


REIT Analysis

Plots from Python Models





Sharpe Ratio



Must adjust for risk when looking at returns.









This doesn't account for asymmetric or fat-tailed distributions.

$$\frac{E[R_a - R_b]}{\sqrt{\text{var}[R_a - R_b]}}$$








Analysis

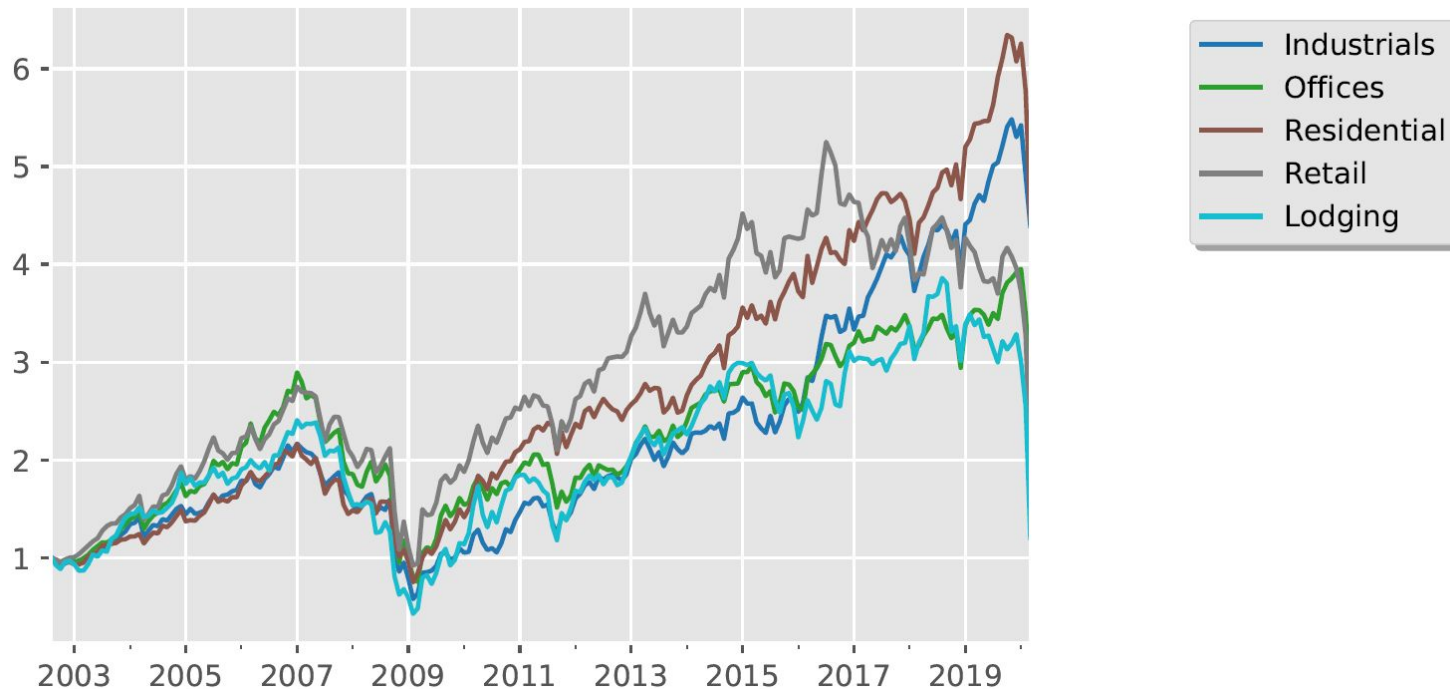
REIT Sector Indexes

-  **Industrials**
Warehouses, distribution centers
-  **Office**
Office spaces, office buildings
-  **Residential**
Multi-family, single-family, manufactured homes
-  **Retail**
Outlets, shopping centers, malls, power centers
-  **Lodging**
Hotels, resorts
-  **Diversified**
Property mix

Other Assets

-  **TLT**
Long-term Treasuries
-  **SPY**
S&P 500 Index
-  **MDY**
MidCap 400 ETF
-  **LQD**
Investment Grade Bonds
-  **IWM**
Russell 2000 Index

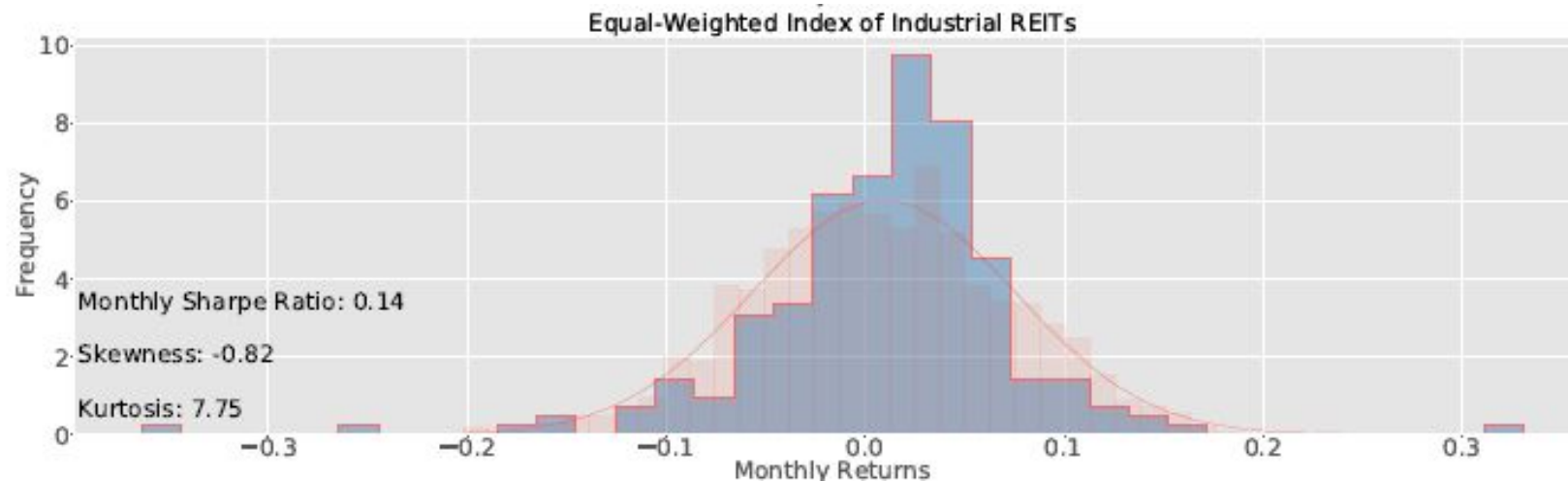
REIT Sector Returns





Sector Analysis

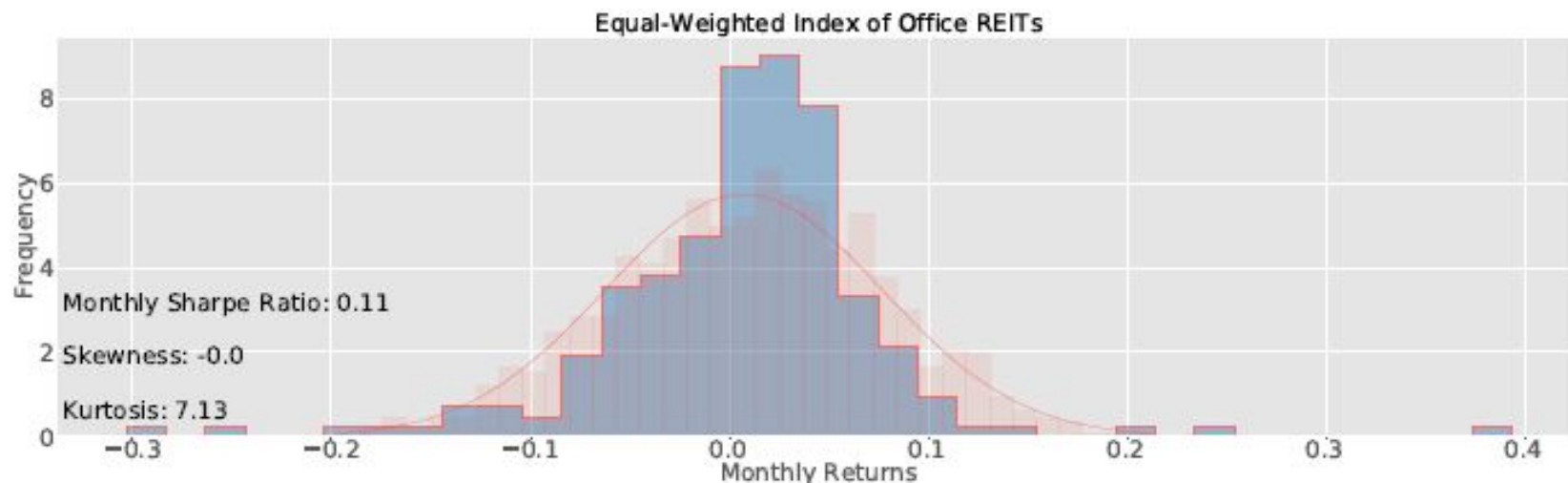
Industrials





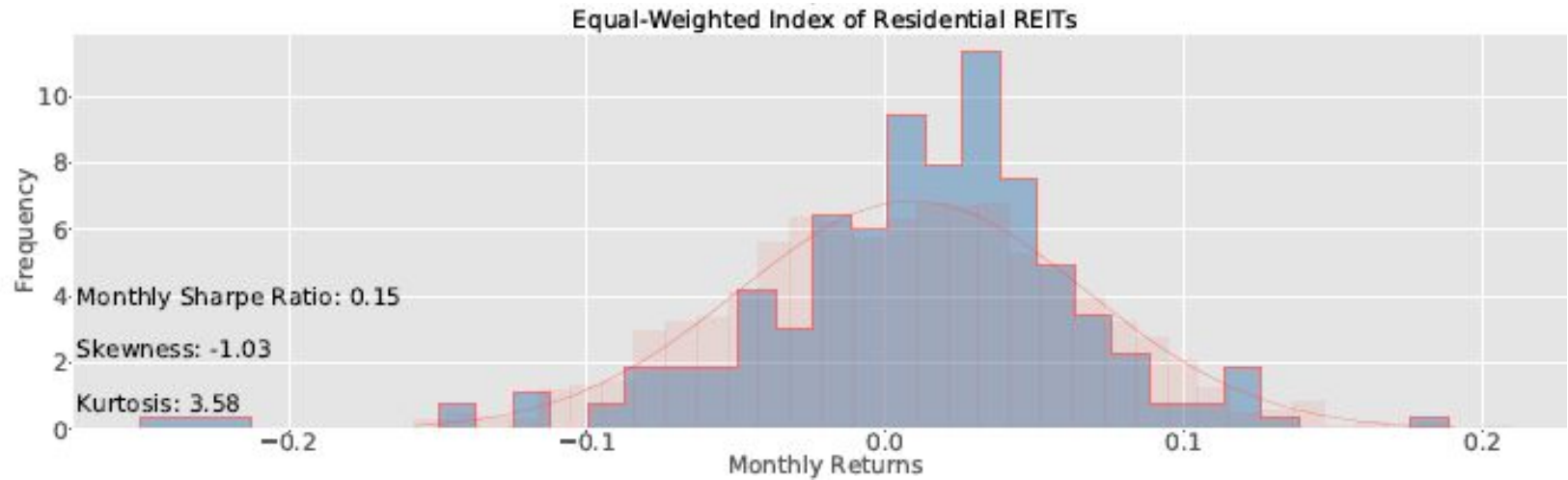
Sector Analysis

Offices



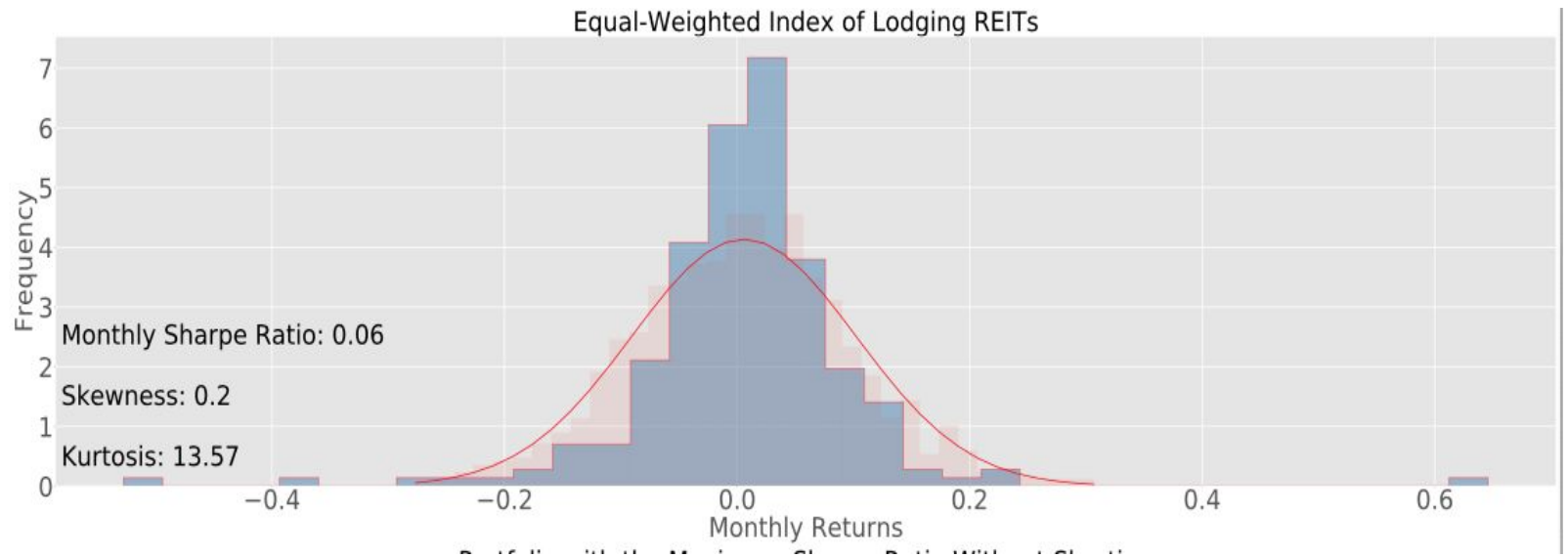
Sector Analysis

Residential



Sector Analysis

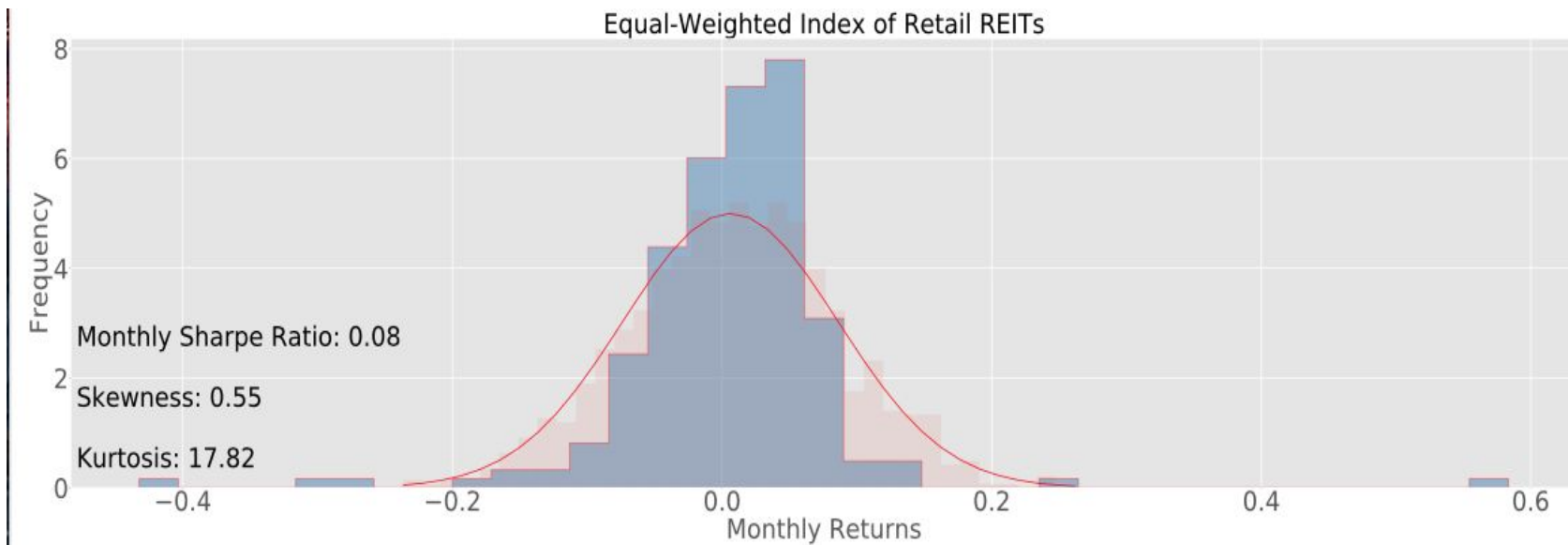
Lodging



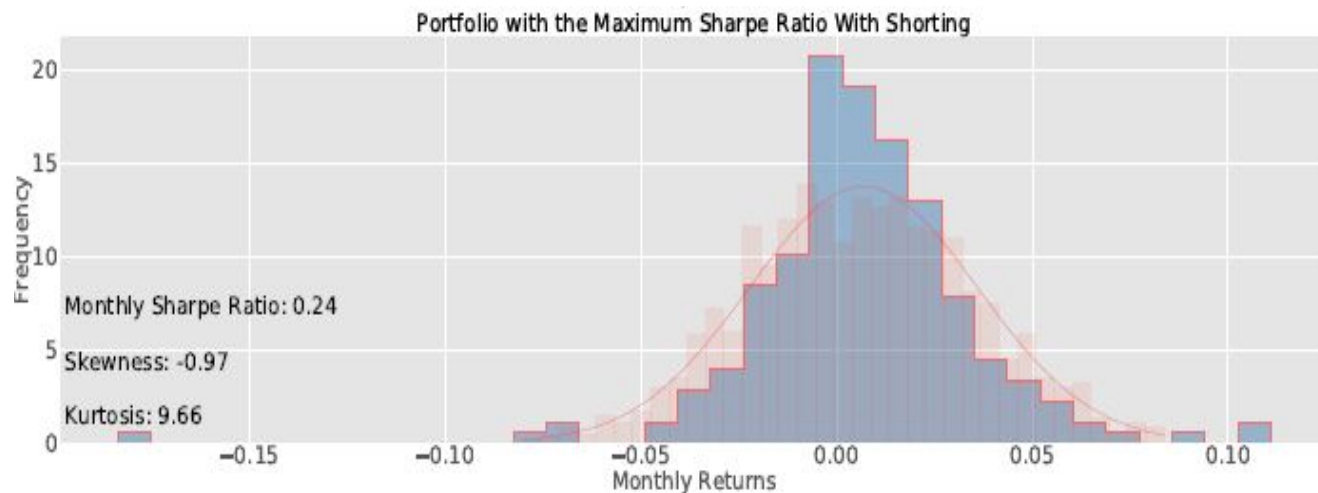


Sector Analysis

Retail

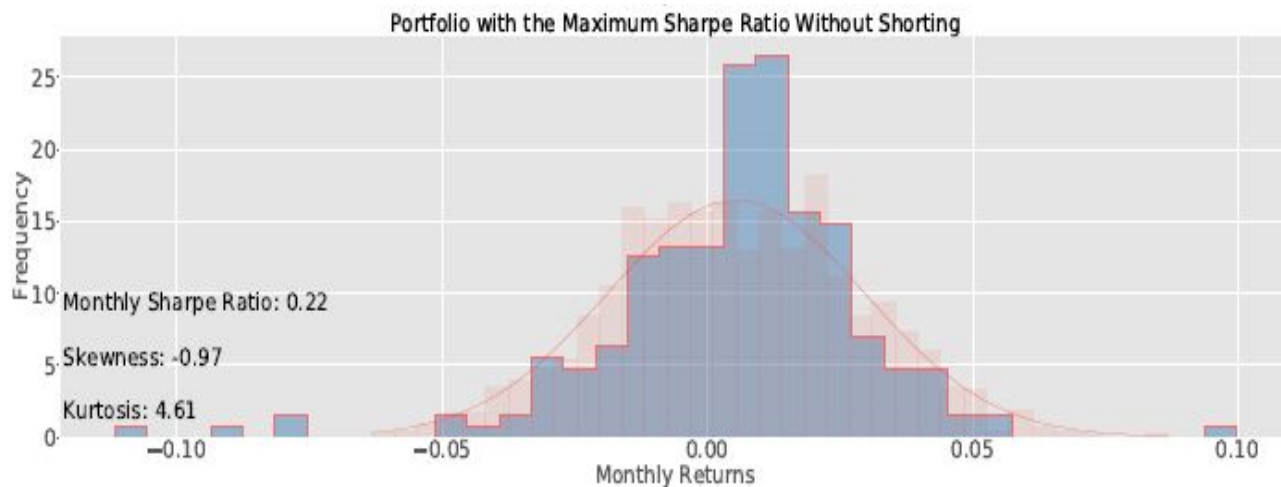


Max Sharpe Ratio With Shorting (Using Sector REITS)



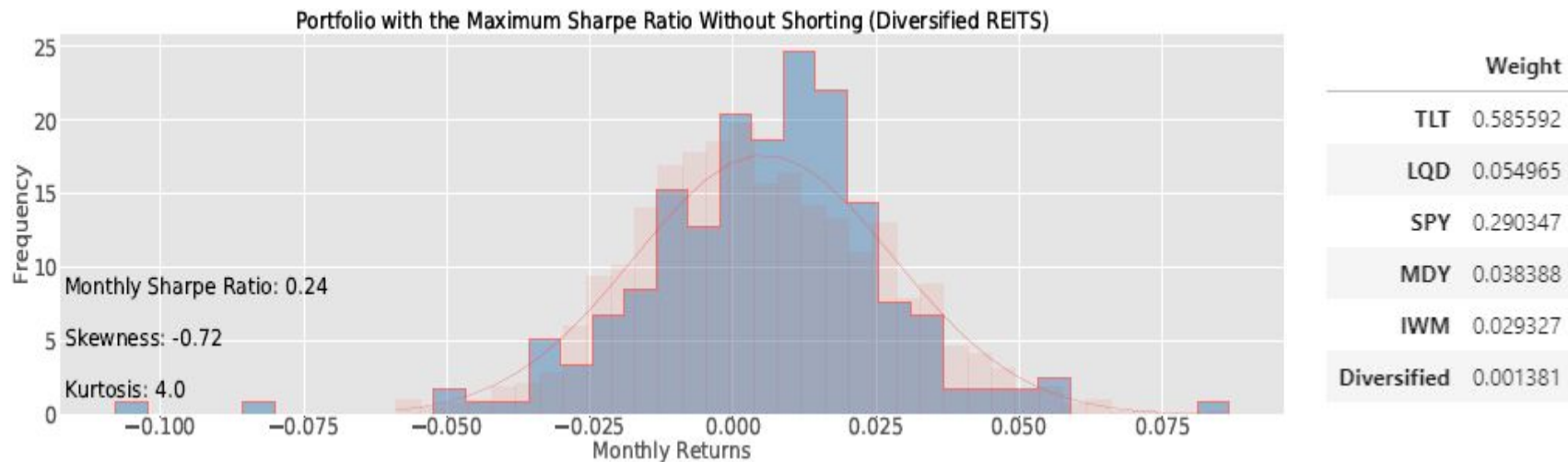
	Weight
TLT	0.605605
LQD	-0.031690
SPY	0.222182
MDY	0.287971
IWM	-0.042033
Industrials	0.093486
Offices	-0.125997
Residential	0.433687
Retail	-0.368840
Lodging	-0.074370

Max Sharpe Ratio Without Shorting (Using Sector REITS)



Weight	
TLT	0.298498
LQD	0.315809
SPY	0.167084
MDY	0.027378
IWM	0.004625
Industrials	0.090526
Offices	0.037939
Residential	0.033994
Retail	0.001383
Lodging	0.022764

Max Sharpe Ratio Without Shorting (Using Diversified REITS)





Conclusion

REITs do not provide diversification.

The key assumption made is that we are looking at the sectors as a whole, without considering that some asset managers can allocate to the best REITs within each sector, thus making all of these sectors more attractive.

Just like in any other asset class, if you have above average selection then you can provide additional returns for the same level of risk.



When using diversified REITs get a .14% allocation into real estate in our sharpe maximizing portfolio



When shorting is allowed, we have an overwhelming short positions of 36.88% in retail, 12.60% in office, and 7.44% in lodging, while only longing industrials and residential.



When shorting is allowed the only sizable position is in the industrial sector with a 9.05% allocation

Appendix 1

Correlation of Assets

	TLT	LQD	SPY	MDY	IWM	Industrials	Offices	Residential	Retail	Lodging
TLT	1	0.473176	-0.349001	-0.348132	-0.376488	-0.0446007	-0.112695	-0.0382098	-0.0701147	-0.221995
LQD	0.473176	1	0.295282	0.308694	0.247232	0.36282	0.451283	0.403875	0.439554	0.372791
SPY	-0.349001	0.295282	1	0.94114	0.910599	0.682789	0.671902	0.648635	0.619584	0.746947
MDY	-0.348132	0.308694	0.94114	1	0.969496	0.712804	0.727887	0.685168	0.699978	0.807329
IWM	-0.376488	0.247232	0.910599	0.969496	1	0.710993	0.718399	0.688045	0.695984	0.798426
Industrials	-0.0446007	0.36282	0.682789	0.712804	0.710993	1	0.86547	0.845916	0.844155	0.81169
Offices	-0.112695	0.451283	0.671902	0.727887	0.718399	0.86547	1	0.839193	0.897871	0.8344
Residential	-0.0382098	0.403875	0.648635	0.685168	0.688045	0.845916	0.839193	1	0.806834	0.784602
Retail	-0.0701147	0.439554	0.619584	0.699978	0.695984	0.844155	0.897871	0.806834	1	0.867295
Lodging	-0.221995	0.372791	0.746947	0.807329	0.798426	0.81169	0.8344	0.784602	0.867295	1