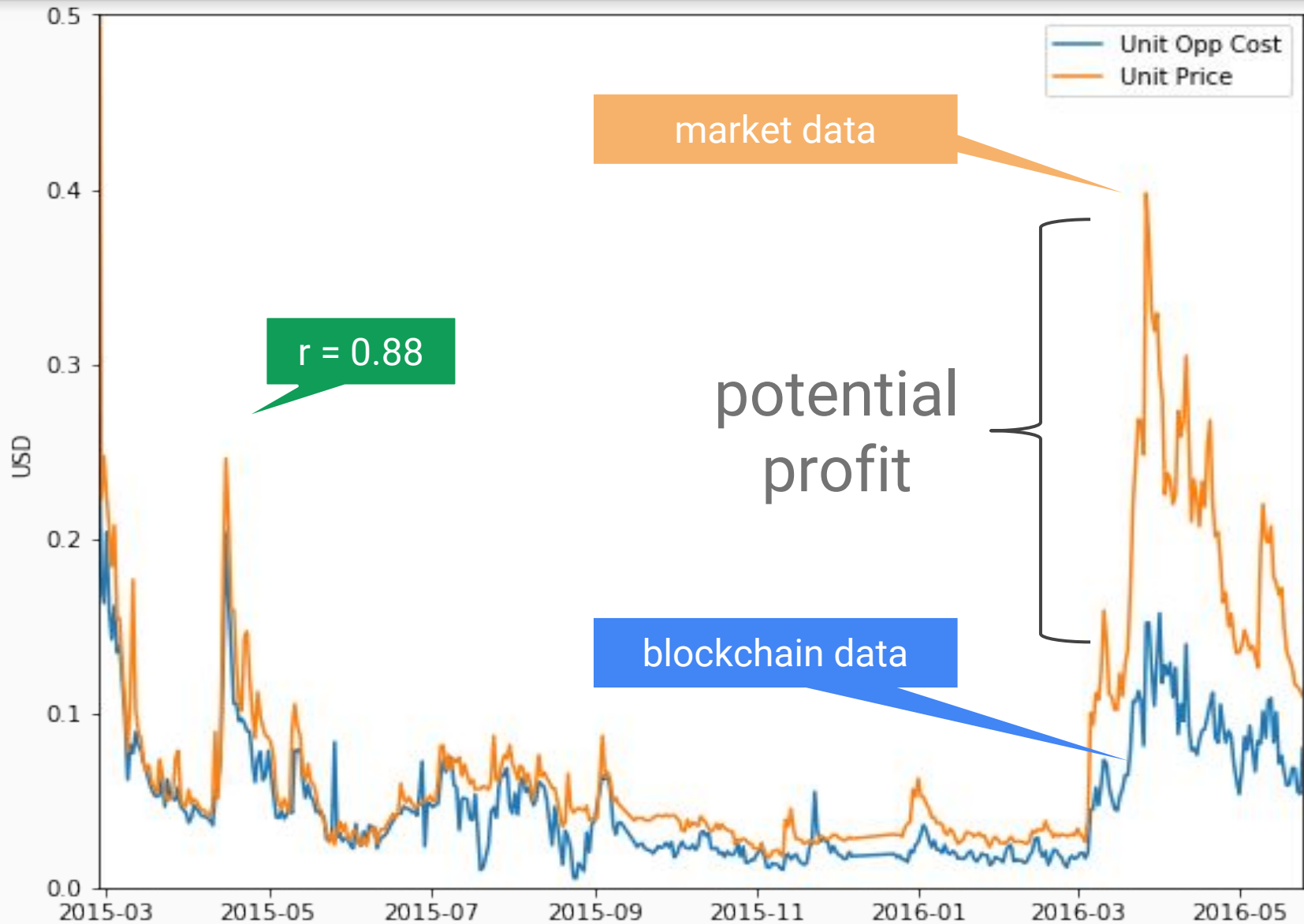
$$= \frac{\text{\# of hashes to mine 1 altcoin}}{\text{\# of hashes to mine 1 bitcoin}} \times \text{bitcoin price}$$

daily Σ difficulty /
daily # coins mined

Example of opportunity cost of mining



Opp cost correlated with price



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Estimating Profitability with Simulation

Estimating profit with simulation

Start mining on random day

Invest **\$1** of opp cost per day

Sell on same day

Continue for some duration, d

Obtain total revenue, v

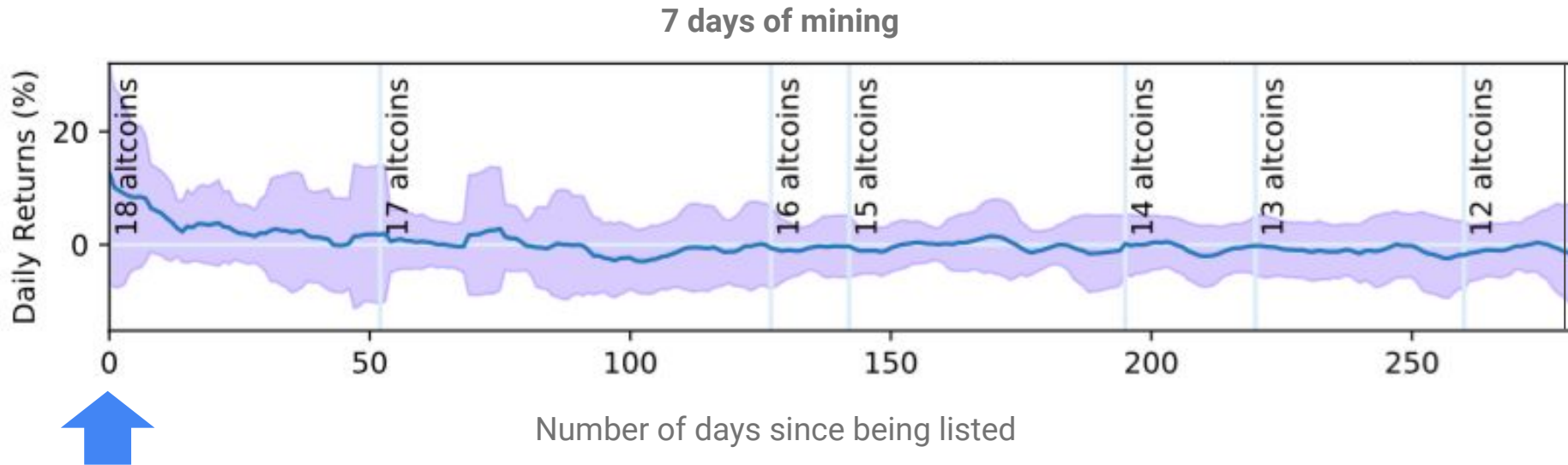
Daily rate of return: $d(1 + r)^d = v$

Compute expected rate of return: $E[r]$

Expected rate of return

	7 days	30 days	Capital Invested
PPC	-1.1%	-0.3%	\$4.1M
AUR	0.6%	0.1%	\$1.4M
WBB	6.6%	1.5%	\$61.2K
DOT	18.3%	4.9%	\$3.2K

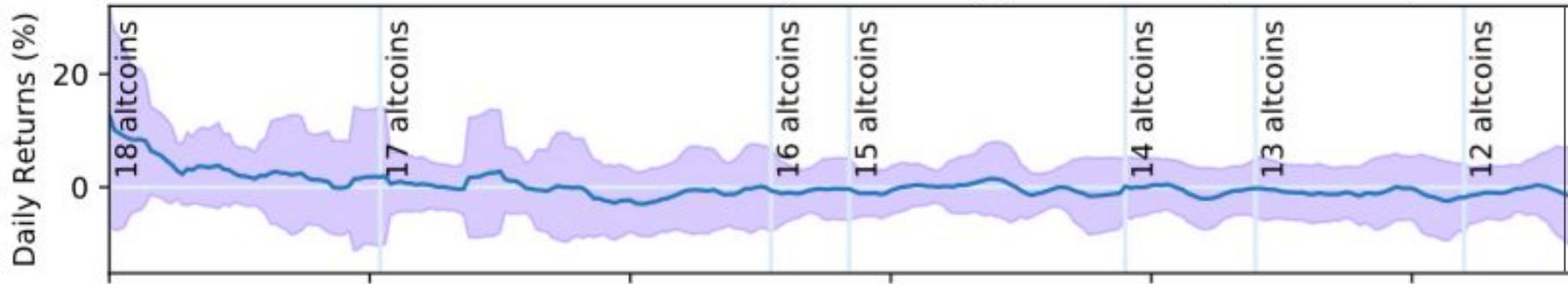
Daily returns for mining a random altcoin



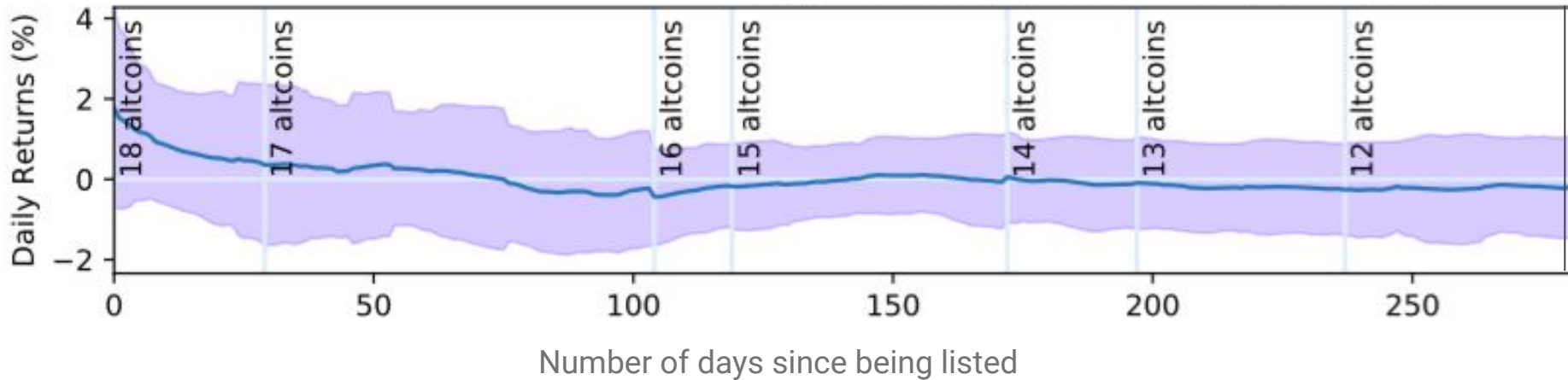
1. Pick a random altcoin from 18 altcoins.
2. Mine the coin on Day 0. Sell by end of day.
3. Mine same coin on Day 1. Sell by end of day.
4. ...
5. Mine same coin on Day 6. Sell by end of day.
6. Compute expected daily return.

Daily returns for mining a random altcoin

7 days of mining



30 days of mining





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Summary

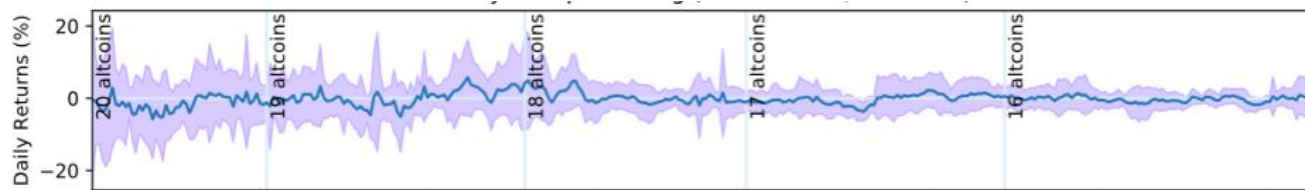
Summary

Using opp cost to estimate mining cost

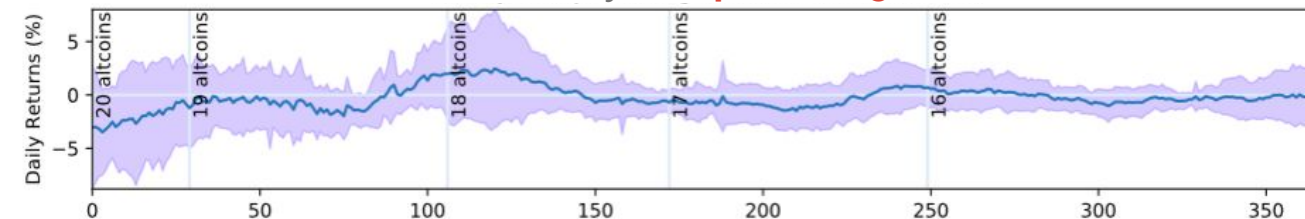
Using simulation to estimate profit

Early start correlated with high returns

7 days of **speculating**



30 days of **speculating**



Number of days since being listed



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