



Small Cap Cryptos

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Motivation & Summary

Motivations

We wanted to see whether a portfolio or individual selection of a small bucket of lower market cap cryptocurrencies performed better, worse, or same as a more traditional crypto portfolio of Bitcoin and Ethereum.

Questions

- Would picking a token with a small market cap outperform Bitcoin and Ethereum on a risk-adjusted basis over a 1-year timeframe?
- Is picking one of these smaller tokens akin to buying a lottery ticket or could it be a solid investment?
- Would it be better to randomly pick any token with a market cap under \$1 billion or to take a portfolio of many?

Summary of Findings

- While we were cut short on time to compute and analyze everything we wanted, we did get a good chunk of data. This data confirms that Bitcoin and Ethereum are the lowest risk of the selection of tokens we sampled, but also have the lowest potential returns.
- Daily returns of Bitcoin and Ethereum are muted compared to the other tokens we selected, as were the standard deviations.
- Monte Carlo Simulation returned data seems too good to be true due to sample size and dates





Questions & Data

- Would picking a token with a small market cap outperform Bitcoin and Ethereum on a risk-adjusted basis over a 1-year timeframe?
 - To do this, first we had to select a random number of crypto tokens. We randomly chose some under \$1 billion in total market capitalization, with most under \$500 million. We then compared the previous one year returns to that of Bitcoin and Ethereum, as well as running a monte carlo simulation to determine potential future returns.
- Is picking one of these smaller tokens akin to buying a lottery ticket or could it be a solid investment?
 - Probably more like a lottery ticket. Our data is not robust enough in that we only have roughly 1 year of data, which happened to take place during a major bull market for alt coins. Picking almost any of these would have generated better returns than investing in Bitcoin or Ethereum during the same timespan.
- We did not have time to get into the random token returns vs multiple token returns but given the high standard deviations of these tokens, logically it would be a much safer bet to buy a small amount of many lower cap tokens than a large amount of any single one.

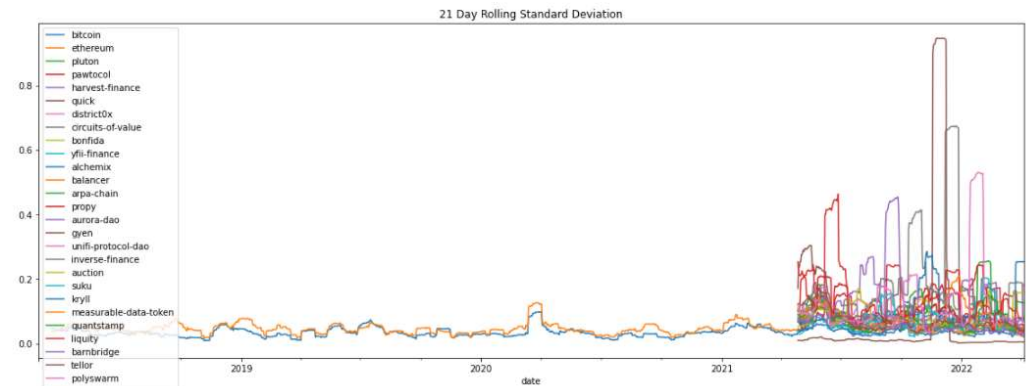
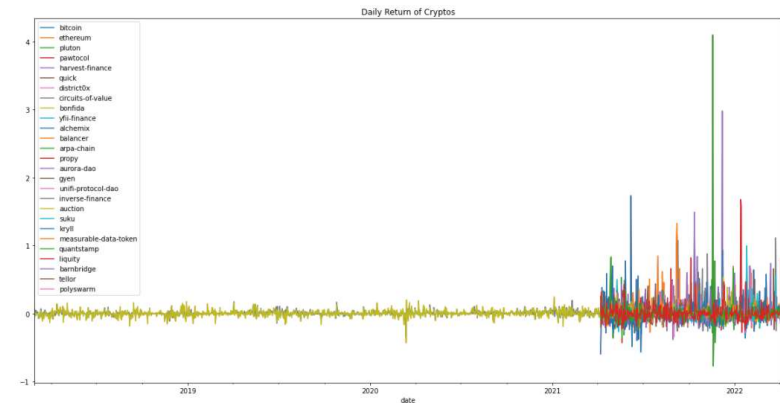
Data Cleanup & Exploration

- While running the data, we had a few tokens that ended up giving us problems when trying to combine all data into a readable chart. We ended up dropping a few tokens that were giving us this issue, which enabled us to read clean data.
- The correlation most of these smaller cap tokens have to Bitcoin is much lower than we anticipated. From 0.02 (Gyen) to 0.81 (Ethereum), there is a significantly broader correlation than we expected.
- Data kept giving us NaN values when running MCSimulation and some of the values were such outliers that we couldn't properly chart our data. To solve this, we ended up omitting the outlier data.



Discussion

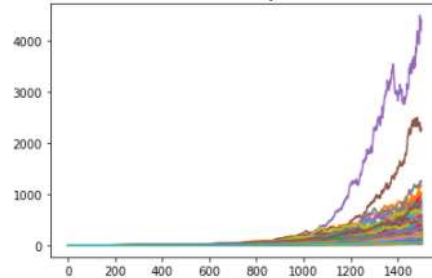
- Combing through crypto data is much more difficult than stock data. Some of these actually doubled during a single day, which is something that doesn't happen in traditional markets.
- Standard deviations of the smaller tokens were multitudes higher than those of Bitcoin and Ethereum. BTC and ETH are still considered very volatile assets, which means the other tokens were considered are SIGNIFICANTLY riskier.



```
# Print summary statistics
print(even_tbt)
```

```
count      500.000000
mean       233.427288
std        284.579406
min        14.905593
25%        92.127918
50%       160.993530
75%       281.150414
max       4404.234209
95% CI Lower  33.387668
95% CI Upper 842.184337
Name: 1500, dtype: float64
```

500 Simulations of Cumulative Portfolio Return Trajectories Over the Next 1500 Trading Days.



Monte Carlo Simulation Results

After reviewing our Monte Carlo Simulation results, we determined there are two likely scenarios.

1. We do not have enough data. Considering the mean return over 1500 days is 233x, this is an almost 6.5% daily return.
2. We should all put as much money as we can into this portfolio allocation.

While we wish the correct answer were scenario #2, we are 99.99% sure it's scenario #1.



Postmortem

- Ultimately, there is simply not enough data for us to properly answer all of our questions. Considering there are now almost 19,000 cryptocurrencies with thousands being created each year.
- We would like to have had some kind of random function that chose a certain random token from a list and compared that to a BTC/ETH portfolio.
- We also would have liked if there were more data (including data from a bear market).
- Ultimately, there is much more we can do with this data by further manipulation or additions during future projects.

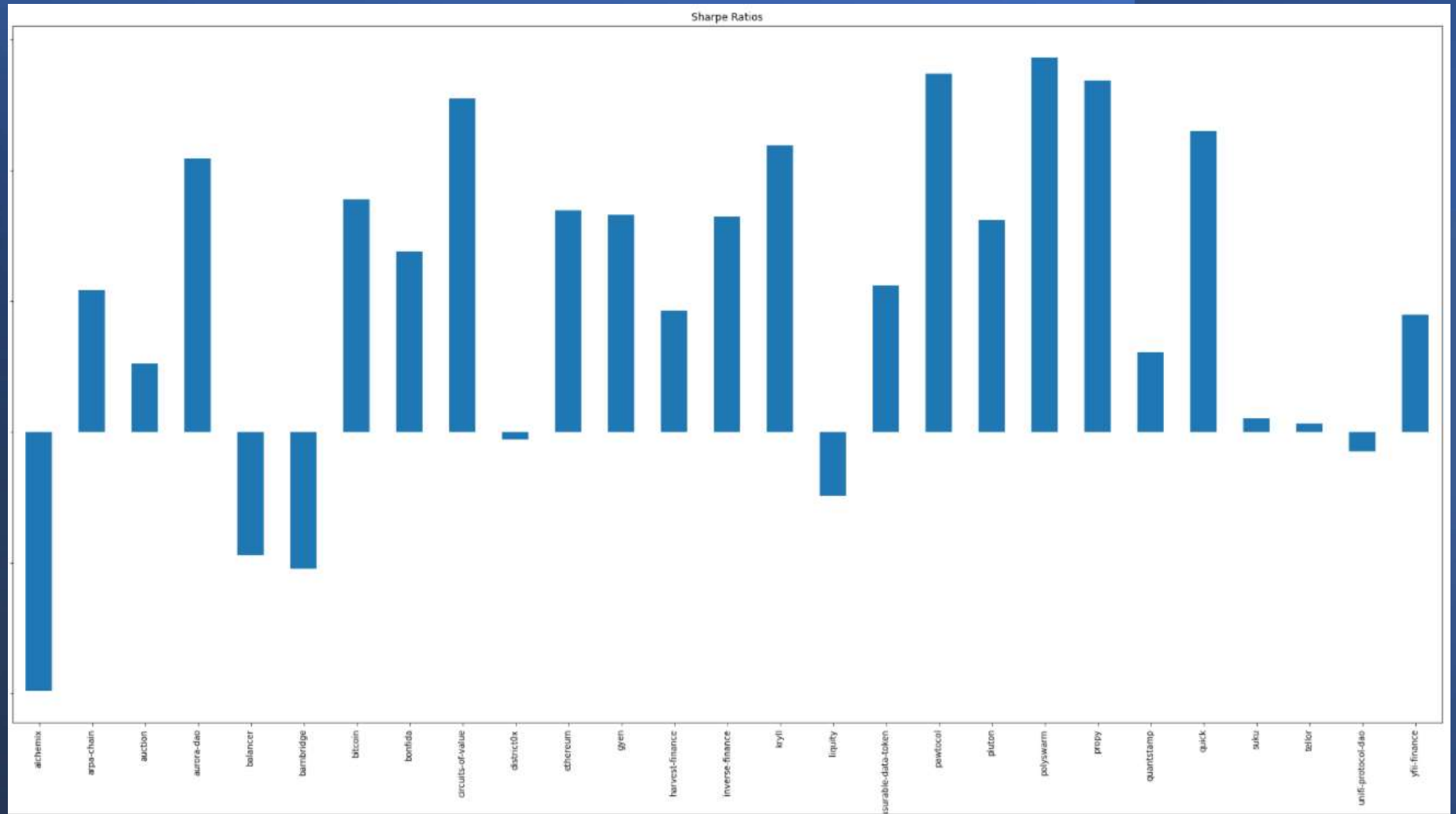
Questions

Open-floor Q&A with the audience

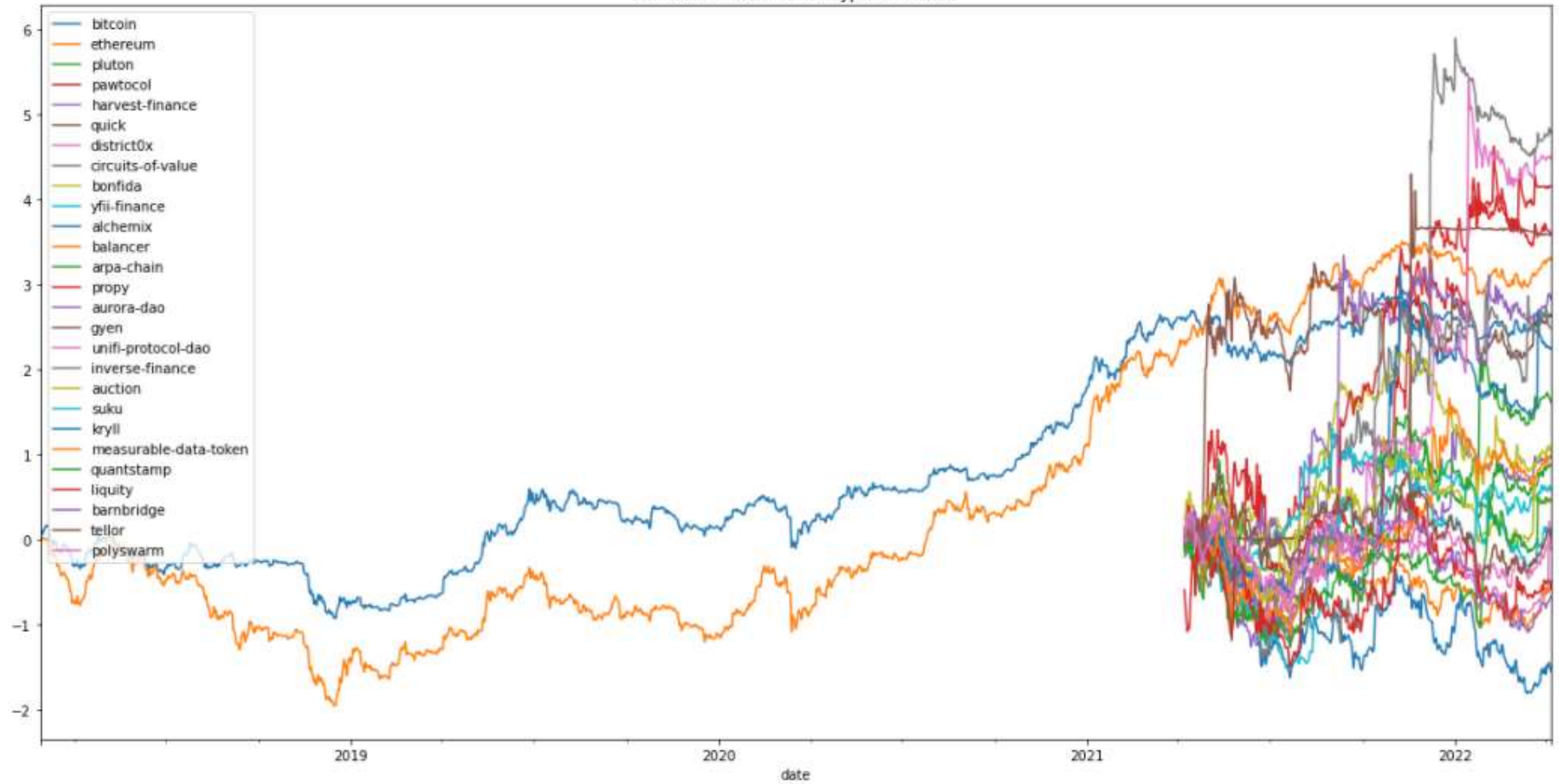




Larger Data Visualizations



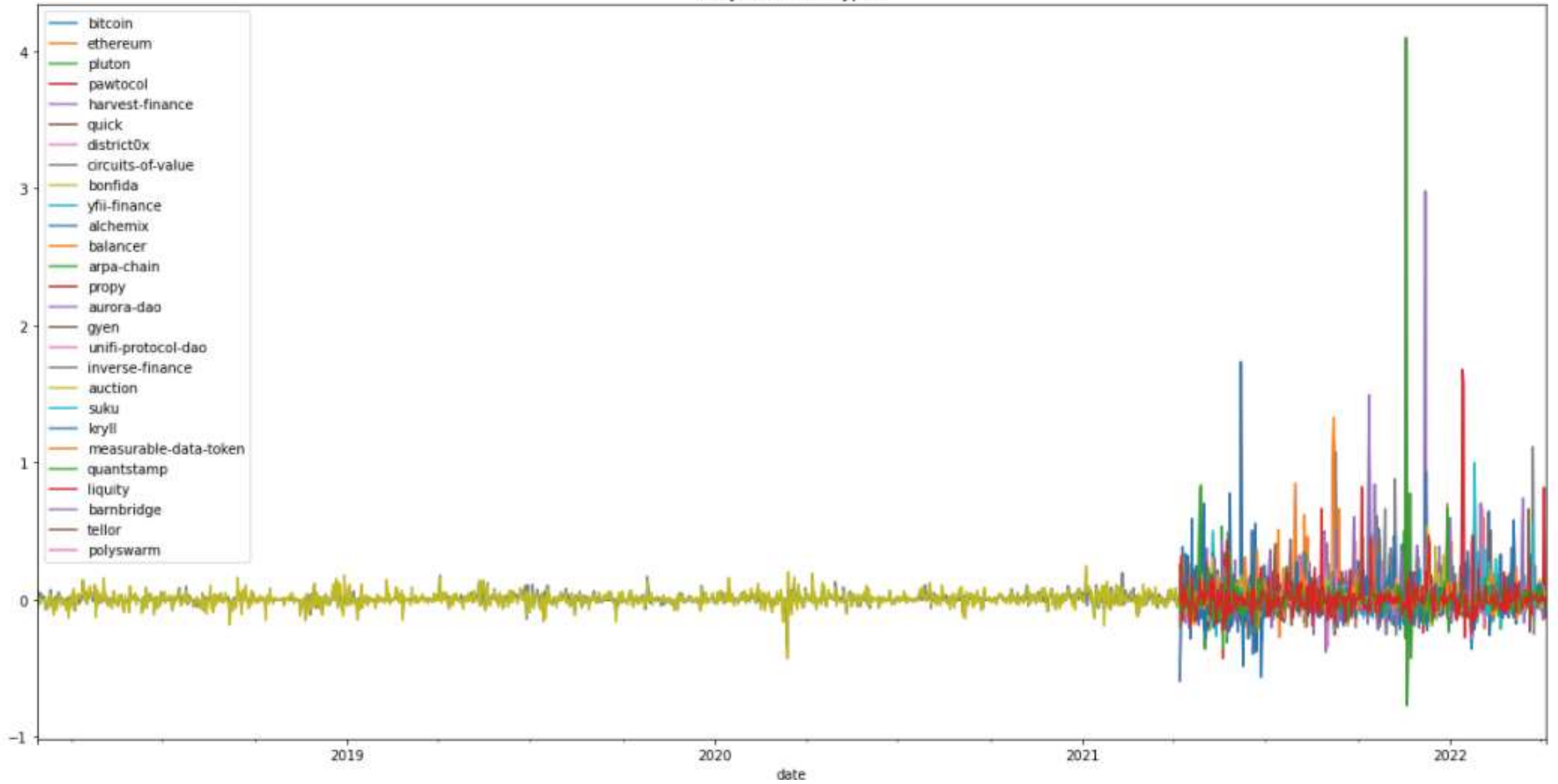
Cumulative Returns of Crypto Portfolios



Correlations

	bitcoin	ethereum	pluton	pawtocol	aventus	harvest-finance	quick	district0x	circuits-of-value	bonfida	yfi-finance	alchemy	balancer	arpa-chain	propy	aurora-dao	gyen	unifi-protocol-dao	inverse-finance	auction	suku	kryll	measurable-data-token	quantstamp	liquity	barnbridge	tellor	polyswarm
bitcoin	1.000000	0.811292	0.281015	0.071664	-0.000901	0.300507	0.440203	0.528501	0.201748	0.524841	0.568373	0.605180	0.746451	0.618408	0.312263	0.256949	0.024021	0.588596	0.217875	0.458641	0.202734	0.304735	0.476894	0.573520	0.257340	0.351552	0.702492	0.159608
ethereum	0.811292	1.000000	0.316742	0.128406	0.052214	0.309019	0.499030	0.537675	0.272176	0.642564	0.636380	0.739677	0.871717	0.614272	0.317706	0.269326	0.028821	0.621230	0.227303	0.461789	0.234859	0.317787	0.517584	0.569625	0.334274	0.357501	0.723043	0.198722
pluton	0.281015	0.316742	1.000000	0.083995	-0.002148	0.119134	0.176445	0.216386	0.163208	0.287454	0.212416	0.275042	0.287788	0.283560	0.131755	0.082338	-0.040719	0.277878	0.039151	0.147554	0.093399	0.115794	0.216985	0.131963	0.054173	0.161100	0.313421	0.027977
pawtocol	0.071664	0.128406	0.083995	1.000000	-0.003061	0.025708	0.021305	0.084887	0.205913	0.096861	0.082854	0.145256	0.116063	0.167560	0.127260	0.053672	0.038768	0.082308	-0.027046	0.112866	0.049516	0.032522	0.139216	0.128536	0.028203	0.054107	0.097352	0.085346
aventus	-0.000901	0.052214	-0.002148	-0.003061	1.000000	0.011188	-0.021043	0.013219	0.031719	0.007035	0.014867	-0.019429	0.035490	0.081189	-0.003568	0.008194	-0.003039	0.038846	0.013066	0.047382	0.003101	0.003930	0.012495	-0.024786	-0.048978	0.013206	0.018209	0.035904
harvest-finance	0.300507	0.309019	0.119134	0.025708	0.011188	1.000000	0.324516	0.246603	0.080411	0.219364	0.249692	0.325107	0.300497	0.241937	0.120502	0.111310	0.019832	0.222030	0.077526	0.247578	0.141716	0.132948	0.202908	0.212339	0.136948	0.278627	0.328062	0.066772
quick	0.440203	0.499030	0.176445	0.021305	-0.021043	0.324516	1.000000	0.395871	0.140738	0.373524	0.362135	0.423481	0.477555	0.383534	0.284918	0.177084	0.015915	0.288956	0.139808	0.396111	0.152343	0.185887	0.375083	0.373787	0.125011	0.242296	0.488932	0.071888
district0x	0.528501	0.537675	0.216386	0.084887	0.013219	0.246603	0.395871	1.000000	0.154671	0.443455	0.451679	0.433395	0.506676	0.427914	0.248861	0.168611	0.011317	0.374517	0.125702	0.391544	0.204235	0.209320	0.371786	0.379500	0.186293	0.211625	0.542171	0.107089
circuits-of-value	0.201748	0.272176	0.163208	0.205913	0.031719	0.080411	0.140738	0.154671	1.000000	0.187601	0.214415	0.201930	0.247440	0.167551	0.025125	0.123161	0.078799	0.190725	0.030132	0.131509	0.021174	0.055922	0.199097	0.147880	0.137731	0.002826	0.164822	0.071129
bonfida	0.524841	0.642564	0.287454	0.096861	0.007035	0.219364	0.373524	0.443455	0.187601	1.000000	0.454267	0.472518	0.568496	0.438509	0.273577	0.338789	0.020950	0.387596	0.124405	0.379534	0.289622	0.235989	0.383657	0.405713	0.284755	0.300919	0.515374	0.068033
yfi-finance	0.568373	0.636380	0.212416	0.082854	0.014867	0.249692	0.362135	0.451679	0.214415	0.454267	1.000000	0.458958	0.654507	0.473525	0.223597	0.184893	0.010289	0.473633	0.143618	0.379058	0.112701	0.166561	0.344530	0.473573	0.189120	0.214351	0.558763	0.131897
alchemy	0.605180	0.739677	0.275042	0.145256	-0.019429	0.325107	0.423481	0.433395	0.201930	0.472518	0.458958	1.000000	0.675147	0.541044	0.308708	0.186874	0.016025	0.436851	0.293250	0.381086	0.200851	0.299835	0.414195	0.441968	0.236060	0.308834	0.558567	0.174727
balancer	0.746451	0.671717	0.287788	0.116083	0.035490	0.300497	0.477555	0.506676	0.247440	0.568496	0.654507	0.675147	1.000000	0.587980	0.279775	0.219611	0.031690	0.625921	0.212493	0.453708	0.217863	0.315955	0.481585	0.547645	0.303909	0.354156	0.686820	0.163388
arpa-chain	0.618408	0.614272	0.283560	0.167560	0.081189	0.241537	0.383534	0.427914	0.167551	0.438509	0.473525	0.541044	0.587980	1.000000	0.362693	0.180034	0.003507	0.449980	0.243194	0.455607	0.200518	0.287916	0.451538	0.475282	0.182240	0.248151	0.570786	0.149120
propy	0.312263	0.317706	0.131755	0.127260	-0.003568	0.120502	0.284918	0.248861	0.025125	0.275577	0.223597	0.308708	0.279775	0.362693	1.000000	0.158596	-0.033252	0.199334	0.174644	0.318503	0.051308	0.182747	0.196393	0.264800	0.238866	0.175571	0.309656	0.279849
aurora-dao	0.256949	0.269326	0.082338	0.053672	0.003101	0.111310	0.177084	0.168611	0.123161	0.338789	0.184893	0.186874	0.219611	0.180034	0.158596	1.000000	-0.035093	0.184699	0.026713	0.171373	0.189876	0.085935	0.174740	0.250499	0.099646	0.127723	0.244490	0.011706
gyen	0.024021	0.028821	-0.040719	0.038768	0.003039	0.019832	0.015915	0.011317	0.078799	0.020950	0.010289	0.016025	0.031690	0.003507	-0.033252	-0.035093	1.000000	0.021878	-0.004134	0.002162	-0.022742	-0.041034	0.017745	0.023072	0.031513	0.009133	-0.002646	-0.000949
unifi-protocol-dao	0.588596	0.621230	0.277878	0.082308	0.038846	0.220050	0.288956	0.374517	0.190725	0.387596	0.473633	0.436851	0.625921	0.449980	0.199334	0.184699	0.021878	1.000000	0.100669	0.403293	0.147444	0.207912	0.337909	0.414776	0.228200	0.238663	0.536698	0.121406
inverse-finance	0.217875	0.227303	0.039151	-0.027046	0.013066	0.077526	0.139808	0.125702	0.030132	0.124405	0.143618	0.289250	0.212493	0.243194	0.174644	0.026713	-0.004134	0.100669	1.000000	0.187580	0.048969	0.130966	0.123898	0.138408	0.088512	0.102516	0.179940	0.143633
auction	0.458641	0.461789	0.147554	0.112866	0.047382	0.247578	0.396111	0.391544	0.131509	0.379534	0.379058	0.381086	0.453708	0.455607	0.318503	0.171373	0.002162	0.403293	0.187580	1.000000	0.173218	0.157773	0.334976	0.385583	0.091534	0.215844	0.456700	0.112955
suku	0.202734	0.234859	0.093399	0.049516	0.003101	0.141716	0.152343	0.204235	0.021174	0.289622	0.112701	0.200851	0.217863	0.200518	0.051308	0.188876	-0.022742	0.147444	0.048969	0.173218	1.000000	0.206258	0.127383	0.080115	0.084127	0.135797	0.205290	-0.001138
kryll	0.304735	0.317787	0.115794	0.032522	0.003930	0.132948	0.185887	0.209320	0.055922	0.235989	0.166561	0.299835	0.315955	0.287916	0.182747	0.085935	-0.041034	0.207912	0.130966	0.157773	0.208258	1.000000	0.204392	0.374154	0.160155	0.144557	0.289353	0.034937
measurable-data-token	0.476894	0.517584	0.216985	0.139216	0.012495	0.202908	0.375083	0.371786	0.199097	0.383657	0.344530	0.414195	0.481585	0.451538	0.196393	0.174740	0.017745	0.337909	0.123898	0.334976	0.127383	0.204392	1.000000	0.358575	0.157878	0.174785	0.452009	0.126116
quantstamp	0.573520	0.569625	0.131963	0.128536	-0.024786	0.212339	0.373787	0.379500	0.147880	0.405713	0.473573	0.441968	0.547645	0.475282	0.264800	0.250499	0.023072	0.414776	0.138408	0.385583	0.080115	0.374154	0.358575	1.000000	0.176147	0.205426	0.508609	0.119211
liquity	0.257340	0.334274	0.054173	0.028203	-0.048978	0.136948	0.125011	0.186293	0.137731	0.284755	0.189120	0.236060	0.303909	0.182240	0.238366	0.099646	0.031513	0.228200	0.088512	0.091534	0.084127	0.160155	0.157878	0.176147	1.000000	0.110733	0.246055	0.115414
barnbridge	0.351552	0.357501	0.161100	0.054107	0.013206	0.278627	0.242296	0.211625	0.002826	0.300919	0.214351	0.308834	0.354156	0.248151	0.173571	0.127723	0.009133	0.238663	0.102516	0.215844	0.135797	0.144557	0.174785	0.205426	0.110733	1.000000	0.268118	0.068418
tellor	0.702492	0.723043	0.313421	0.097352	0.018209	0.328062	0.488932	0.542171	0.164822	0.515374	0.558763	0.558567	0.686820	0.570786	0.309656	0.244490	-0.002646	0.536698	0.179940	0.456700	0.205290	0.269535	0.452009	0.508609	0.246055	0.268118	1.000000	0.147003
polyswarm	0.159608	0.198722	0.027977	0.085346	0.035904	0.066772	0.071888	0.107089	0.071129	0.068033	0.131897	0.174727	0.163388	0.149120	0.279849	0.011706	-0.000949	0.121406	0.143633	0.112955	-0.001138	0.034937	0.126116	0.119211	0.115414	0.068418	0.147003	1.000000

Daily Return of Cryptos



21 Day Rolling Standard Deviation

