# Deriving insights from Brazilian investment funds via Data Science

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What are investment funds?

- Pool of monies that belong to one or various shareholders
- Each share correspond to na ideal fraction of the fund's assets
  - E.g. stocks, bonds….
- May be either closed-end (shares must be sold) or open-end (shares may be redeemed)
- May adopt various strategies and trade several types of assets
  - Fixed income funds – commercial papers, debentures, bonds….
  - Stock funds – stock funds or derivatives related to stocks
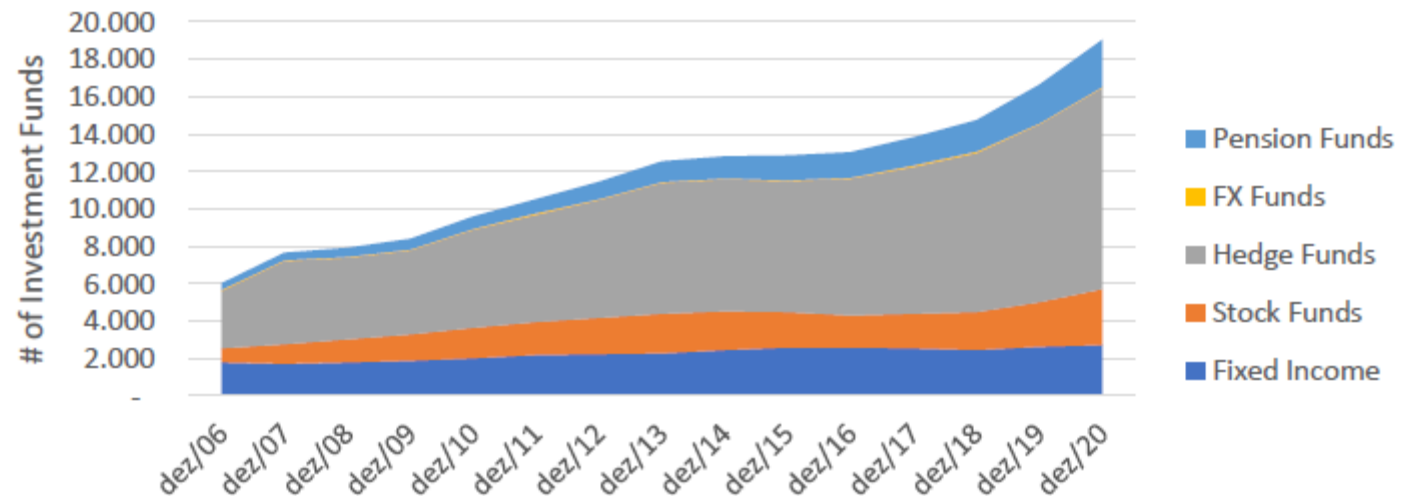 - Hedge funds – all of the above and another myriad of assets

Total Net Worth of Brazilian Investment Funds - in million BRL

Source: ANBIMA

Count of Investment Funds per Class
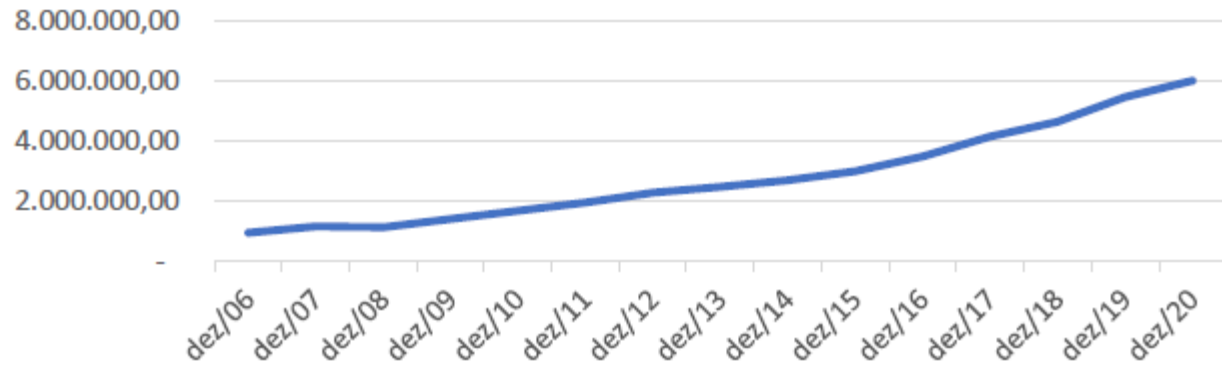
More and more assets in Brazil are managed via investment funds

How do fund shareholders behave according to changes on the markets?

How different funds can either attract or repel shareholders according to the same changes?

Data used on this project

- List of investment funds registered in Brazil (available since the Early 90's), published by CVM

- Daily stats published by CVM between 2017 and 2020, with the fund net worth, share value, subscriptions and redemptions paid on the given day

- IBOVESPA and SELIC daily values for the same time span

Methodology

- Two sets of funds were chosen – fixed income funds and hedge funds
- The daily stats of funds were filtered to avoid outliers and errors
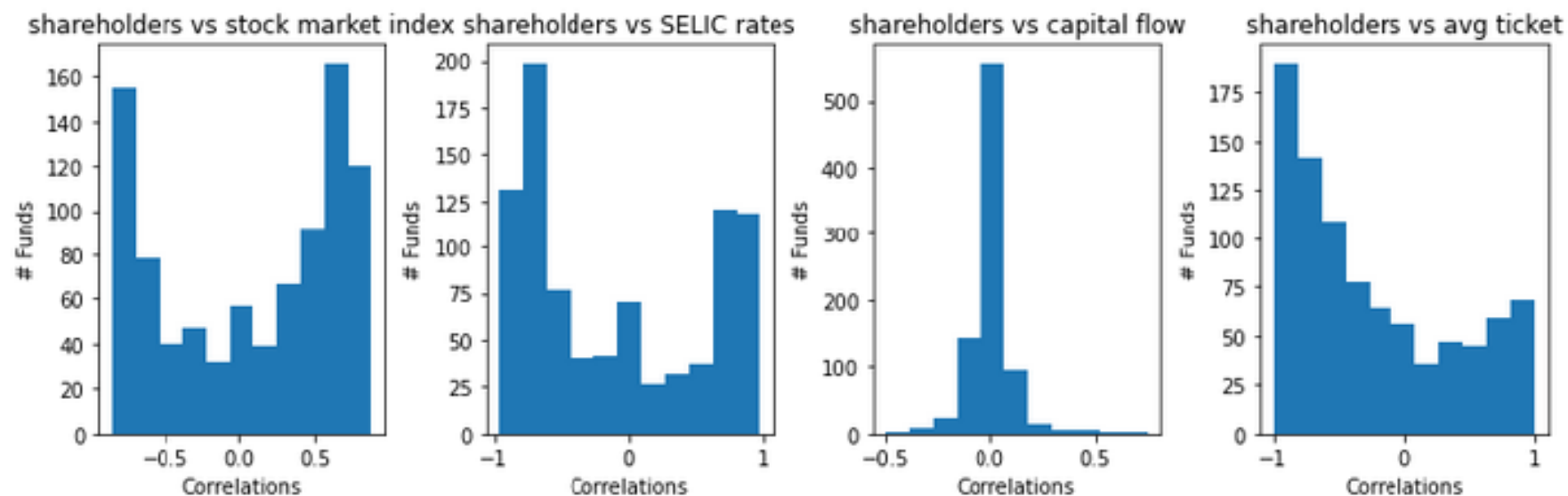
```
In [4]: historicSeries.describe()
```

Out[4]:

|	VL_TOTAL	VL_QUOTA	VL_PATRIM_LIQ	CAPTC_DIA	RESG_DIA	NR_COTST
count	1.539843e+07	1.539843e+07	1.539843e+07	1.539843e+07	1.539843e+07	1.539843e+07
mean	4.509613e+08	1.502239e+04	4.491871e+08	2.829099e+06	2.752343e+06	1.059561e+03
std	3.028144e+09	2.302718e+07	3.008135e+09	7.038041e+07	6.968411e+07	2.113526e+04
min	-8.804822e+08	-3.259389e+07	-8.833179e+07	0.000000e+00	0.000000e+00	0.000000e+00
25%	1.678671e+07	1.390819e+00	1.678042e+07	0.000000e+00	0.000000e+00	1.000000e+00
50%	4.723933e+07	2.874078e+00	4.717449e+07	0.000000e+00	0.000000e+00	2.000000e+00
75%	1.713284e+08	2.861168e+01	1.708142e+08	0.000000e+00	0.000000e+00	1.300000e+01
max	3.439999e+12	9.033537e+10	3.439999e+12	4.281956e+10	4.230832e+10	5.300000e+07

Methodology

- Correlations will be calculated between the # of shareholders and some relevant metrics

- The correlations of each metric for each fund will be displayed on a histogram in order to derive insights about the fund class behavior towards the metric

- Afterwards, clusterization will be used to test if such correlation sets can be used to separate funds into groups

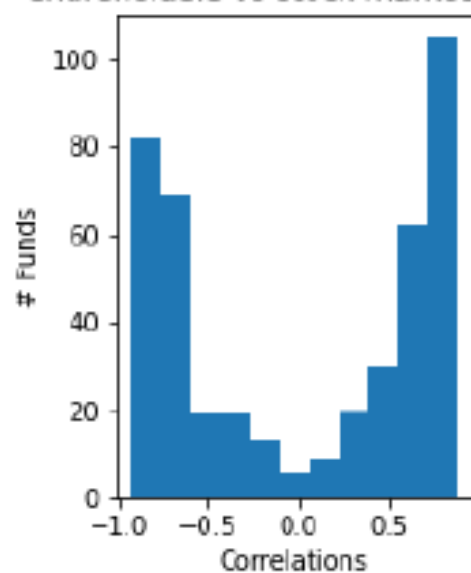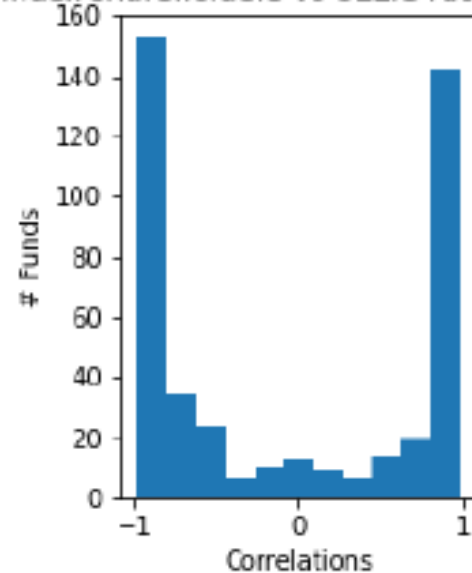# Results

Hedge Funds Results 2016-2020
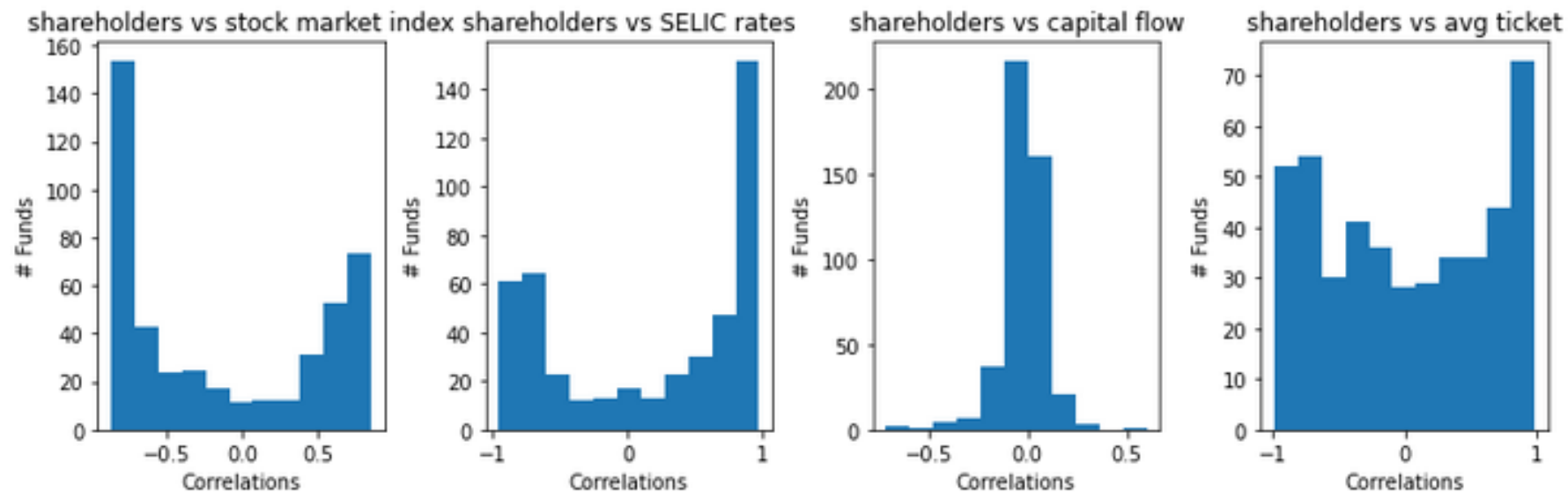
Year by Year Analysis – Fixed Income Funds

Fixed Income Funds Results 2017-2017
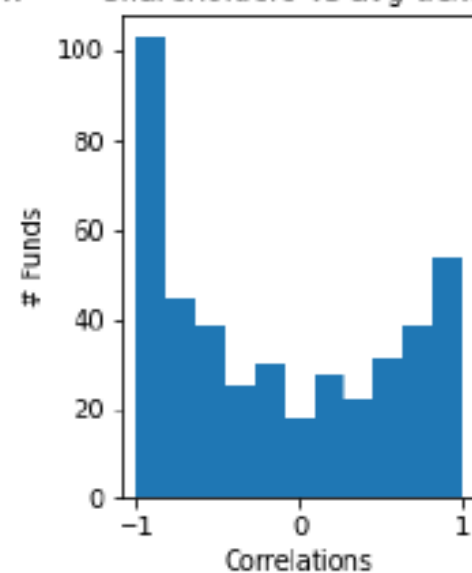
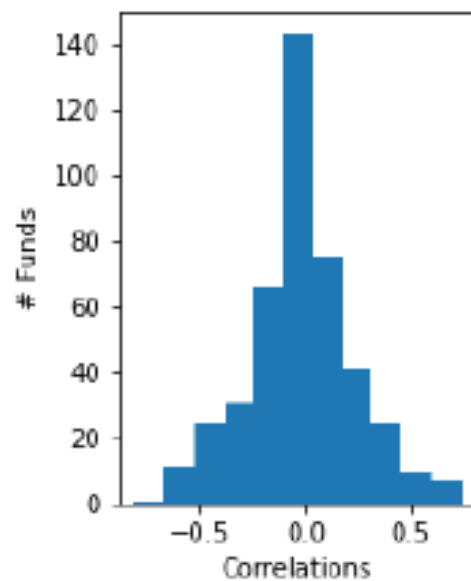### shareholders vs stock market index · shareholders vs SELIC rates · shareholders vs capital flow · shareholders vs avg ticket
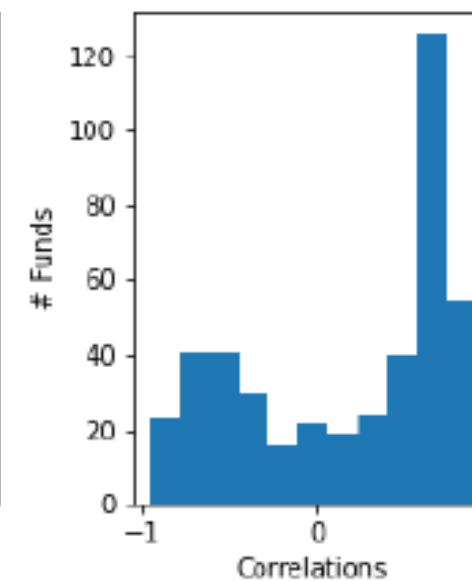
Fixed Income Funds Results 2018-2018

shareholders vs stock market index · shareholders vs SELIC rates · shareholders vs capital flow · shareholders vs avg ticket

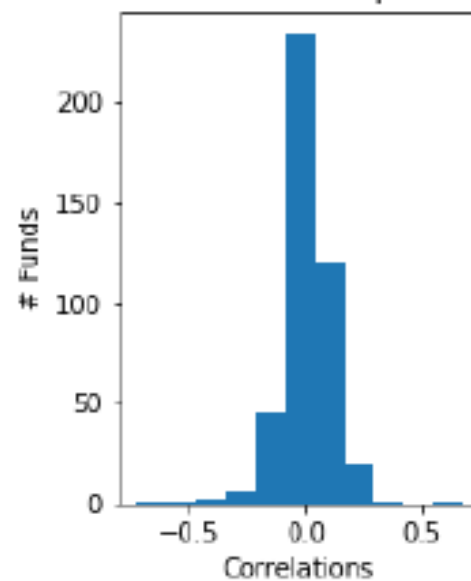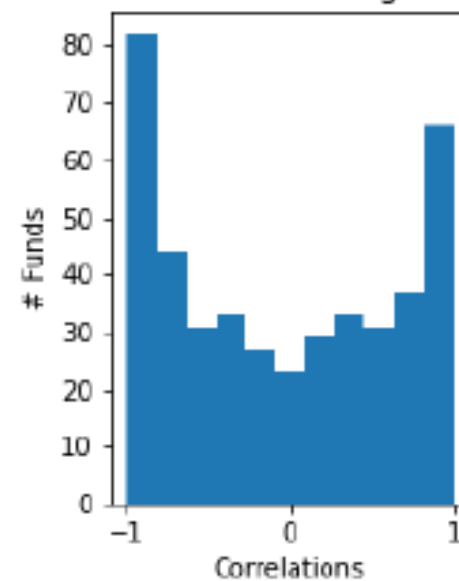## Fixed Income Funds Results 2019-2019

shareholders vs stock market index   shareholders vs SELIC rates   shareholders vs capital flow   shareholders vs avg ticket
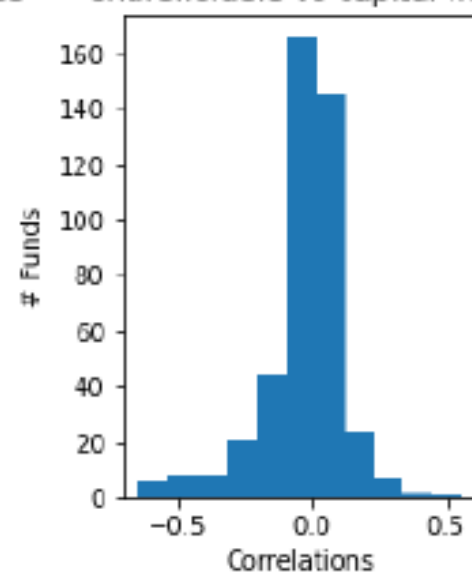
Fixed Income Funds Results 2020-2020

shareholders vs stock market index   shareholders vs SELIC rates   shareholders vs capital flow   shareholders vs avg ticket
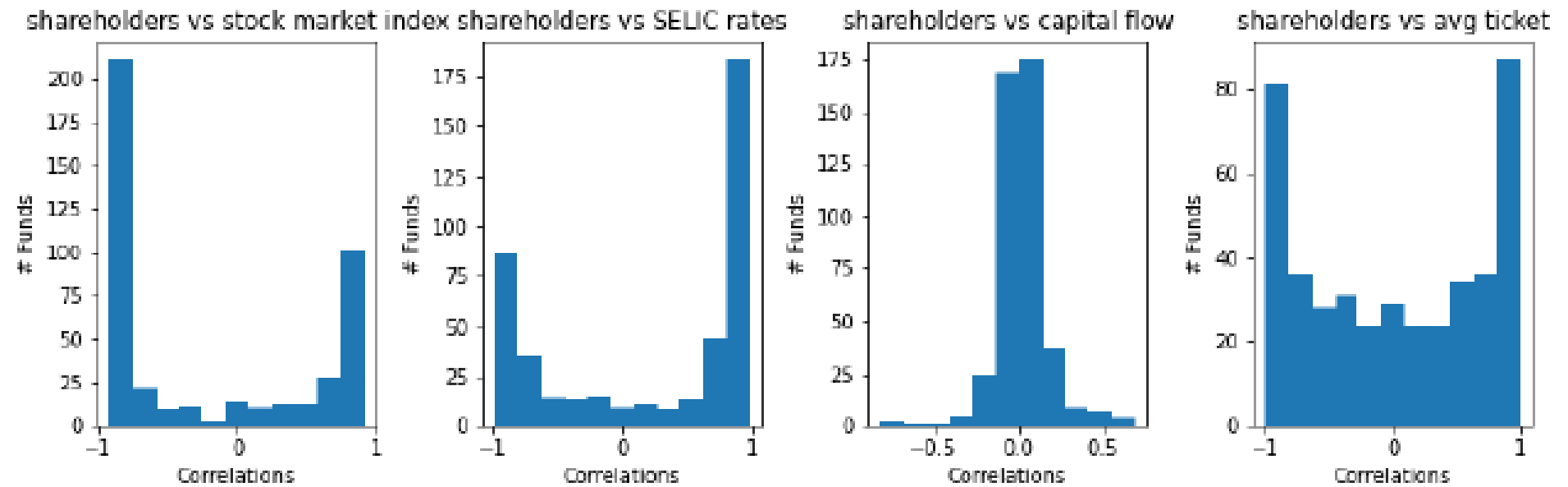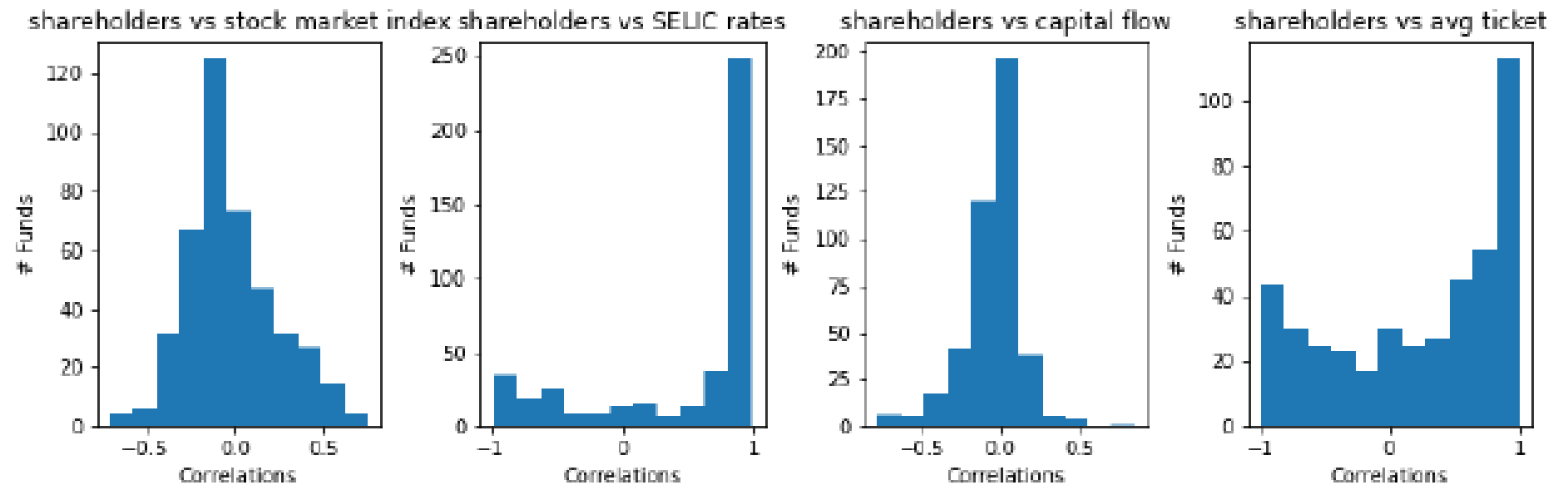
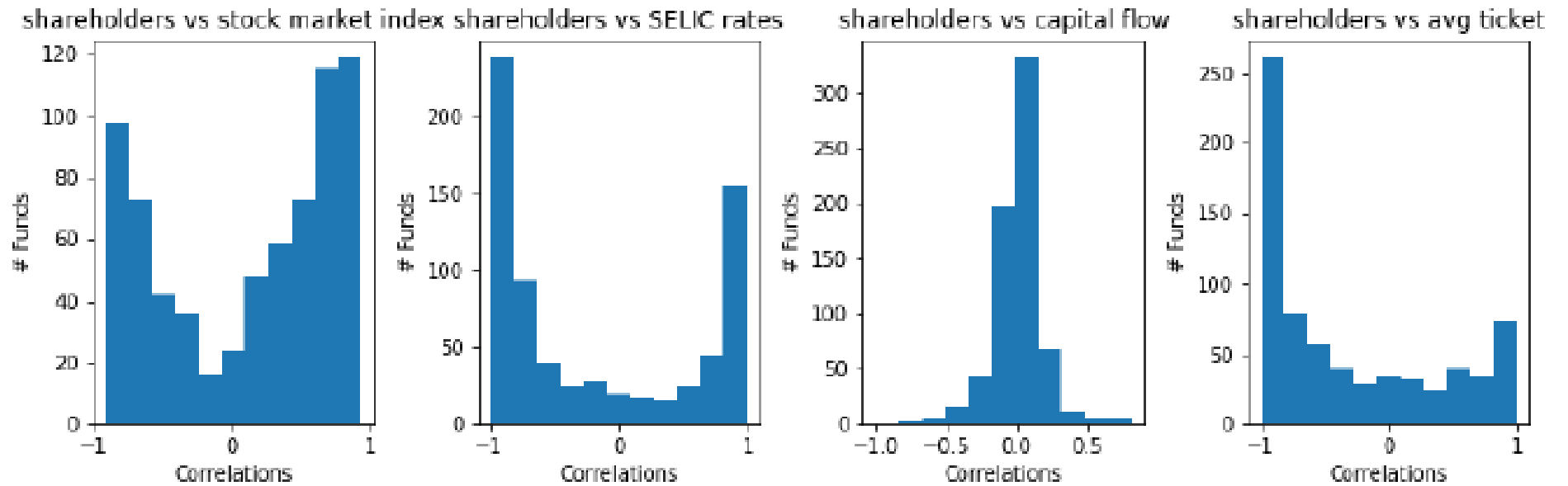# Year by Year Analysis – Hedge Funds

Hedge Funds Results 2017-2017
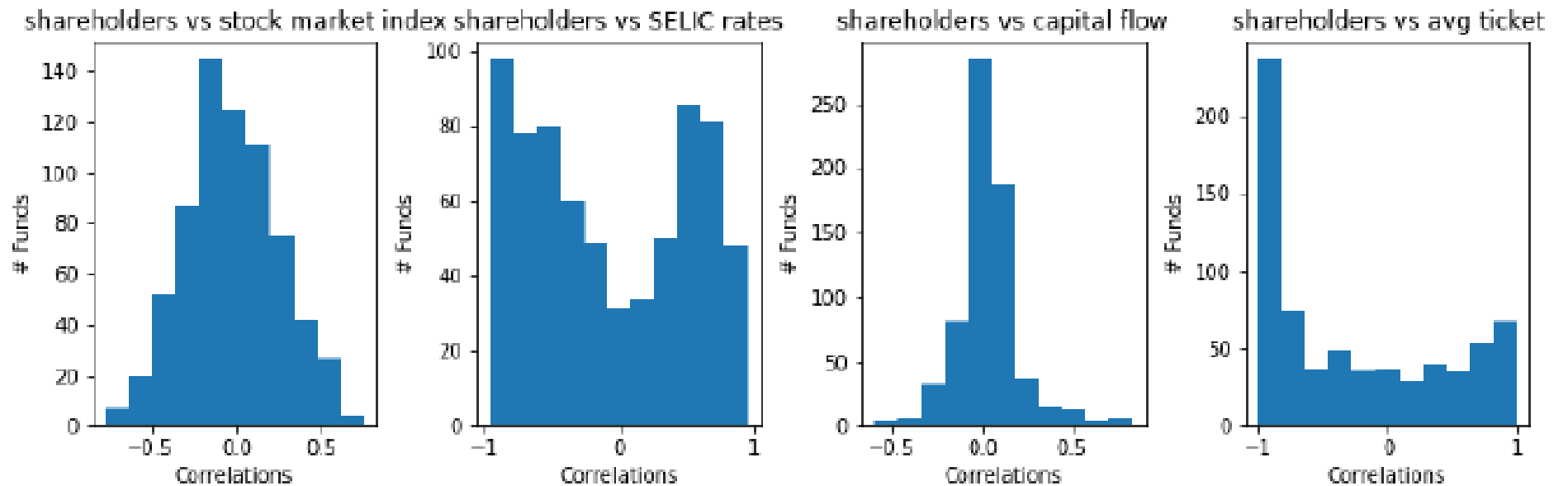
shareholders vs stock market index | shareholders vs SELIC rates | shareholders vs capital flow | shareholders vs avg ticket

Hedge Funds Results 2018-2018

shareholders vs stock market index | shareholders vs SELIC rates | shareholders vs capital flow | shareholders vs avg ticket

Hedge Funds Results 2019-2019

shareholders vs stock market index shareholders vs SELIC rates   shareholders vs capital flow   shareholders vs avg ticket

Hedge Funds Results 2020-2020

shareholders vs stock market index shareholders vs SELIC rates   shareholders vs capital flow   shareholders vs avg ticket
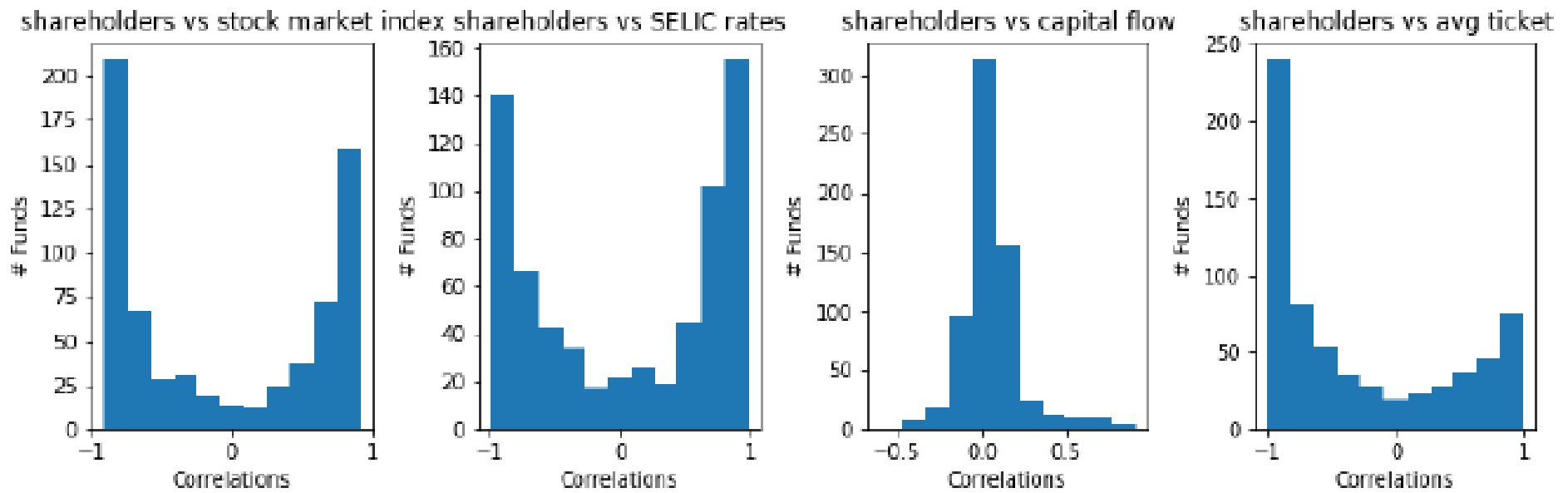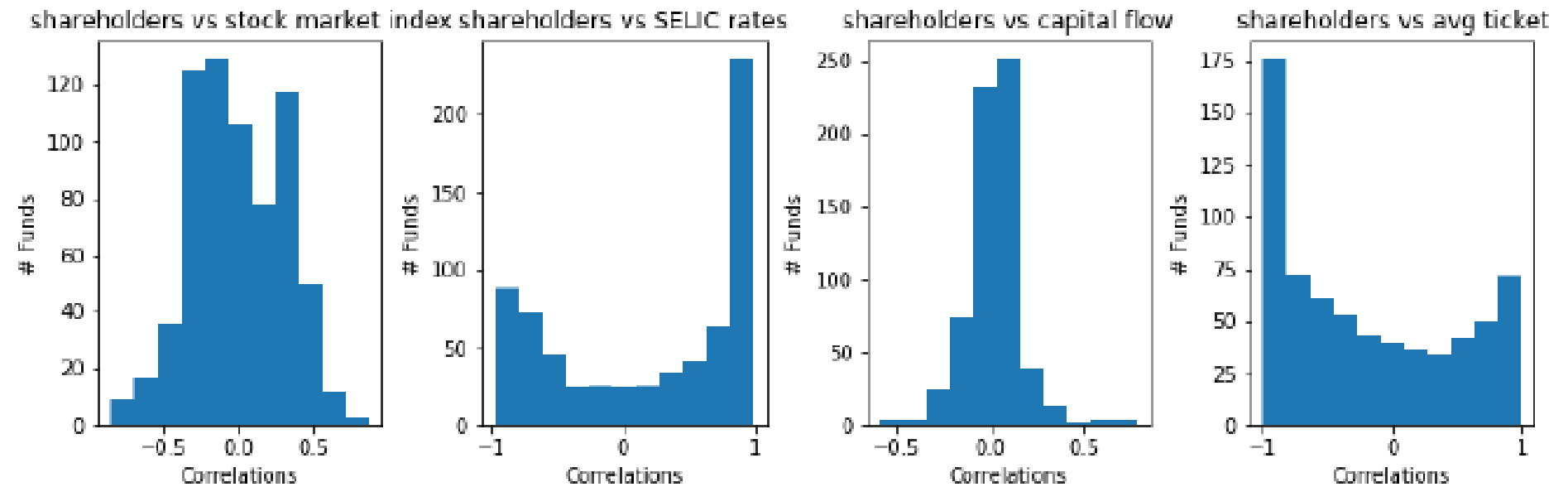
Shareholders vs IBOVESPA and IBOVESPA behavior – hedge funds
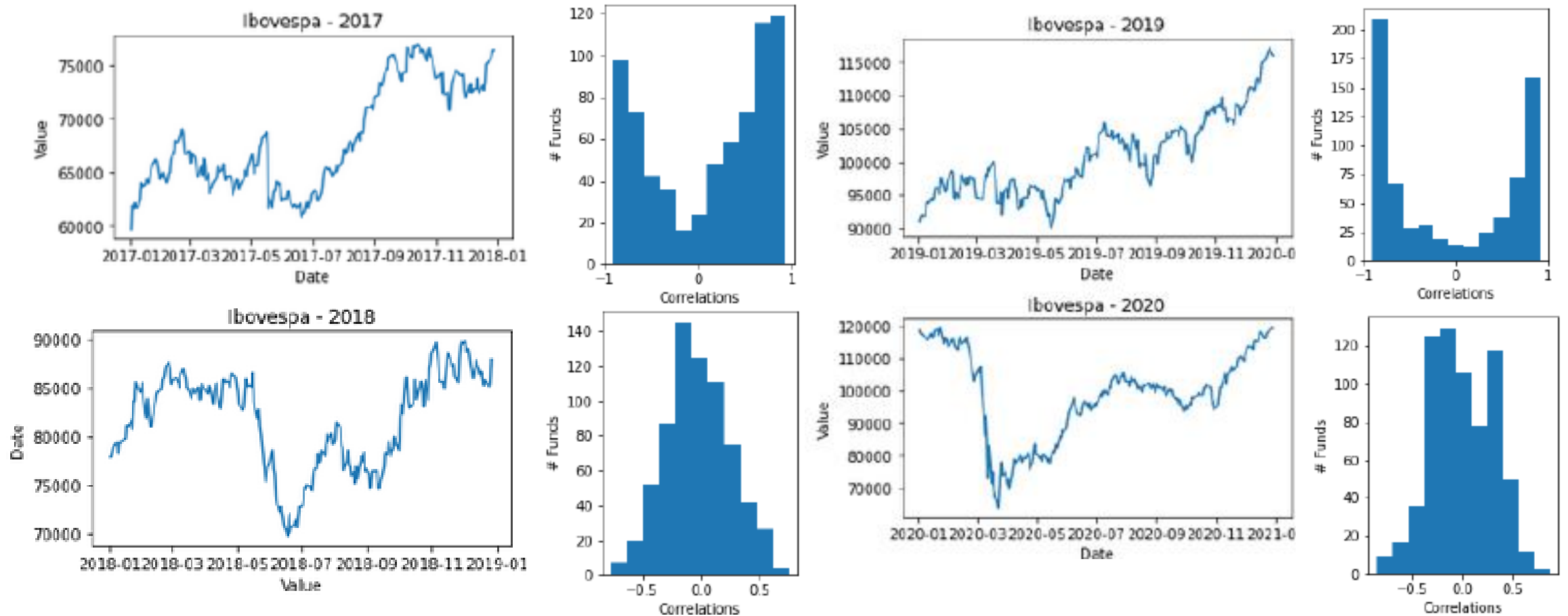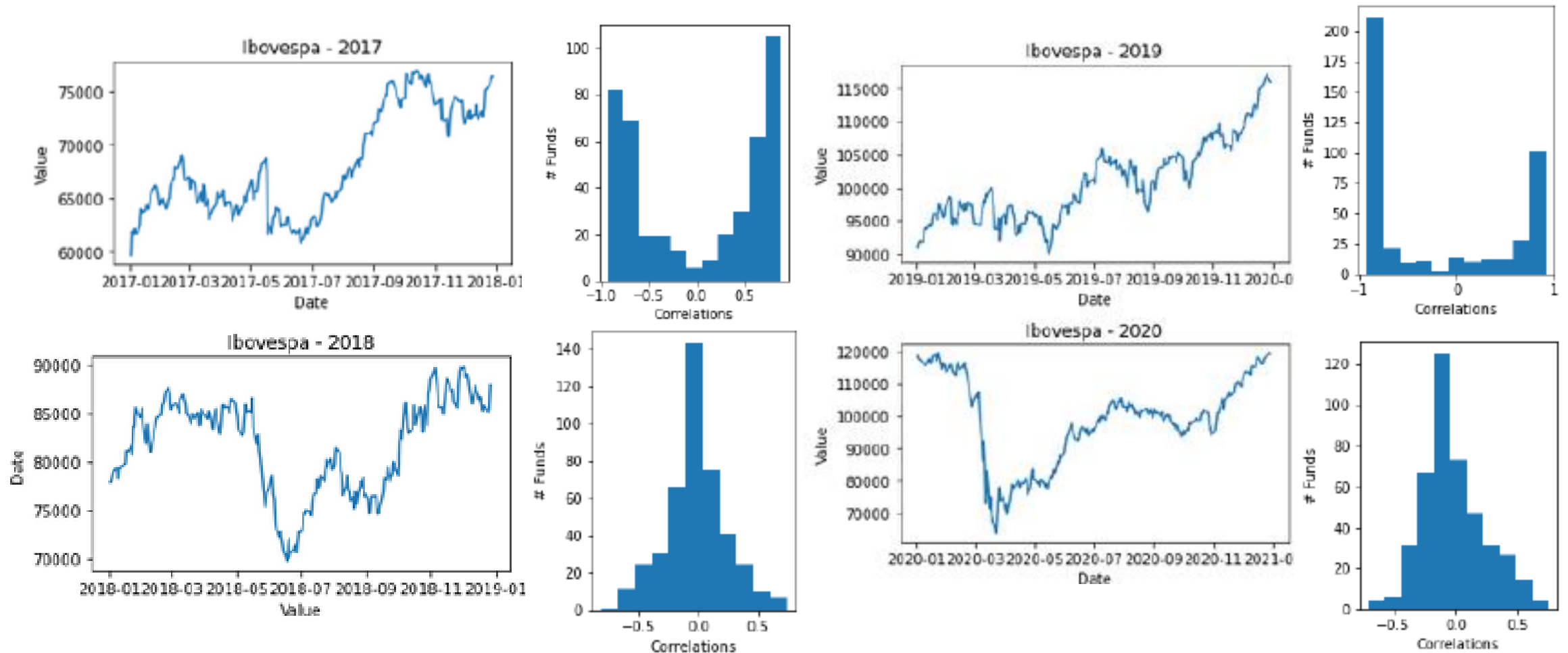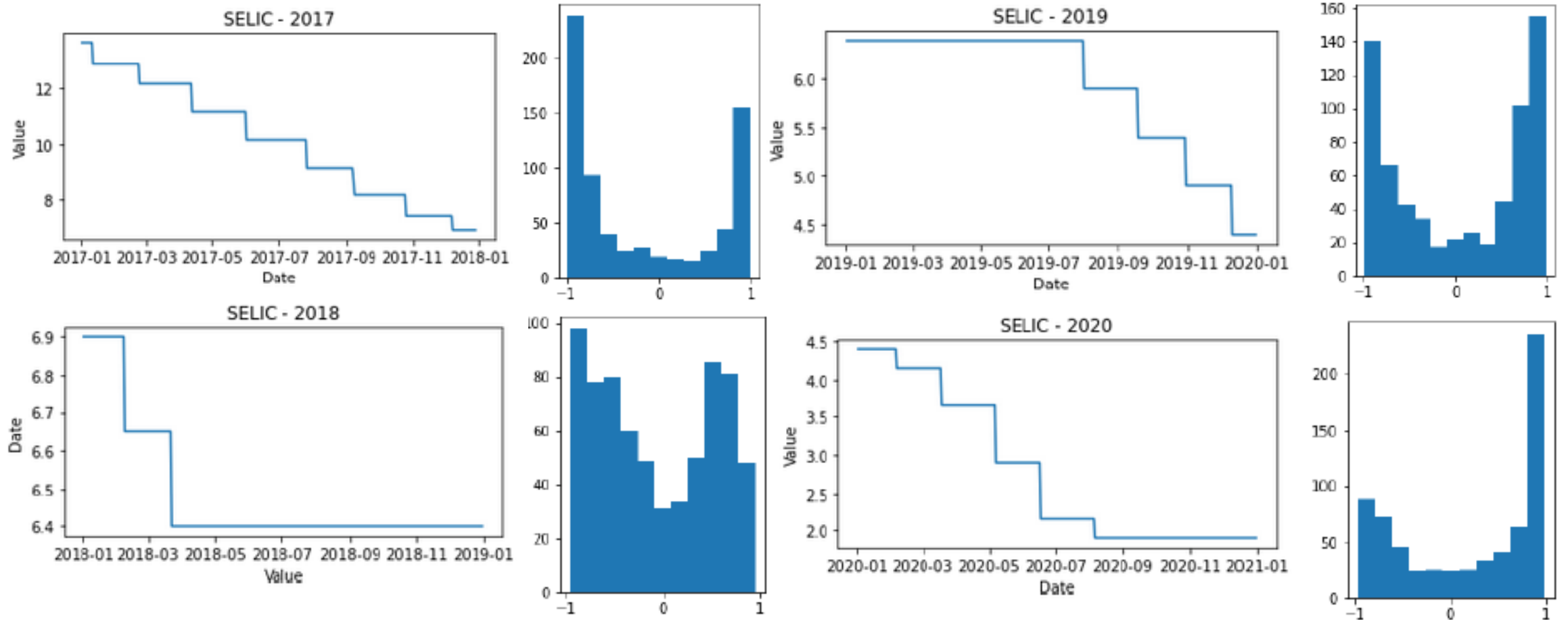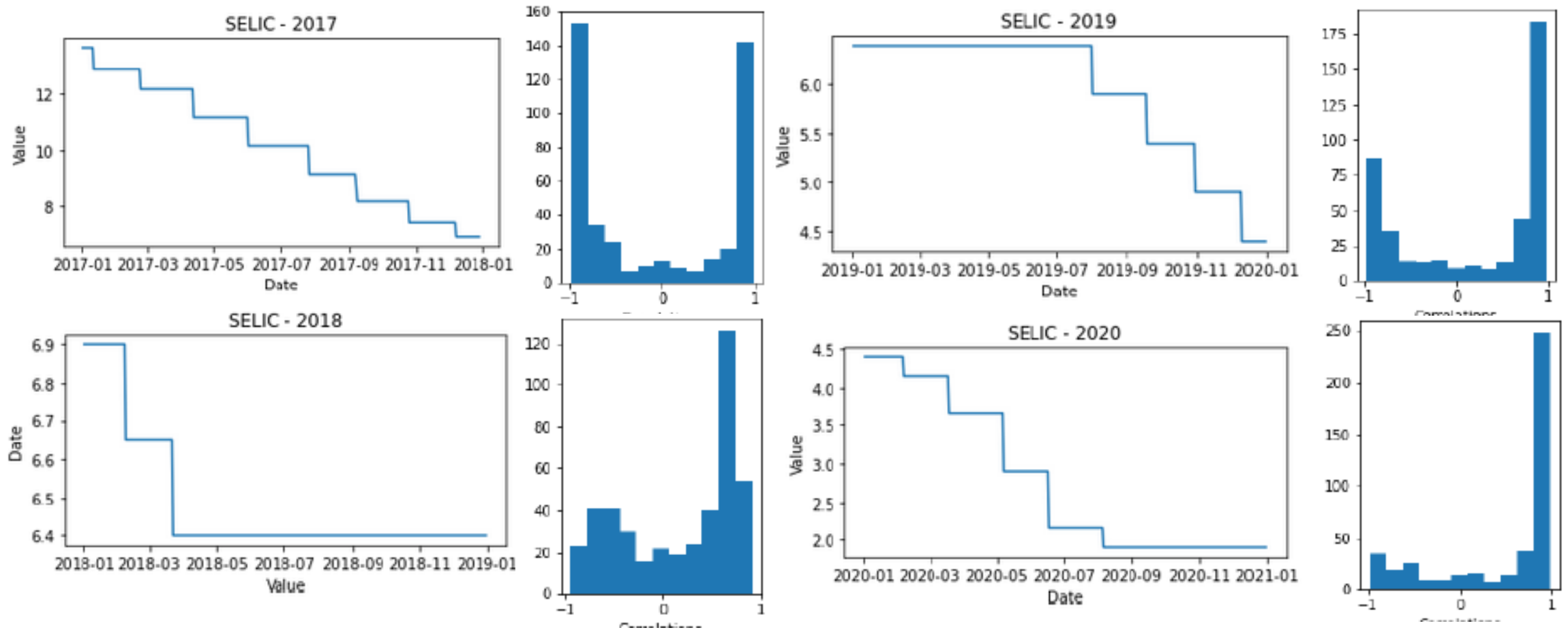
Shareholders vs IBOVESPA and IBOVESPA behavior – fixed income funds

Shareholders vs SELIC and SELIC behavior – hedge funds

Shareholders vs SELIC and SELIC behavior – fixed income funds

Clusterization outputs – Hedge Funds

Clusterization outputs – Fixed Income Funds

Fixed Income wordcloud - Cluster #1

Fixed Income wordcloud - Cluster #3

Fixed Income wordcloud - Cluster #2

Fixed Income wordcloud - Cluster #4

Thanks!