20200702 Covid19 Update (Short Version)

- Covid-19 Update 6/26/20
  - https://www.youtube.com/watch?v=hIBvIXzNb50&feature=youtu.be
  - 21:49 – Colchicine (Colcris) Manufacturers
  - 26:00 – Mutation of Wuhan Virus has more/stronger spikes
  - 50:00 – Payors (insurance cos) Bonanza
- What We Should ALL Be Doing Right Now!
  - https://www.youtube.com/watch?v=wVs5AyjzwRM&app=desktop

STOCK OF INTEREST

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StockOfInterest.com

July 2, 2020

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Abstract

Many portfolio creation strategies (e.g. FundX and Rouwenhorst98) are based solely on ticker price histories. Unfortunately, a systematic examination of the complete enumeration of these strategies likely produces false positives (data dredging). In addition, the nature of these time series changes about every ten years or so (This has been known for a while, but was recently pointed out by Meb Faber and previously by Hellmut Scholtz).

However, we can still question strategies with poor statistical results.

Here, we present alternatives to several “price history” based momentum strategies which have better t-tests results than FundX.

We also show show why models may not need to incorporate Rouwenhorst's 'k' (hold time).

These results are currently **uncorrected** for survivorship bias.

I look forward to any feedback on how to do better statistical tests, so that I can later present stockofinterest - Part II".

Agenda

- Disclaimer: This is a progress report. The work is not finished.
- Inspiration
- Prior Work
- Approach
- Results
- Discussion
- Future Work
- Bibliography

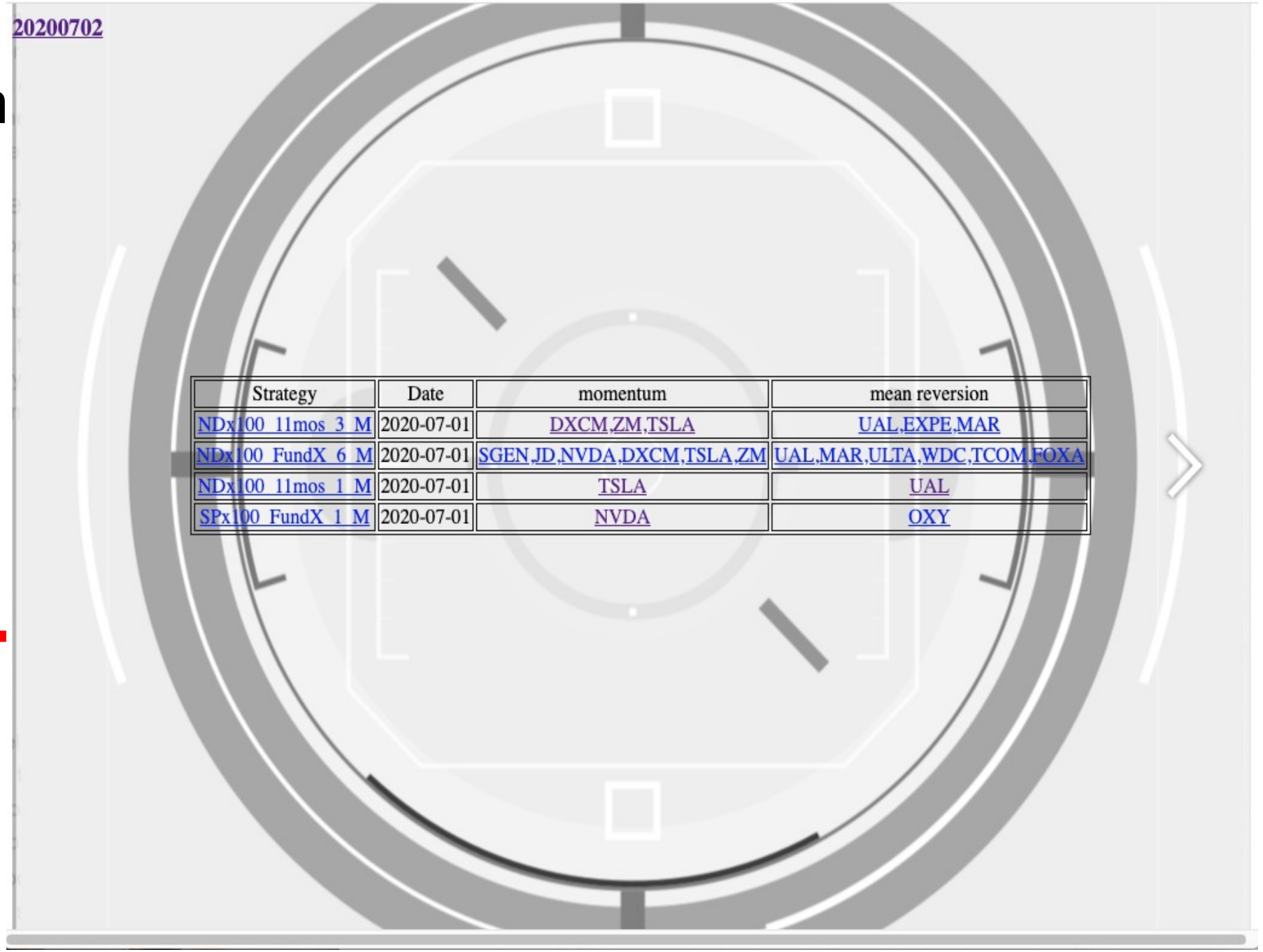
Inspiration

PERSON OF INTEREST

The protagonist, a programmer, directs the Machine to provide only a tiny fragment of data: the social security number of a "person of interest".

Inspiration:

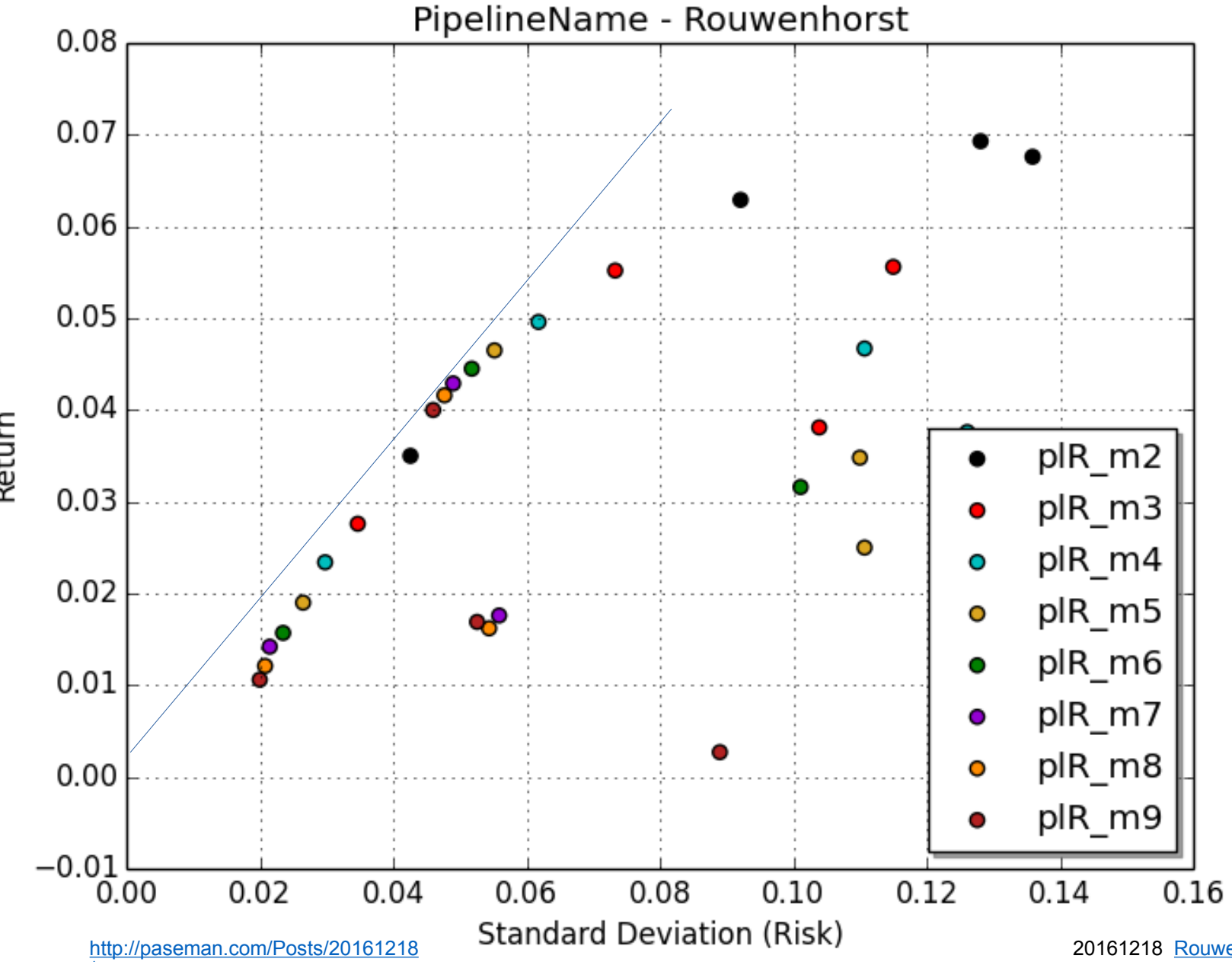
stockofinterest.com



Prior Work

- [1998] Rouwenhorst "International Momentum Strategies" - JOF
  - past J-month return (J equals 3, 6, 9, or 12) - “Training”
  - held for K subsequent months (K equals 3, 6, 9, or 12 months) - “Test”
- [2016] Paseman - Pipelining Rouwenhorst
  - set: marketIndexName='SPY'; # Market Universe
  - set: risklessReturnSecurityName='%5EH15_TB_M6'
  - set: timeFrames=['1 4 2015 12 15 2016','1 4 2013 12 15 2014']; # 2 timeframes
  - set: js=[25, 35, 45, 65, 130]; # 5 return (daily training) periods. For each stock, look at last j day return
  - set: ks=[25, 35, 41, 65, 130]; # 5 holding (daily test) periods. Sell each stock after k days
  - computeSecurityReturns();
  - computeRouwenhorstSecurityRankings();
  - setXsMemberCount(2,3,4,5,6,7,8,9); # 8 portfolio members
  - computePortfolioReturns(); # Run 2 x 5 x 5 x 8 = 400 programs
  - report();
- [2017] Weighting Approach: Repurposing Timers
  - FundX

Prior Work



Risk/Return

- Risk = Standard Deviation
- Smaller portfolio size increases both
- Efficient Frontier
- Tangent Line identifies “Optimal” Portfolio
  - (Max Sharpe Ratio)

http://paseman.com/Posts/20161218/

20161218 Rouwenhorst Sensitivity To js[25,35,45,65,130]/ks[25,35,41,65,130]

Approach

Approach: Test 5850* Portfolio Strategies

- (5) for universeName,benchmark in [("NDx100",'%5EIXIC'),...,("DAX30",'%5EGDAXI')]:
  - (13) for methodName, lags, cutoffPoint in [["FundX",[1,3,6,12],12],...["12mos",[12],12]]:
    - (6) for portfolioMemberCount in [1,2,3,4,5,6]:
      - (1) for rule in ['M']: # TBD ’W’
        - (5) for timeframe in [5yrs, 10yrs, 15yrs, 20yrs, 22yrs]:
          - (4) for portfolioMemberSelectionApproach in [top N, bottom N, timed top N, top N excess returns]
            - (1) for portfolioMemberWeightingStrategy in [equalWeights] # TBD Multifactor
              - calculate returns
              - Run Students t-test (portfolioReturns, benchmarkReturns)

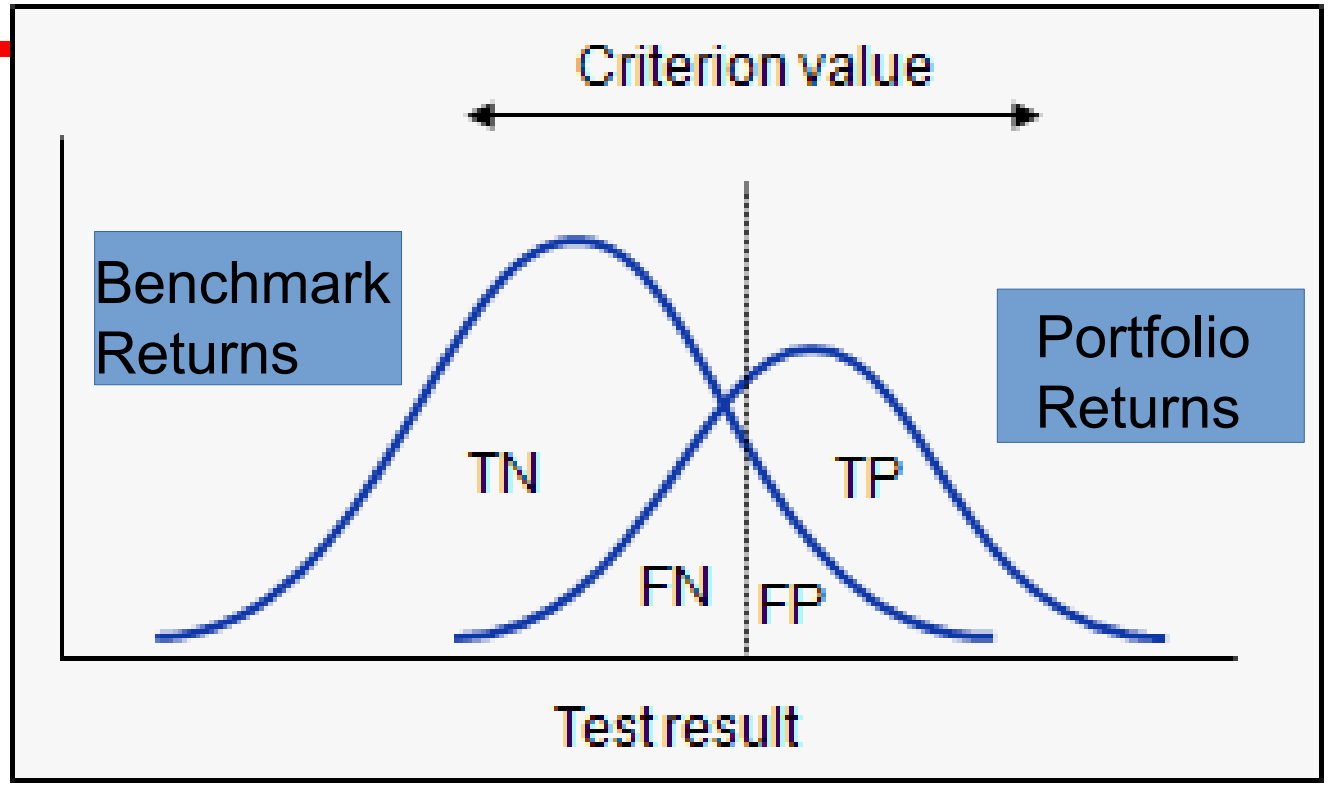
* 5850 = (5x13x6x5x4)

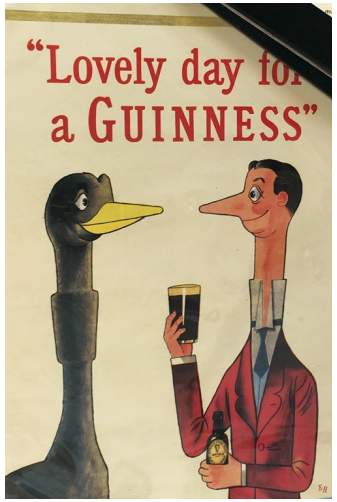
Approach: Students T-Test & Benchmarks

- Even a blind pig finds an acorn now and then...
- Example: CYDY – 20200402 - tiny, volatile CYDY $0.31→$3.31→$2.35
  - Date SPY CYDY
  - 20200402 250 2.35
  - 20200702 313 6.00 (Tuesday it was $10)
  - 25% >150% → >125% compared to benchmark
- So how do we tell if a portfolio holding CYDY is “better” than, say, SPY?

Approach: Students T-Test

- William Sealy Gosset
  - Guinness Brewing
  - Monitor Quality of Stout

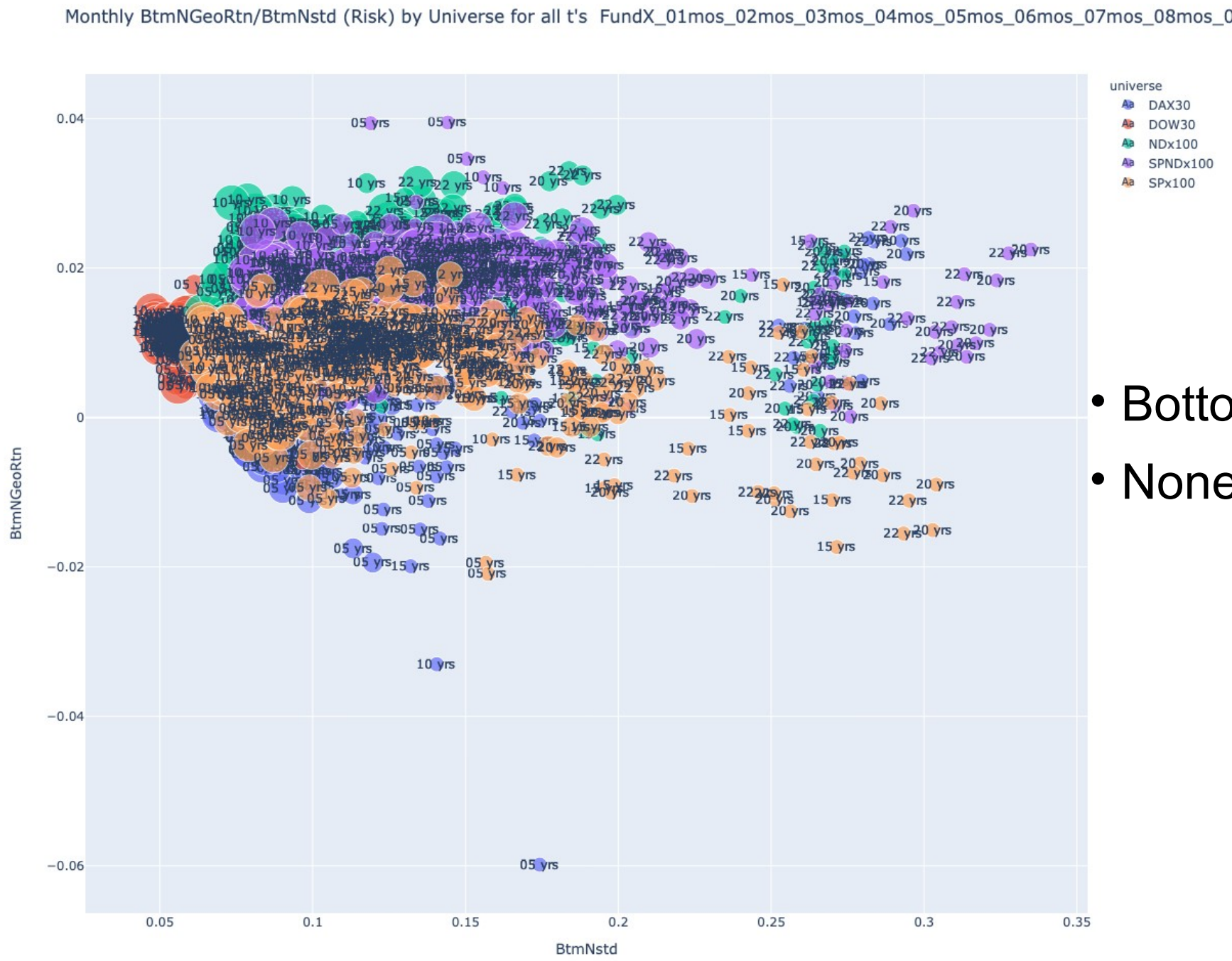




https://www.investopedia.com/terms/t/t-test.asp
Check assumptions

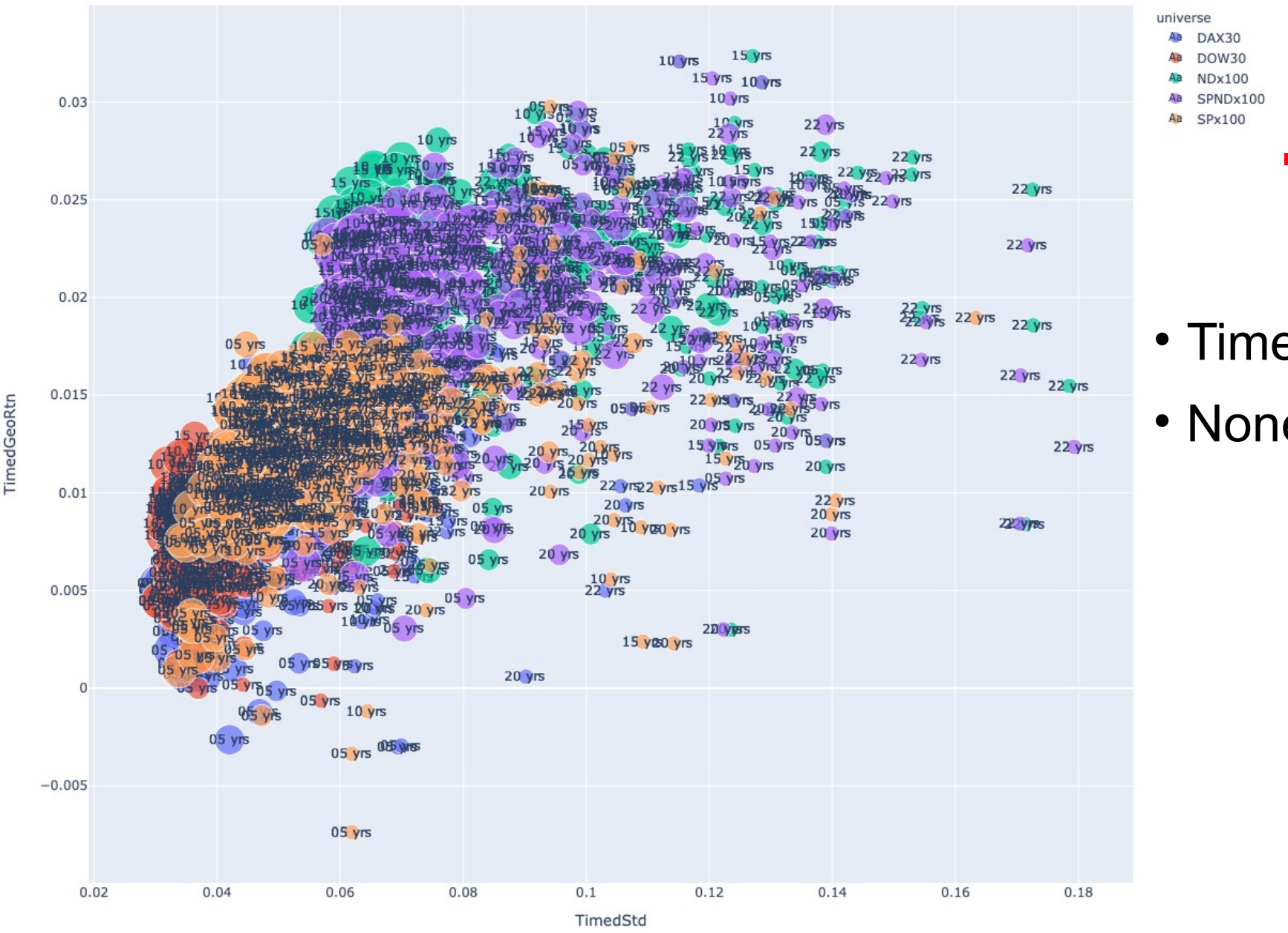
Results

Results



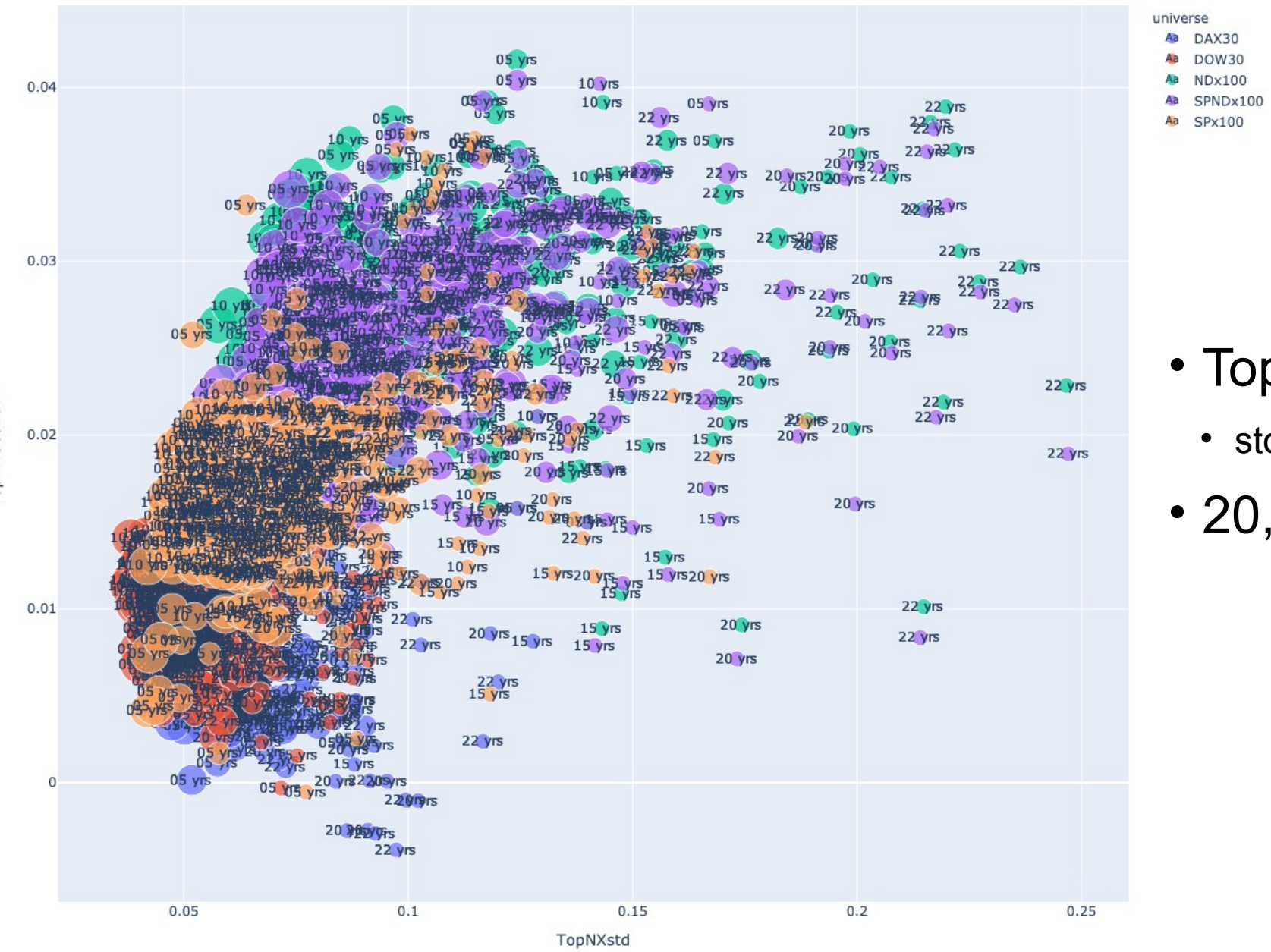
- Bottom N
- None pass the T-Test

Results



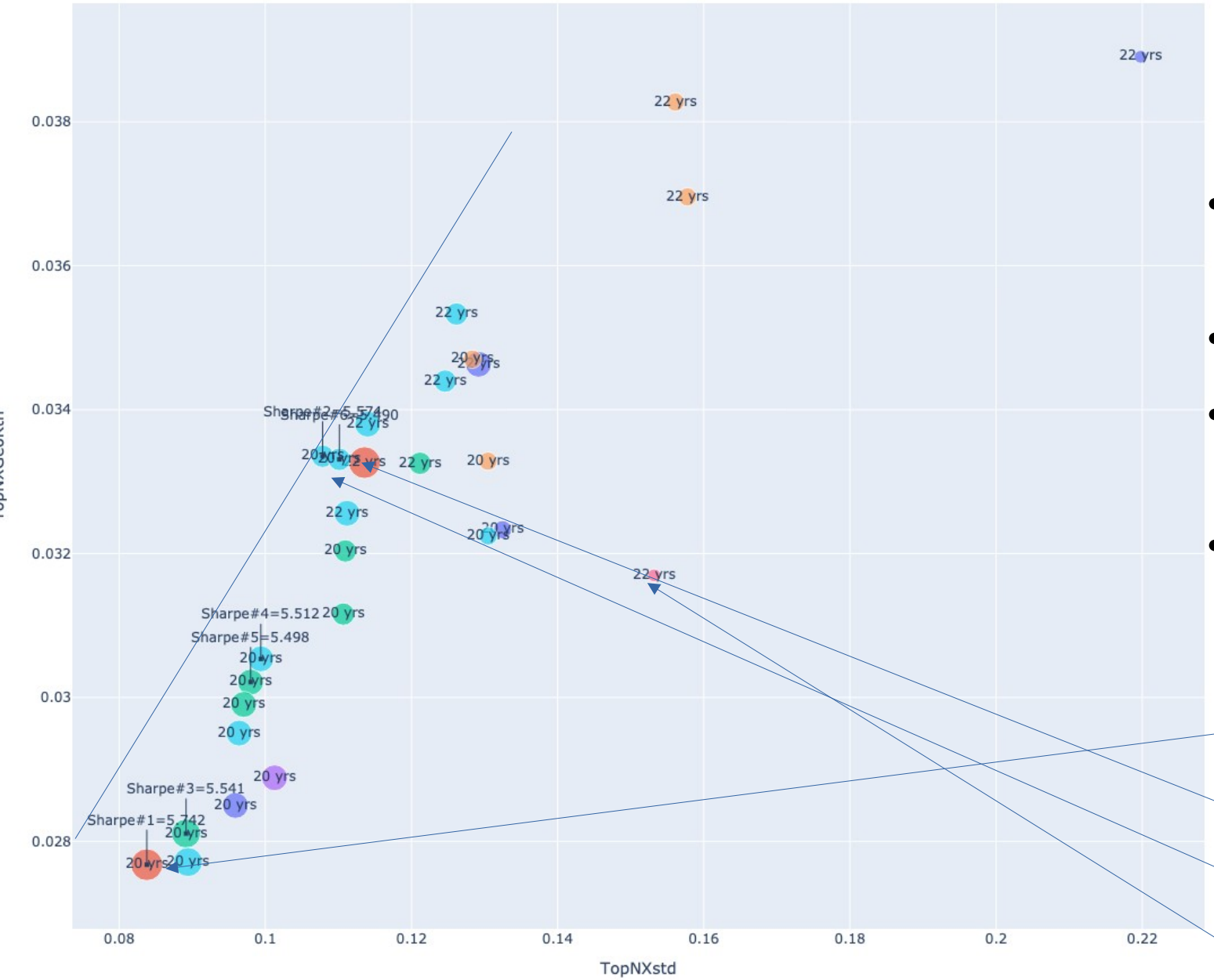
- Timed Top N
- None pass the T-Test

Results



- Top N Excess Returns
  - stock return - risk free rate (^IRX)
- 20,22yr returns pass the T-Test

Results



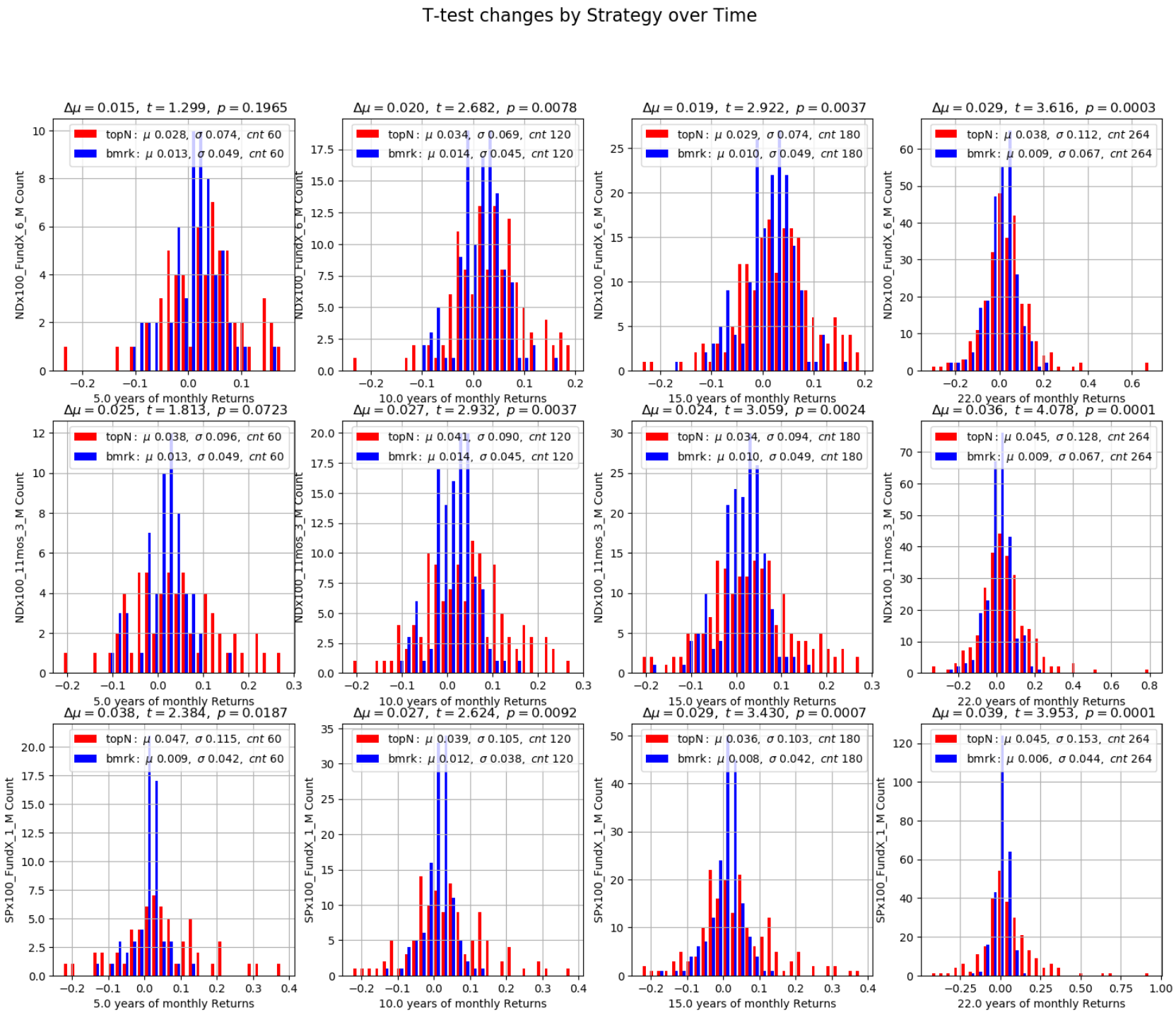
- Top N Excess Returns
  - stock return - risk free rate (^IRX)
- 20,22yr returns have T-Test>3.64
- Note that the strategies that pass form an efficient frontier and..
- The “Optimal” ones (Maximum Sharpe ratio) occur at the Efficient Frontier’s tangent
  - 1) NDx100_07mos_6,t:3.72,p:.0002
  - 2) SPNDx_11mos_3,t:4.09,p:.00005
  - 3) NDx100_11mos_3,t:4.05,p:.00005
  - SPx100_FundX_1,t:3.66,p:.0002

Results

				TopNXGeoRtn		TopNXROI		TopNXSharpe	
			Timeframe: last	20 yrs	22 yrs	20 yrs	22 yrs	20 yrs	22 yrs
universe	method	N	rule						
NDx100	06mos	1	M		0.038904		23760.741218		4.487714
		4	M	0.028500	0.034631	848.211816	8003.358750	5.325197	5.265603
	07mos	6	M	0.027676	0.033264	699.646106	5645.903892	5.741920	5.562661
	08mos	3	M	0.032036	0.033254	1934.233019	5631.735545	5.285685	5.395978
		4	M	0.030214		1265.565113		5.498321	
	09mos	4	M	0.028884		927.845365		5.178442	
	10mos	2	M	0.033284	0.036956	2585.596768	14477.798958	4.877159	4.923387
	11mos	2	M	0.032244		2030.412263		4.755954	
		3	M	0.033309	0.035328	2600.638680	9562.116758	5.489662	5.487148
		4	M	0.030537	0.033798	1364.260434	6471.266343	5.512315	5.679712
SPNDx100	06mos	2	M	0.032332		2072.092563		4.729126	
	08mos	3	M	0.031158		1576.884716		5.166344	
		4	M	0.029904		1177.106209		5.484684	
		5	M	0.028110		774.321982		5.540571	
	10mos	2	M	0.034702	0.038274	3593.505498	20248.504052	5.097427	5.086832
	11mos	3	M	0.033352	0.034397	2626.882991	7539.530357	5.573948	5.407681
		4	M	0.029505	0.032560	1072.545659	4715.467126	5.471328	5.598614
		5	M	0.027714		705.814788		5.485550	
SPx100	FundX	1	M		0.031697		3781.917434		4.493868

- Top N Excess Returns
  - stock return - risk free rate (^IRX)
- 20,22yr returns pass the T-Test
- Note that the strategies that pass form an efficient frontier and..
- The “Optimal” ones (Maximum Sharpe ratio) occur at the Efficient Frontier’s tangent
  - 1) NDx100_07mos_6,t:3.72,p:.0002
  - 2) SPNDx_11mos_3,t:4.09,p:.00005
  - 3) NDx100_11mos_3,t:4.05,p:.00005
  - SPx100_FundX_1,t:3.66,p:.0002

Results



- NDx100_FundX_6_M
  - 5,10,15,22 yrs
  -
  -
- NDx100_11mos_3_M
  - 5,10,15,22 yrs
  -
  -
- SPx100_FundX_1_M
  - 5,10,15,22 yrs

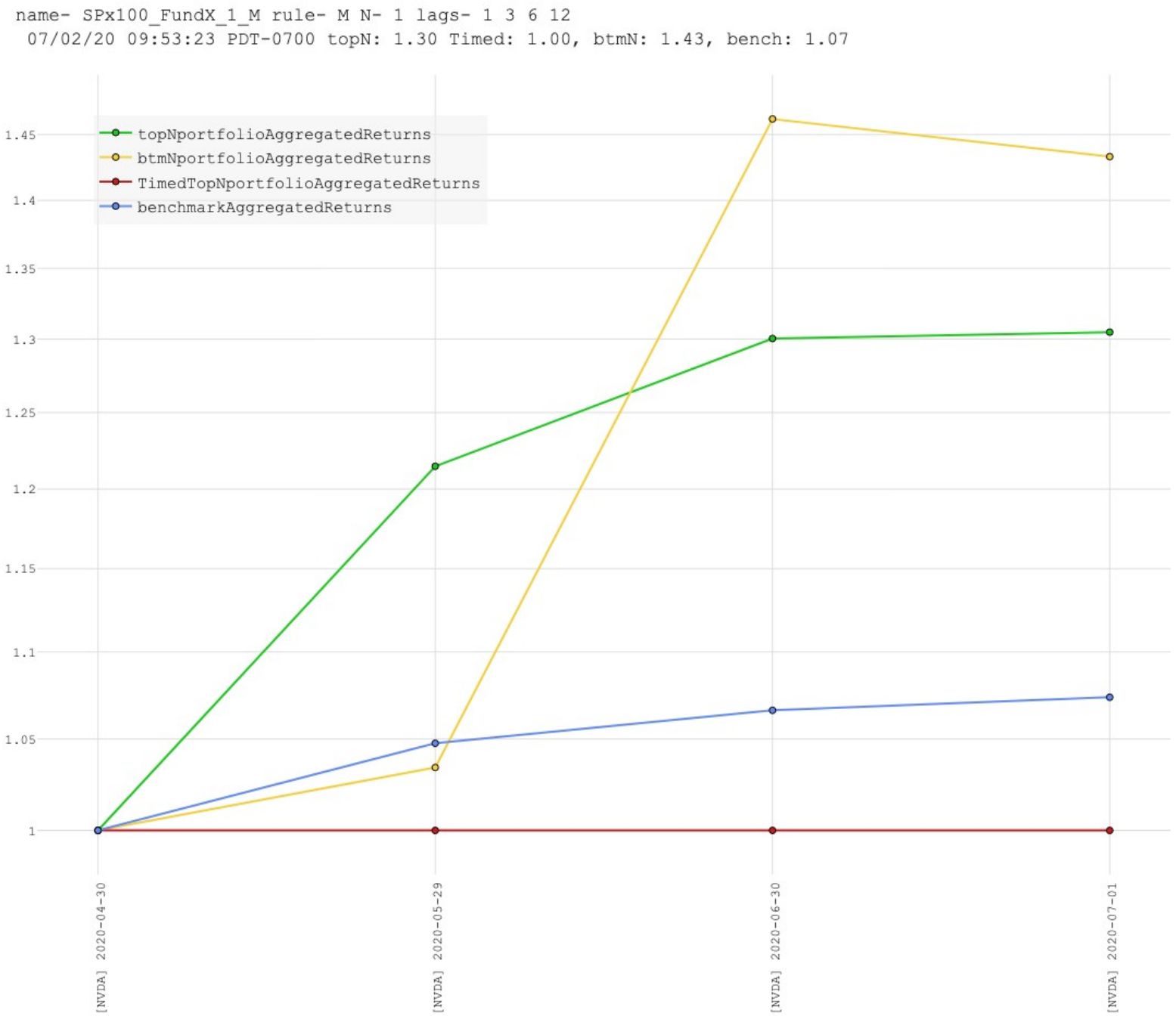
Results

4 Months
NDx100_11mos_3_M
1.33

Results

4 Months
NDx100_FundX_6_M
1.33

Results



4 Months

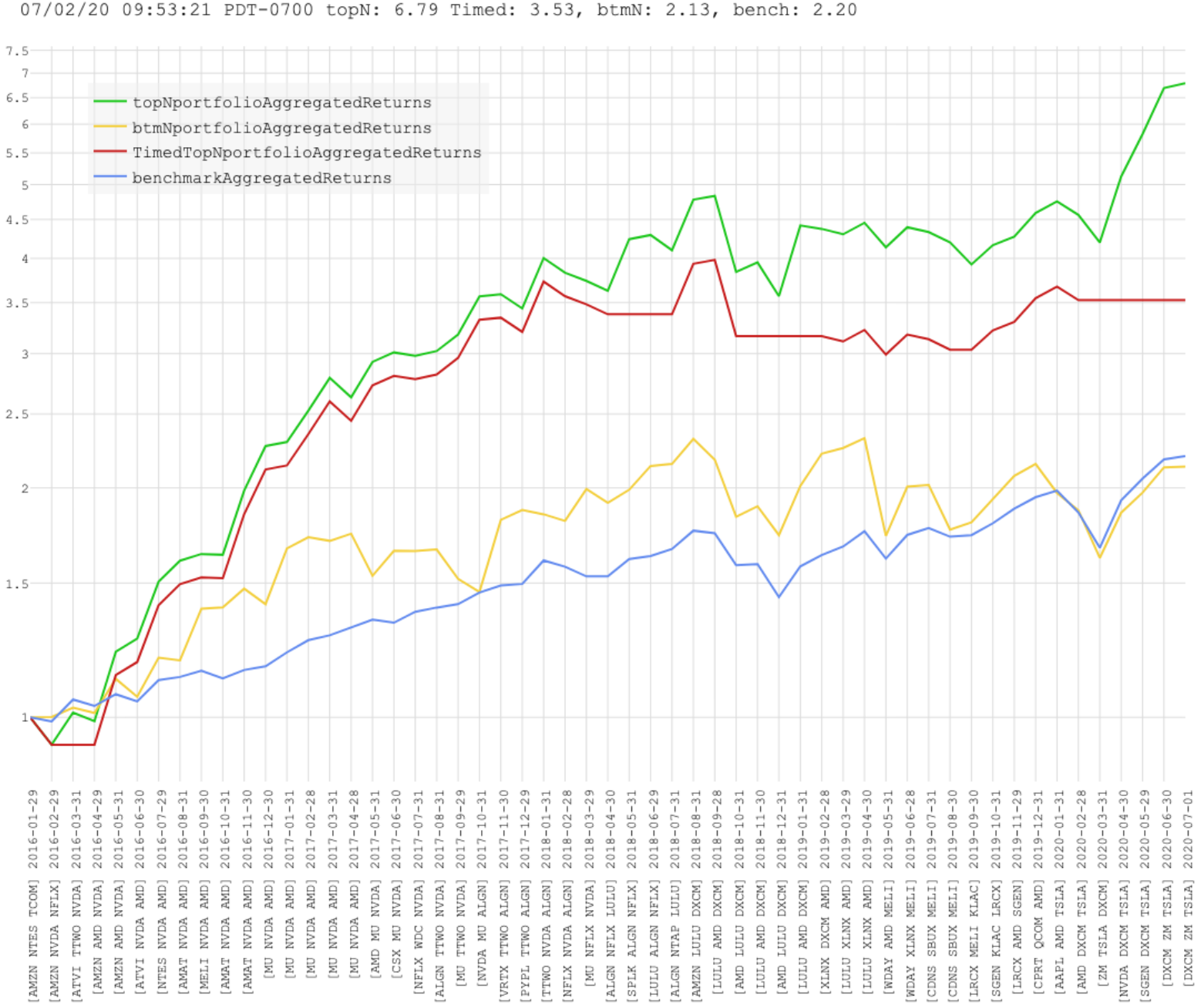
SPx100_FundX_1_M

1.3

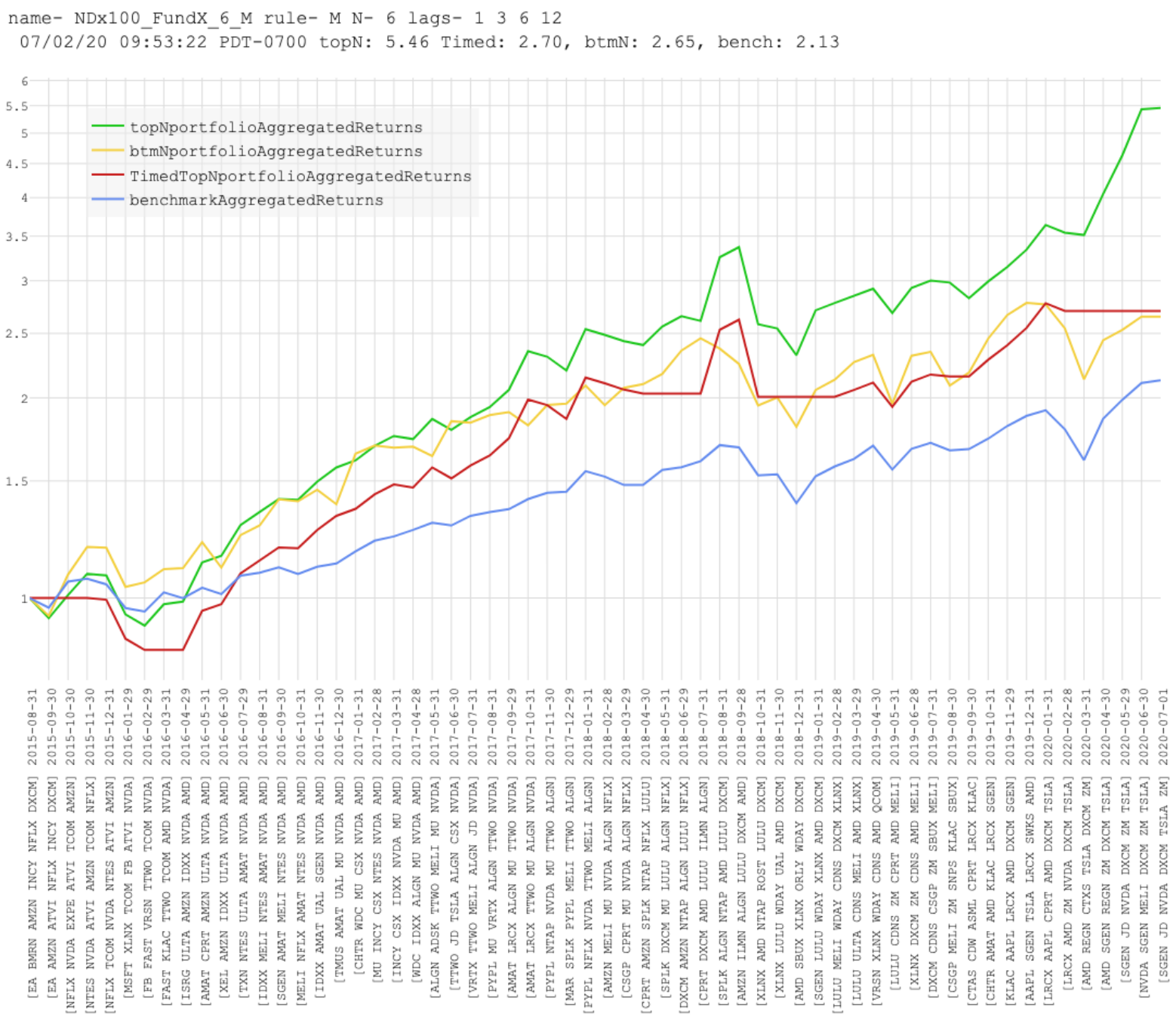
BtmN – 1.43

Results

55 Months
NDx100_11mos_3_M
6.79



Results



55 Months
NDx100_FundX_6_M
5.46

Over 22 years, t:3.55, p:.0004

Discussion

Discussion: Key Points

- No BtmN stock strategy or Timed TopN passed the significance test for any year.
- The only universe/count/method/lag/selection approaches that passed the significance test are for timeframes of 20 and 22 years TopNXt and TopNX.
  - i.e. No strategies for 5,10,15 or 20 years passed the significance test.
- When narrowing the timeFrame to 20 years, only universes containing NASDAQ components pass the significance test. (1998-1999 were good years for the NASDAQ)
- Of these, portfolios formed using ranking based on 11 month prior returns (lags) with 2, 3 and 4 members produces the best excess returns (= stock return - risk free rate (^IRX)).
- Of these, the optimal portfolio on the efficient frontier was the 3 member portfolio with 11 month lag.
- Though not shown, I expanded the NDx100 universe to include 13 week TBills and S&P500. This increased performance due to the fact that IRX (and many S&P500 components) traded below a dollar. However, the results were very volatile.

Discussion: Key Points

- The best performing strategy was a strategy trading in the NDx100, looking at performance with an 11 month lag and 3 members.
- However, note that of the 265 monthly returns between april 1998 and may 2020, fully 95 were below the benchmark returns.
- In 2000, 6/12 monthly returns were below the benchmark, and in a particularly miserable period august 2007 to may 2009, the benchmark outperformed the index 9/14 months. During this period, the benchmark dropped 31.32%. However, the strategy dropped 31.9%. Though this is a long and painful way to lose 31% of your money; it not much worse than buy and holding the benchmark index. And, on balance, the strategy does much better than holding the benchmark over a period of months.
- How well does this strategy perform during policy “turns”? In other words, how many benchmark>strategy returns there are during QE1 (December 2008 - June 2010), QE2 (November 2010 - June 2011), QE3 (13 September 2012 - 29 October 2014) and after the Trump tax cuts?
  - For QE1, the benchmark was up 22% and the strategy was up 75%.
  - For QE2, the benchmark was up 17% and the strategy was up 21%.
  - And for QE3, the benchmark was up 50% and the strategy was up 227%.

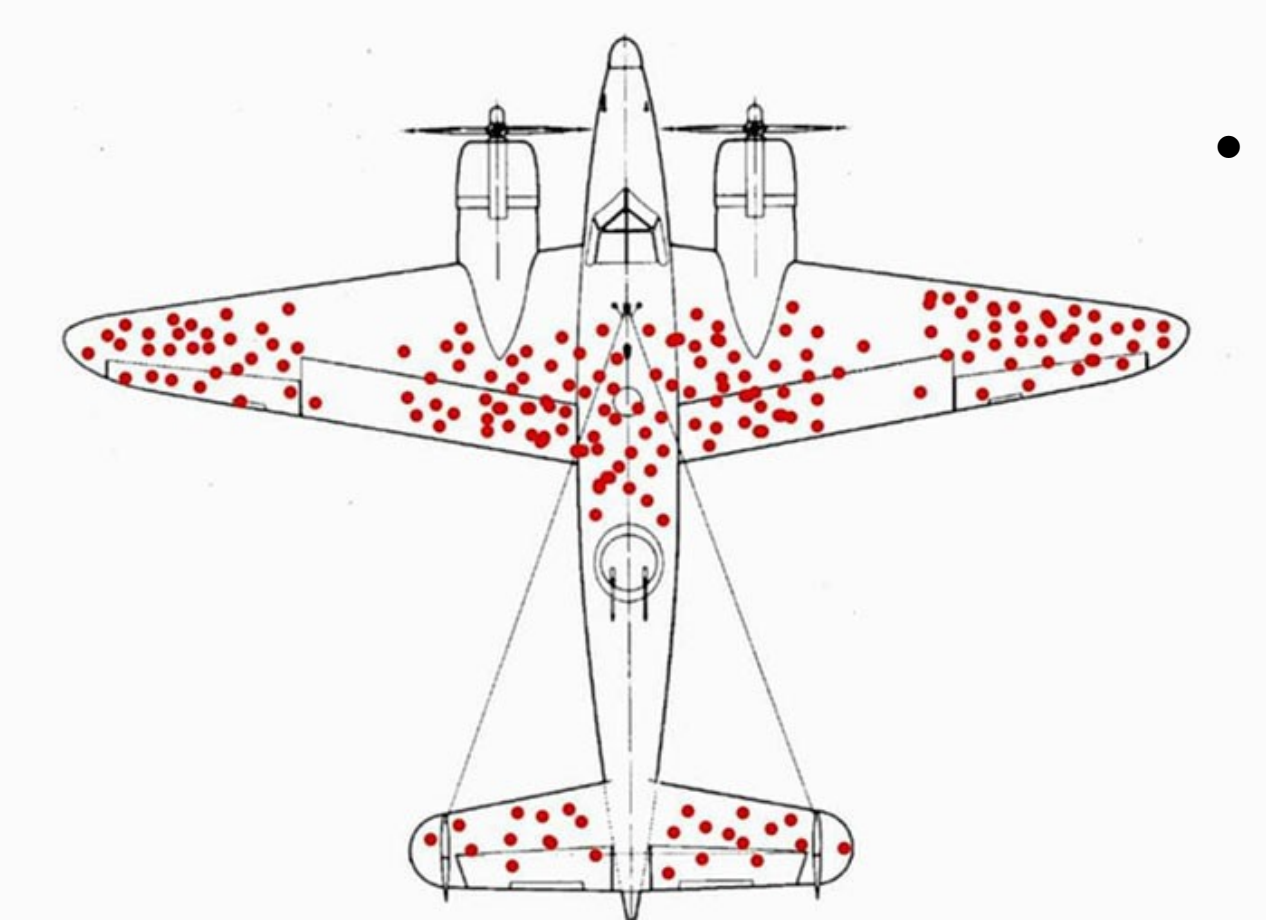
Discussion: SPx100_FundX_1, NDx100_06mos_1

- One member => No portfolio member weighting considerations
- Series looks like this
  - => stay in high growth universe, variable holding period (no ‘k’)

AMZN, AMZN, AMZN, AMZN, VRSN, MNST, SIRI, AMZN, AMZN, AMZN, AMZN, AMZN, AMZN, EBAY, EBAY, EBAY, EBAY, EBAY, CSGP, QCOM, QCOM, QCOM, SWKS, CHKP, QCOM, QCOM, VRSN, INCY, ALXN, AMD, NVDA, VRTX, NVDA, NVDA, VRTX, VRTX, BIIB, ATVI, CTXS, ATVI, ATVI, ATVI, ATVI, BKNG, BKNG, BKNG, GILD, ANSS, MCHP, NTAP, WDC, WDC, NTAP, AMZN, NTES, NTES, NTES, NTES, NTES, NTES, NTES, NTES, NTES, NTES, NTES, NTES, NTES, ALGN, BKNG, BKNG, NTES, SIRI, AMD, ILMN, ILMN, INCY, MNST, MNST, MNST, MNST, MNST, MNST, MNST, AAPL, AAPL, SIRI, SIRI, AAPL, MNST, MNST, MNST, MNST, MNST, MNST, NFLX, VRTX, ISRG, ISRG, VRTX, VRTX, MNST, MNST, MNST, MNST, MNST, BIDU, BIDU, BKNG, ALGN, ALGN, ALGN, ALGN, SGEN, SGEN, SGEN, SGEN, ISRG, AMZN, BIDU, BIDU, BIDU, MELI, INCY, NFLX, NFLX, CSX, TTWO, ILMN, VRTX, VRTX, AMGN, AMGN, AAL, AAL, MNST, MNST, NFLX, MELI, EXPE, SIRI, SIRI, SIRI, INCY, INCY, INCY, UAL, UAL, UAL, UAL, UAL, UAL, NFLX, AAL, NFLX, NFLX, NFLX, BKNG, BKNG, NVDA, NXPI, NXPI, NXPI, NXPI, ULTA, LULU, REGN, MNST, ALXN, ALXN, ALXN, REGN, REGN, REGN, REGN, AAL, AAL, EXPE, EXPE, EXPE, TMUS, ASML, TMUS, NFLX, NFLX, NFLX, NFLX, TSLA, TSLA, TSLA, TSLA, TSLA, TSLA, INCY, INCY, INCY, AAL, AAL, AAL, AAL, AAL, SWKS, SWKS, VRTX, VRTX, MELI, UAL, MNST, LULU, INCY, SWKS, NFLX, NFLX, NFLX, NFLX, NFLX, ATVI, AMZN, NVDA, NVDA, NVDA, AMD, AMD, AMD, AMD, AMD, AMD, AMD, AMD, NVDA, NVDA, NVDA, AMD, AMD, AMD, TSLA, VRTX, ALGN, VRTX, TTWO, NVDA, ALGN, DLTR, DLTR, NFLX, NFLX, LULU, NFLX, NFLX, LULU, AMD, AMD, AMD, AMD, SBUX, XLNX, XLNX, XLNX, CDNS, MELI, MELI, MELI, TTWO, QCOM, SGEN, SGEN, TSLA, TSLA, TSLA, TSLA, TSLA, TSLA

Future Work

Future Work: Address Survivorship Bias



- Complete/Consistent (Clean) data matters
- ← Abraham Wald – Survivorship Bias

Future Work: Survivorship Bias Note

- After substituting DXCM for AAL and ZM for WLTW, the total return went ***down***. This is becase WLTW was pretty hot early on, and contributed a lot to the portfolio's early gains.
- Future Work: Rerun using Don's NASDAQ universe change table and StockInvestorPro 10 year histories.
- An Aside: Index investing allows you to launder capital gains. Imagine you created your own NASDAQ index, and sold WLTW with all its gains and replaced it with ZM. You'd have to pay taxes on it. But not if the substitution is made by the people managing the fund.

Future Work: P-Hacking/Data Dredging

- Golly: 5850 strategies. You'd think at least one would be better than FundX
  - Yes. And that is the key criticism of this approach
  - However note that t=4.093761 and p=0.000050 for SPNDx100_11mos_3_M and NDx100_11mos_3_M
- Future Work: Apply Ren's References and try his "split" suggestion

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Questions?
Correlation and Causation