Technology Real Estate Strategy: Data Centers and Cell Phone Towers

Real Estate Lab Final Presentation
December 11, 2018
Executive Summary

Investment Thesis
- Explosive growth in technology real estate is not currently reflected in today’s pricing
- Downside protection is needed in today’s environment given core real estate pricing is at an all time high

Why technology real estate?
- Increasing demand with constraints on supply will lead to continued low vacancies, growth in rental rates, and cap rate compression

How to execute?
- Create a long-short strategy with a long position in data center and cell phone tower REITs and a short position in the overall real estate market
Who is our target investor?
• Our target investors are long-short REIT focused hedge funds such as AEW, Fir Tree, or Colony Capital

How much funding do we need?
• We are seeking $100 million for our investment

What is the expected return on this investment?
• The fund aims to deliver annual returns between 15% and 20% over a 5 year holding period. We offer investors an 8.0% preferred return on their investment plus 80% of additional returns.
Agenda

• Rationale for Investment Thesis
• What Are We Buying?
• Pricing
• Portfolio Construction
• Portfolio Performance and Backtesting
• Risks and Mitigants
• Target Investors
• Summary
• Q&A
• Appendix
Rationale for Investment Thesis
Technology Sector Growth

Big Data Volume (Exabytes)

- 59% CAGR (2015-2021)

Worldwide Revenues from AI ($billions)

- 45% CAGR (2016-2025)

Rationale for Investment Thesis

Source: Statista
Technology Sector Growth

Number of Connected Units (Billions)

- 17% CAGR (2016-2025)

Annual Cloud Data Center Traffic (Zettabytes)

- 24% CAGR (2017-2021)

Rationale for Investment Thesis

Source: Statista
Technology Sector Growth

North-American 5G-Connections

- 116% CAGR (2019-2021)

Annual Mobile Data Usage (Exabytes)

- 57% CAGR (2016-2021)

Rationale for Investment Thesis

Source: Statista
Tech Sector Growth Leads to Low Vacancy Rates

U.S. average vacancy rates 2009 and Q3-2018

- **Office**: 10% in 2009, 5% in Q3-2018
- **Retail**: 5% in 2009, 3% in Q3-2018
- **Industrial**: 10% in 2009, 5% in Q3-2018
- **Data Centers**: 25% in 2009, 15% in Q3-2018

Note: Data Center series includes CoreSite, CyrusOne, Digital Realty Trust, Equinix, QTS; rental rates for Data Centers exclude QTS due to inconsistent reporting.

Cell tower REIT vacancy rates aren't measured like core property types. Roughly 1-2% of tenants don't renew, annually.

Source: CoStar
Strong Rental Rate Growth

U.S. average rental rate CAGR
Q4-2009 to Q3-2018

Data Centers as the ‘next industrial’ sector?

0% 1% 2% 3% 4%

Office 2.0% Retail 0.9% Industrial 3.1% Data Centers 1.7% Cell Towers 3.7%

Note: Data Center series includes CoreSite, CyrusOne, Digital Realty Trust, Equinix, QTS; rental rates for Data Centers exclude QTS due to inconsistent reporting; rental rates for Cell Towers exclude SBA due to inconsistent reporting.

Rationale for Investment Thesis
Despite Influx of Supply

U.S. average supply % chg. 2009 to Q3-2018

- Robust supply growth over past ten years

Note: Data Center series includes CoreSite, CyrusOne, Digital Realty Trust, Equinix, QTS; rental rates for Data Centers exclude QTS due to inconsistent reporting

Cell tower REITs less exposed to supply concerns due to NIMBY characteristics

Source: CoStar
Strong Demand and Limited Supply – Cell Towers

Strong Demand Drivers
- 5G - Data demand doubles every 2 years
- FirstNet - First Responder Network Authority
  - Congressionally mandated dedicated bandwidth reserved for first responders
  - Received $7 billion of Congressional Funding\(^1\)

Constrained Supply For Tower Space
- NIMBY for new cell towers constrains supply
- High switching costs for telecom tenants
- 1-2% annual loss of tenants who do not renew
- 95% of cell tower land owners own 1 tower

Source: AMT Investor Presentation 2017; FirstNet.gov
Demand Outpacing Supply → Strong Growth in Cell Tower and Data Center REITs

Rationale for Investment Thesis
Real Estate Pricing – Why Include a Short Position?

- Downside protection
- Real estate sector cyclical
- Economists generally think global economy is in late cycle of recovery
- Isolate position within data center and cell tower space
- Limit exposure to broader real estate sector

Rationale for Investment Thesis

Source: Bank of America Merrill Lynch; Evan Lorenz, “Times Table,” Grant’s Interest Rate Observer, October 19, 2018, p.12
Real Estate Pricing – Why include a short position?

- Notable cap rate compression since 2010 and near the cyclical low values in 2007

Source: Green Street Advisors
What Are We Buying?
Data Center Overview

- A building housing servers, network, and storage hardware, offering tenants power, cooling, security, and network connectivity
- Depending on type, data center revenues can include rent, power charges, interconnection charges, and equipment charges
- Data centers operated by REITs can be either owned or leased
- Data centers can be fully fitted with equipment or empty shells built out by the tenants
Portfolio Data Center REITs Overview

- Five data center REITs with combined market cap of ~$67B, making up ~8.3% of the MSCI US REIT index
  - CoreSite, CyrusOne, Digital Realty Trust, Equinix & QTS
- International exposure to data centers
- Retail and hyperscale data centers, with exposure to ~35% of the revenue stream from retail data centers worldwide
- Balanced exposure to data center customers

What Are We Buying?

Source: SNL, Credit Suisse: Data Center REITs Initiation, MSCI
Portfolio Cell Tower REITs Overview

- Three cell tower REITs, which account for ~80% of total U.S. cell towers, with combined market cap of ~$138B
  - American Tower (AMT.REIT)
  - Crown Castle International (CCI.REIT)
  - SBA Communications (SBAC.REIT)
- $12.7B in revenue in 2017
- International exposure to cell towers
- Wireless carriers spend 20-30% of their revenue on cell phone tower leases

Cell towers typically built with variable capacity to support 4-5 tenants
The Short - Vanguard Real Estate ETF

- Largest real estate ETF
- Invests in stocks issued by REITs
- Goal is to closely track the return of the MSCI US Investable Market Real Estate 25/50 Index

What Are We Buying?

### Characteristics as of 10/31/2018

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of stocks</td>
<td>184</td>
</tr>
<tr>
<td>Fund total net assets</td>
<td>$56.3 billion</td>
</tr>
<tr>
<td>Net assets of 10 largest holdings</td>
<td>41%</td>
</tr>
<tr>
<td>Average shares traded per day</td>
<td>5.4 million</td>
</tr>
</tbody>
</table>

Source: Vanguard
Pricing
Attractive Tech Real Estate Pricing – Long Position

- Sector priced at discount to NAV
- Room for cap rate compression
- Price/AFFO in line with overall RE market
- Attractive point of entry given YTD returns (data centers)
- Minimal marginal cost to add tenants undervalued (cell towers)
Attractive Tech Real Estate Pricing – Long Position

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  - Minimal marginal cost to add tenants undervalued (cell towers)
Discount to NAV Analysis (Estimates)

<table>
<thead>
<tr>
<th>REIT Sector</th>
<th>Mean</th>
<th>Median</th>
<th>High</th>
<th>Low</th>
<th>Consensus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office</td>
<td>-21.8%</td>
<td>-21.6%</td>
<td>-28.5%</td>
<td>-13.8%</td>
<td>-22.1%</td>
</tr>
<tr>
<td>Data Centers</td>
<td>-21.0%</td>
<td>-19.5%</td>
<td>-44.5%</td>
<td>4.2%</td>
<td>-21.1%</td>
</tr>
<tr>
<td>Hotel</td>
<td>-14.6%</td>
<td>-14.9%</td>
<td>-18.0%</td>
<td>-10.4%</td>
<td>-19.2%</td>
</tr>
<tr>
<td>Retail</td>
<td>-16.2%</td>
<td>-16.0%</td>
<td>-22.5%</td>
<td>-8.5%</td>
<td>-16.6%</td>
</tr>
<tr>
<td>Multifamily</td>
<td>-13.7%</td>
<td>-13.1%</td>
<td>-21.0%</td>
<td>-7.1%</td>
<td>-13.5%</td>
</tr>
<tr>
<td>Industrial</td>
<td>-3.7%</td>
<td>-2.4%</td>
<td>-12.0%</td>
<td>3.4%</td>
<td>-3.6%</td>
</tr>
</tbody>
</table>

Note: includes all REITs in above sectors with NAV estimates: pertains to 33 Retail, 23 Office, 21 Hotel, 13 Multifamily, 13 Industrial and 5 Data Center REITs
Simple average; Retail is comprised of Shopping Center, Regional Mall and Other Retail REITS as defined by S&P
Cell Tower REIT data unavailable – rough calculation has them trading at premiums to NAV
## Discount to NAV Analysis (Estimates)

<table>
<thead>
<tr>
<th>REIT</th>
<th>Mean</th>
<th>Median</th>
<th>High</th>
<th>Low</th>
<th>Consensus</th>
</tr>
</thead>
<tbody>
<tr>
<td>QTS Realty Trust, Inc.</td>
<td>-38%</td>
<td>-31%</td>
<td>-75%</td>
<td>-12%</td>
<td>-43%</td>
</tr>
<tr>
<td>CoreSite Realty Corporation</td>
<td>-26%</td>
<td>-25%</td>
<td>-50%</td>
<td>3%</td>
<td>-23%</td>
</tr>
<tr>
<td>Equinix, Inc. (REIT)</td>
<td>-17%</td>
<td>-21%</td>
<td>-29%</td>
<td>1%</td>
<td>-17%</td>
</tr>
<tr>
<td>CyrusOne Inc.</td>
<td>-13%</td>
<td>-15%</td>
<td>-33%</td>
<td>23%</td>
<td>-14%</td>
</tr>
<tr>
<td>Digital Realty Trust, Inc.</td>
<td>-10%</td>
<td>-6%</td>
<td>-35%</td>
<td>6%</td>
<td>-8%</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>-21%</strong></td>
<td><strong>-20%</strong></td>
<td><strong>-44%</strong></td>
<td><strong>4%</strong></td>
<td><strong>-21%</strong></td>
</tr>
</tbody>
</table>

Note: Cell Tower REIT (AMT, CCI, SBA) figures not available

Source: S&P Global Market Intelligence
Attractive Tech Real Estate Pricing – Long Position

- Sector priced at discount to NAV
- Room for cap rate compression
- Price/AFFO in line with overall RE market
- Attractive point of entry given YTD returns (data centers)
- Minimal marginal cost to add tenants undervalued (cell towers)
In general, data center and cell tower REITs boast higher cap rates than averages among other sectors.

Note: pertains to implied cap rate LTM as of Q3-2018

Pricing

Source: S&P
Attractive Tech Real Estate Pricing – Long Position

- Sector priced at discount to NAV
- Room for cap rate compression
- **Price/AFFO in line with overall RE market**
- Attractive point of entry given YTD returns (data centers)
- Minimal marginal cost to add tenants undervalued (cell towers)
Price/AFFO Multiples In Line With Other Real Estate Sectors

Data based on weighted average growth numbers from analysts’ forecasted. Data as of 12/5/2018

Source: S&P Global Market Intelligence
Attractive Tech Real Estate Pricing – Long Position

- Sector priced at discount to NAV
- Room for cap rate compression
- Price/AFFO in line with overall RE market
- **Attractive point of entry given YTD returns (data centers)**
- Minimal marginal cost to add tenants undervalued (cell towers)
Data Center REITS - YTD Returns

YTD Price Change (%) and Total Return (%) for Portfolio Data Center REITs

as of 12/4/2018

Source: S&P
Attractive Tech Real Estate Pricing – Long Position

- Sector priced at discount to NAV
- Room for cap rate compression
- Price/AFFO in line with overall RE market
- Attractive point of entry given YTD returns (data centers)

  - Minimal marginal cost to add tenants undervalued (cell towers)
Cell Towers Undervalued

Operational Flexibility

- Cell tower valuations based on number of tenants per tower, but the tenant capacity is greater than the number used in the calculation
  
  - **Example:** AMT valuation based on 2.1 tenants per tower, but capacity is 5+

Sensitivity analysis

- Share prices are highly sensitive to the number of tenants per tower because the marginal cost of additional tenants is nearly zero

Source: Capital IQ and SNL
Expensive Real Estate Pricing – Short Position

NCREIF Property Index: Market Values, Rescaled NOI and Capitalization Rates
Based on a $100 Investment for the Period 1978 through 2017

Market Values
Rescaled NOI
Average Capitalization Rate
Capitalization Rates

Source: NPI
Portfolio Construction
Proposed Portfolio

• Long position in data centers and cell towers
• Short position (30% of long) in overall Real Estate market
• Proceeds from short are used to purchase a portion of the long position
• Additional cash will be placed into brokerage account to cover margin
• Fees on short anticipated to be offset by interest on cash held in brokerage account and excess dividend yield

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<thead>
<tr>
<th>Funding Sources</th>
<th>$</th>
<th>%</th>
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<tbody>
<tr>
<td>Funds from Investors</td>
<td>100,000,000</td>
<td>72%</td>
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<tr>
<td>Proceeds from Short</td>
<td>38,700,000</td>
<td>28%</td>
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<tr>
<td><strong>Total Sources</strong></td>
<td><strong>138,700,000</strong></td>
<td><strong>100%</strong></td>
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<table>
<thead>
<tr>
<th>Uses</th>
<th>$</th>
<th>%</th>
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<tr>
<td>Long</td>
<td>129,000,000</td>
<td>93%</td>
</tr>
<tr>
<td>Brokerage Cash</td>
<td>9,700,000</td>
<td>7%</td>
</tr>
<tr>
<td><strong>Total Uses</strong></td>
<td><strong>138,700,000</strong></td>
<td><strong>100%</strong></td>
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</table>

<table>
<thead>
<tr>
<th>Position</th>
<th>$</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>Gross Position</td>
<td></td>
<td></td>
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<tr>
<td>Long</td>
<td>129,000,000</td>
<td>73%</td>
</tr>
<tr>
<td>Short</td>
<td>38,700,000</td>
<td>22%</td>
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<tr>
<td>Brokerage Cash</td>
<td>9,700,000</td>
<td>5%</td>
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<tr>
<td><strong>Total Gross Position</strong></td>
<td><strong>177,400,000</strong></td>
<td><strong>100%</strong></td>
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</table>

<table>
<thead>
<tr>
<th>Net Position</th>
<th>$</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>Long</td>
<td>129,000,000</td>
<td>129%</td>
</tr>
<tr>
<td>Short</td>
<td>(38,700,000)</td>
<td>-39%</td>
</tr>
<tr>
<td>Brokerage Cash</td>
<td>9,700,000</td>
<td>10%</td>
</tr>
<tr>
<td><strong>Total Net Position</strong></td>
<td><strong>100,000,000</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Gross Exposure (as % of equity) 177%
Proposed Portfolio

Long Position

- Data Center Owners (50% of long)
  - Stocks weighted based on market cap
    - Digital Realty (DLR)
    - Equinix (EQIX)
    - CoreSite (COR)
    - CyrusOne (CONE)
    - QTS Realty Trust (QTS)
- Cell Tower Owners (50% of long)
  - Stocks weighted based on market cap
    - American Tower Company (AMT)
    - SBA Communications (SBAC)
    - Crown Castle International (CCI)

Short Position

- Vanguard Real Estate ETF (NYSE: VNQ)
  - Largest Real Estate ETF
  - Broad exposure to U.S. real estate
  - High liquidity: average 5.4 million shares traded daily

Portfolio Construction
Portfolio Performance and Backtesting
Risk and Return

Portfolio Performance and Backtesting

Source: Data taken from https://www.portfoliovisualizer.com/
Backtesting – Long Vs Short

Total Returns 2007 Through 2018

Source: Data taken from https://www.portfoliovisualizer.com/
Backtesting – Portfolio Vs Long

Total Returns 2007 through 2018

Portfolio Returns
Long Only Returns

Source: Data taken from https://www.portfoliovisualizer.com/
Portfolio Performance and Backtesting

Source: Data taken from https://www.portfoliovisualizer.com/
## Sensitivity Analysis – Fund Return

<table>
<thead>
<tr>
<th>Short Return</th>
<th>0%</th>
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<th>15%</th>
<th>20%</th>
<th>25%</th>
<th>30%</th>
<th>35%</th>
</tr>
</thead>
<tbody>
<tr>
<td>25%</td>
<td>(35%)</td>
<td>(29%)</td>
<td>(23%)</td>
<td>(16%)</td>
<td>(10%)</td>
<td>(3%)</td>
<td>3%</td>
<td>10%</td>
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<tr>
<td>20%</td>
<td>(34%)</td>
<td>(27%)</td>
<td>(21%)</td>
<td>(14%)</td>
<td>(8%)</td>
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<td>5%</td>
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<td>7%</td>
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<td>3%</td>
<td>9%</td>
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<tr>
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<td>(15%)</td>
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<td>(2%)</td>
<td>5%</td>
<td>11%</td>
<td>17%</td>
</tr>
<tr>
<td>0%</td>
<td>(26%)</td>
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<td>(13%)</td>
<td>(6%)</td>
<td>0%</td>
<td>6%</td>
<td>13%</td>
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<td>(5%)</td>
<td>1%</td>
<td>8%</td>
<td>14%</td>
<td>21%</td>
<td>27%</td>
</tr>
</tbody>
</table>

Data based on average returns, standard deviations, and correlations as shown in prior slides. Distribution of outcomes shown in **appendix**.

### Most likely scenarios yields average return **20.6%**  
(long only return: 17.5%)

### Covering more outcomes yields average return **20.6%**  
(long only return: 17.5%)

- Based on statistical characteristics from 2007 to present
- Expected fund IRR: 16.5%
- Cash-on-cash multiple for investors: 2.1x net of management fees and performance based fees

<table>
<thead>
<tr>
<th>Position</th>
<th>Return</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long position</td>
<td>15.7%</td>
<td>20.0%</td>
</tr>
<tr>
<td>Short position</td>
<td>5.0%</td>
<td>23.9%</td>
</tr>
<tr>
<td>Correlation</td>
<td>68.0%</td>
<td></td>
</tr>
</tbody>
</table>
Simulation of Fund Performance (RE Downturn)

- Hypothetical real estate downturn
- Expected fund IRR: -5.8%
- Cash-on-cash multiple for investors: 0.7x net of management fees and performance based fees

<table>
<thead>
<tr>
<th>Position</th>
<th>Return</th>
<th>Standard Deviation</th>
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</thead>
<tbody>
<tr>
<td>Long position</td>
<td>-10.0%</td>
<td>20.0%</td>
</tr>
<tr>
<td>Short position</td>
<td>-25.0%</td>
<td>20.0%</td>
</tr>
<tr>
<td>Correlation</td>
<td>70.0%</td>
<td></td>
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</tbody>
</table>

Assumptions

Portfolio Performance and Backtesting
Risks and Mitigants
# Risks and Mitigants

<table>
<thead>
<tr>
<th>Risks</th>
<th>Mitigants</th>
</tr>
</thead>
</table>
| Hyperscale growth (data centers) | • Security concerns limits some from using public cloud  
• Our portfolio has hyperscalers as customers |
| Obsolescence | • Slower technological development for CPUs after years of development, we see limited risk over the investment horizon. |
| Moore’s Law | • Hardware producers now focusing more on reducing power usage than reducing transistor size |
| Pricing History | • Data centers and cell towers among the highest yielding assets in the real estate industry in past few years.  
• Cap rates have come down; but the sector still trading well above the industry average and we believe there is room for compression. |
## Risks and Mitigants

<table>
<thead>
<tr>
<th><strong>Risks</strong></th>
<th><strong>Mitigants</strong></th>
</tr>
</thead>
</table>
| Oversupply             | • Cell Towers protected by NIMBY.  
                        | • Data Center growth projected to outpace supply and locations for data center development are limited. |
| Capital Market Risk    | • Funds available for distribution (FAD) are substantially higher than taxable income.  
                        | • Selected REITs maintain investment-grade credit ratings from the major agencies and have relatively conservative debt maturity schedules.  
                        | • Our long short strategy aims to reduce this risk |
| Developments in Telecom| • Although recent approval of 7,000+ satellites for new system pose a threat to our portfolio, development is anticipated to take longer than our holding period. |
Fee Structure & Target Investors
Fee Structure

- 1% management fee on raised funds
- 8% preferred return on investors’ contributions
- 20% management participation above 8% return

<table>
<thead>
<tr>
<th>Distribution of Proceeds (in $000s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Investment</td>
</tr>
<tr>
<td>Ending Value</td>
</tr>
<tr>
<td><strong>Total Proceeds</strong></td>
</tr>
<tr>
<td>Less Management Fees</td>
</tr>
<tr>
<td><strong>Total Proceeds Net of Management Fees</strong></td>
</tr>
<tr>
<td>Less Initial Investment</td>
</tr>
<tr>
<td><strong>Total Returns net of Management Fees</strong></td>
</tr>
</tbody>
</table>

- Paid Preferred: 8.0% 46,933
- Left for Distribution: 62,565
  - Distributed to Investors: 80% 50,052
  - Distributed to GPs: 20% 12,513

- Total to Investors: 196,985
- Total to GPs: 17,614

Data based on average returns, standard deviations, and correlations from 2007-2018 (IRR = 16.5%)
Long-Short Strategies are Poised to Take Advantage of a Potential Downturn

**Early Cycle**
- Real estate viewed as ‘unknowable and risky’

**Early Recovery**
- Skepticism abates

**Mid Cycle**
- Growth picks up and credit spreads tighten
- Stub equities Recapitalizations
- Misunderstood capital structure trades

**Late Cycle**
- Growth expectations inflated, cap rates compress
- Take privates
- Smart money selling
- Equity / credit shorts

**Early Downturn**
- Credit spreads widen as growth expectations fail to materialize
- Bankruptcies of overleveraged developers

**Early Cycle Stabilization**
- Fear subsides
- Distressed credit
- High quality real estate back on sale

Target Investors

Source: Pensions and Investments
Target Investors

- Target: Long-Short Real Estate Focused Hedge Fund
- $153+ Billion in Assets under Management dedicated to Real Estate Long-Short Positions
- YE 2017- Average Long-Short Ratio for companies listed: ~1.18:1

### Potential Long/Short RE Funds ($Billions in AUM)

<table>
<thead>
<tr>
<th>Fund</th>
<th>Long Pond Capital ($4.04)</th>
<th>Fir Tree ($10.9)</th>
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<tbody>
<tr>
<td>Colony Capital ($58)</td>
<td>AEW ($72.6)</td>
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</tr>
<tr>
<td>Security Cap ($2.84)</td>
<td>v3 ($0.48)</td>
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</tr>
<tr>
<td>Starwood ($0.73)</td>
<td>Heitman ($2.07)</td>
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</tr>
<tr>
<td>Waterfront Capital Partners ($0.75)</td>
<td>40 North ($0.87)</td>
<td></td>
</tr>
</tbody>
</table>

Source: Wall Street Oasis, Company Statements and Liabilities
Summary
Summary

Growth
• Data usage and storage expected to grow at massive rates

Pricing
• Supply and demand dynamics expected to lead to continued low vacancies, rent growth, and cap rate compression

Downside Protection
• Positive risk adjusted returns even through downturn

Summary

Positions and Funding

<p>| | |</p>
<table>
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</thead>
<tbody>
<tr>
<td>Long</td>
<td>$ 129,000,000</td>
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<tr>
<td>Short</td>
<td>$(38,700,000)</td>
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<td>Brokerage Cash</td>
<td>$ 9,700,000</td>
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<tr>
<td>Funding needed</td>
<td>$ 100,000,000</td>
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Expected Returns

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<tbody>
<tr>
<td>Returns to Investors</td>
<td>15% to 20%</td>
</tr>
<tr>
<td>Expected payments to GP</td>
<td>$ 10,000,000</td>
</tr>
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</table>
Q&A
Thank you
Appendix
Appendix – Data Centers
Two Types of Data Centers

Retail / Colocation
- Data centers that power, interconnect, and house IT hardware for multiple customers in a single data center facility
- Typically smaller and shorter leases
- ~1,500 multitenant data center vendors worldwide but consolidating

Wholesale / Hyperscale
- Single customers that take on large space
- 5-10 year leases, up to 20 years
- Might be customized for customers
- Power cost typically passed through
- Includes powered base buildings (PBBs) which are shells built out by the lessee

Appendix – Data Centers
Source: CoreSite investor presentation, SNL, Credit Suisse: Data Center REITs Initiation
Key Data Center Customer Types

- Cloud and IT services
- Enterprise
- Financial companies
- Network and mobile services
- Content providers

Source: Equinix annual report, Credit Suisse: Data Center REITs Initiation
CoreSite Realty Corp (NYSE: COR)

- Operates 20 data centers across 8 locations in the US
  - No international presence
- Leases 25% of assets, owns 75%
- Overall 2.1% market share in the Data Center industry
- History of industry leading growth, driven by organic expansion
- Higher focus on retail than other NYSE traded data center REITs
- 10 biggest customers account for 30% of revenue
- Second only to Digital Realty in interconnections
  - Opportunity for further growth?
- Potential acquisition candidate due to high strategic value?
  - Green Street estimates takeout probability equal to 20%

Appendix – Data Centers

Source: CoreSite investor presentation, SNL, Credit Suisse: Data Center REITs Initiation
CyrusOne, Inc. (NASDAQ: CONE)

- Operates 45 data centers, predominately in the US
  - Presence in China, Europe and Singapore
  - Growing internationally through acquisitions in key markets in China, Europe and South America
- Strategic focus on Fortune 1,000 companies, with ~20% of customers in this category
- Investor-grade credit rating
- History of industry-leading data center build speed
- Increasing number of leases with price escalators
- Robust development pipeline in 2019

Appendix – Data Centers

Company Overview

- Market Cap (M) $5,911
- Total Debt/Total Cap (%) 29.0%
- Share Price $56.08
- Dividend Yield (%) 3.3%
- FFO/Share NA
- LTM FFO/Share NA
- LTM FFO/Share Growth (%) 9.6%
- P/NTM AFFO 15.80x
- P/NAV (%) 83.6%

Source: SNL, Green Street Advisors, Earnings Presentation, Credit Suisse, JP Morgan
Digital Realty Trust, Inc. (NYSE: DLR)

- The world’s second largest data center company operating 198 data centers worldwide
  - ~81% US, ~14% Europe, ~5% Asia Pacific
  - Will enter Latin America in a JV with Brookfield, who is already highly invested in the region
- Have become a one-stop shop for tenants through acquiring well-positioned companies within interconnections and hyperscale
- After 2017 acquisition of DuPont Fabros their footprint is approximately three times that of Equinix
- Leases 14% of assets, owns 86%
- High retention rate of existing customers, Q3 saw high levels of leasing volume at elevated prices

Appendix – Data Centers

<table>
<thead>
<tr>
<th>Company Overview</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Cap (M)</td>
<td>$23,731</td>
</tr>
<tr>
<td>Total Debt/Total Cap (%)</td>
<td>26.5%</td>
</tr>
<tr>
<td>Share Price</td>
<td>$115.04</td>
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<tr>
<td>Dividend Yield (%)</td>
<td>3.5%</td>
</tr>
<tr>
<td>FFO/Share</td>
<td>$1.57</td>
</tr>
<tr>
<td>LTM FFO/Share</td>
<td>$6.30</td>
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<tr>
<td>LTM FFO/Share Growth (%)</td>
<td>9.6%</td>
</tr>
<tr>
<td>P/NTM AFFO</td>
<td>18.20x</td>
</tr>
<tr>
<td>P/NAV (%)</td>
<td>99.4%</td>
</tr>
</tbody>
</table>

Source: Green Street Advisors, JLL Data Center Outlook 2018, Digital Realty Trust investor presentation, SNL, Barclays
Equinix, Inc. (NASDAQ: EQIX)

- The world’s largest data center REIT. Owns 80 data centers and operates 208 data centers worldwide
  - Most global and distributed data center REIT
- Industry consolidator growing through acquisitions but also saw a 9% organic revenue growth in the last quarter
- Competitive moat due to global footprint (55% of revenue from outside U.S.) and network-dense assets after acquisition of Verizon’s mega data center portfolio in 2017
- 77% of revenue derived from colocation leases
- Most interconnectedness among data center REITs, positioning the company well to handle growth of 5G, edge computing, and Internet of Things.

Appendix – Data Centers

<table>
<thead>
<tr>
<th>Source: SNL, Green Street Advisors, JLL: Global Data Center Outlook, EQIX: 3Q 2018 10-Q</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Company Overview</strong></td>
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<tr>
<td>Market Cap (M)</td>
<td>$30,973</td>
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<tr>
<td>Total Debt/Total Cap (%)</td>
<td>24.6%</td>
<td></td>
</tr>
<tr>
<td>Share Price</td>
<td>$385.28</td>
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</tr>
<tr>
<td>Dividend Yield (%)</td>
<td>2.4%</td>
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</tr>
<tr>
<td>FFO/Share</td>
<td>$4.24</td>
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</tr>
<tr>
<td>LTM FFO/Share</td>
<td>$15.13</td>
<td></td>
</tr>
<tr>
<td>LTM FFO/Share Growth (%)</td>
<td>23.7%</td>
<td></td>
</tr>
<tr>
<td>P/NTM AFFO</td>
<td>17.20x</td>
<td></td>
</tr>
<tr>
<td>P/NAV (%)</td>
<td>86.8%</td>
<td></td>
</tr>
</tbody>
</table>
QTS Realty Trust, Inc. (NYSE: QTS)

- Smallest of the five data center REITs in terms of market cap. Near 100% U.S. exposure with potential to expand internationally within 5 years.
- Completed restructuring in 2018 to focus on hyperscale and hybrid colocation customers and decrease focus on cloud and managed services. Firm had record lease bookings through Q3 2018.
- QTS launched industry’s first Software Designed Data Center platform in 2017.
  - Allows QTS to quickly gain insights into customer requirements and data needs.
  - Customers can ensure assets in QTS data centers are being used optimally online and via mobile devices.
  - Customers can order additional cross connects using automated system, increasing speed and efficiency.

Company Overview

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Market Cap (M)</td>
<td>$2,706</td>
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<tr>
<td>Total Debt/Total Cap (%)</td>
<td>28.9%</td>
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<tr>
<td>Share Price</td>
<td>$40.61</td>
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<tr>
<td>Dividend Yield (%)</td>
<td>4.0%</td>
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<tr>
<td>FFO/Share</td>
<td>$0.35</td>
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<td>LTM FFO/Share</td>
<td>$1.60</td>
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<tr>
<td>LTM FFO/Share Growth (%)</td>
<td>(37.5%)</td>
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<tr>
<td>P/NTM AFFO</td>
<td>15.10x</td>
</tr>
<tr>
<td>P/NAV (%)</td>
<td>68.7%</td>
</tr>
</tbody>
</table>
Revenue Breakdown

Retail vs Hyperscale

- Hyperscale, 37%
- Retail, 63%

Geographic Breakdown

- International, 32%
- Domestic, 68%

Appendix – Data Centers

Source: SNL, Credit Suisse: Data Center REITs
Unlevered Cap Rates

<table>
<thead>
<tr>
<th>REIT</th>
<th>COR</th>
<th>CONE</th>
<th>DLR</th>
<th>EQIX</th>
<th>QTS</th>
<th>AMT</th>
<th>Weighted Average</th>
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</thead>
<tbody>
<tr>
<td>Real Estate Value ($000)</td>
<td>6,034,893</td>
<td>6,122,933</td>
<td>24,993,901</td>
<td>35,558,835</td>
<td>2,836,731</td>
<td>63,135,402</td>
<td>138,682,695</td>
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<tr>
<td>Total RE NOI Calc LTM ($000)</td>
<td>318,632</td>
<td>488,100</td>
<td>1,923,894</td>
<td>2,858,257</td>
<td>236,206</td>
<td>4,850,587</td>
<td>10,675,676</td>
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<tr>
<td>Implied Cap Rate (Unlevered)</td>
<td>5.30%</td>
<td>8.00%</td>
<td>7.70%</td>
<td>8.00%</td>
<td>8.30%</td>
<td>7.70%</td>
<td>7.70%</td>
</tr>
</tbody>
</table>

Note: Real Estate Values shown pertain to average of current and prior quarter for each of the past four quarters.
Same Store NOI Growth

Growth of Same Store Net Operating Income

All Equity REITs
Data Centers

Percent change, over a year ago


Source: S&P Global Market Intelligence, NREIT T-Tracker
In general, data center and cell tower REITs boast higher cap rates than averages among other sectors.
Cap rate compression would drive pricing

National Unlevered Cap Rates – Core Property Types and Data Centers

Note: Data Center series pertains to cap rates reported from data center transactions nationally.

Source: CoStar

Appendix – Data Centers
Cap rate compression would drive pricing

Unlevered Cap Rates

- Average
- CoreSite Realty Corporation
- Digital Realty Trust, Inc.
- QTS Realty Trust, Inc.
- American Tower Corporation (REIT)
- CyrusOne Inc.
- Equinix, Inc. (REIT)

Some cap rate compression apparent in select REIT data

Appendix – Data Centers

Source: CoStar
Data Center REITS - YTD Returns

Appendix – Data Centers

Source: S&P Global Market Intelligence
Appendix – Cell Towers
Cellular data growth drives demand for cell tower space

Global Monthly Mobile Data Traffic, By Type

- Mobile Video
- Mobile Web/Data/VoIP
- Mobile Audio
- Mobile File Sharing

Note: 1 Exabyte = 1 billion gigabytes

Appendix – Cell Towers

Source: Cisco, BI Intelligence calculations, 2017
American Tower Corp. (NYSE: AMT)

- The world’s largest owner and operator of cell towers
- 150,181 towers owned and operated in 2017
- ~55% US revenue, ~18% Asia, ~17% LATAM, ~10% EMEA

Appendix – Cell Towers

Data as of 2018/12/02:

- Market Cap (M) $71,834
- Total Debt/Total Cap (%) 24.5%
- Share Price $162.86
- Dividend Yield (%) 1.9%
- FFO/Share $1.69
- LTM FFO/Share $6.65
- LTM FFO/Share Growth (%) 9.6%
- P/NTM AFFO 20.50x
- P/NAV (%) 122.6%

Source: AMT Investor Presentation 2017, SNL
Same Store Growth for Cell Towers at AMT

- Long term contracts with annual rent increases
- Cell tower industry displays oligopoly characteristics
  - Small number of large firms
  - Nearly identical product
  - Significant barriers to entry

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</thead>
<tbody>
<tr>
<td>Contractual Rent Increase</td>
<td>3.0%</td>
<td>3.0%</td>
<td>3.0%</td>
<td>3.0%</td>
<td>3.0%</td>
<td>3.0%</td>
<td>3.0%</td>
<td>2.5%</td>
<td>2.5%</td>
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<tr>
<td>Colocation</td>
<td>2.2%</td>
<td>2.2%</td>
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<td>2.2%</td>
<td>2.0%</td>
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</tr>
<tr>
<td>Amendments</td>
<td>2.4%</td>
<td>2.4%</td>
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<td>2.4%</td>
<td>2.2%</td>
<td>2.2%</td>
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</tr>
<tr>
<td>Churn/Rent Rolldown</td>
<td>(1.7%)</td>
<td>(1.7%)</td>
<td>(2.0%)</td>
<td>(2.5%)</td>
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<tr>
<td>NOI Growth</td>
<td>5.9%</td>
<td>5.9%</td>
<td>5.6%</td>
<td>5.1%</td>
<td>4.9%</td>
<td>4.7%</td>
<td>4.7%</td>
<td>4.0%</td>
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<td>4.5%</td>
<td>1.9%</td>
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<tbody>
<tr>
<td>Contractual Rent Increase</td>
<td>5.3%</td>
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<td>5.0%</td>
<td>5.0%</td>
<td>5.0%</td>
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<td>5.0%</td>
<td>5.0%</td>
<td>4.5%</td>
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</tr>
<tr>
<td>Colocation</td>
<td>5.5%</td>
<td>5.5%</td>
<td>5.5%</td>
<td>5.0%</td>
<td>5.0%</td>
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<tr>
<td>Churn/Rent Rolldown</td>
<td>(3.5%)</td>
<td>(3.0%)</td>
<td>(3.0%)</td>
<td>(3.0%)</td>
<td>(3.0%)</td>
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<tr>
<td>NOI Growth</td>
<td>0.3%</td>
<td>0.5%</td>
<td>0.5%</td>
<td>0.0%</td>
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<td>0.0%</td>
<td>0.0%</td>
<td>5.0%</td>
</tr>
</tbody>
</table>

Source: Green Street Advisors
Crown Castle International Corp. (NYSE: CCI)

- The world’s 2nd largest owner and operator of cell towers
- 40,080 towers owned and operated in 2017
- 61% of revenue from towers, primarily in the U.S.
  - 24% of revenue from fiber optic cable business
  - 10% of revenue from small cell transponders in urban areas

Appendix – Cell Towers

Data as of 2018/12/02:

- Market Cap (M) $47,169
- Total Debt/Total Cap (%) 25.6%
- Share Price $113.70
- Dividend Yield (%) 4.0%
- FFO/Share $1.24
- LTM FFO/Share $4.64
- LTM FFO/Share Growth (%) 6.7%
- P/NTM AFFO 19.40x

Source: CCI 10K 2015, SNL
SBA Communications Corporation (NASDAQ: SBAC)

- SBAC became a REIT structure 1/17/2017
- 27,910 towers owned and operated in 2017
- Capital loss carryovers from prior year operations have resulted in estimated dividend start date in 2021
- Leverage 2 turns above AMT / CCI
- 75% of revenue from U.S. tower leasing
  - 15% of revenue from international leasing
  - 10% of revenue from site development services

Appendix – Cell Towers

<table>
<thead>
<tr>
<th>Data as of 2018/12/02:</th>
</tr>
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<tbody>
<tr>
<td><strong>Market Cap (M)</strong></td>
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<tr>
<td><strong>Total Debt/Total Cap (%)</strong></td>
</tr>
<tr>
<td><strong>Share Price</strong></td>
</tr>
<tr>
<td><strong>Dividend Yield (%)</strong></td>
</tr>
<tr>
<td><strong>LTM AFFO/Share</strong></td>
</tr>
</tbody>
</table>

Source: SBAC 10K 2017, SNL
Appendix – The Short (Vanguard RE ETF)
### The Short - Vanguard Real Estate ETF

<table>
<thead>
<tr>
<th>Portfolio REITs</th>
<th>Market Value in ETF</th>
<th>Weighting in ETF</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMT.REIT</td>
<td>3,377,597,763</td>
<td>6.0%</td>
</tr>
<tr>
<td>CCI.REIT</td>
<td>2,213,993,267</td>
<td>3.9%</td>
</tr>
<tr>
<td>SBAC.REIT</td>
<td>916,846,907</td>
<td>1.6%</td>
</tr>
<tr>
<td>COR</td>
<td>158,726,928</td>
<td>0.3%</td>
</tr>
<tr>
<td>CONE</td>
<td>258,952,559</td>
<td>0.5%</td>
</tr>
<tr>
<td>QTS</td>
<td>95,963,971</td>
<td>0.2%</td>
</tr>
<tr>
<td>EQIX.REIT</td>
<td>1,477,071,987</td>
<td>2.6%</td>
</tr>
<tr>
<td>DLR</td>
<td>1,043,822,297</td>
<td>1.9%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>9,542,975,679</strong></td>
<td><strong>17.0%</strong></td>
</tr>
</tbody>
</table>

**ETF Total** 56,293,296,050 100.0%

---

### Appendix – The Short (Vanguard RE ETF)

**Month-end ten largest holdings**

as of 10/31/2018

<table>
<thead>
<tr>
<th>Rank/holdings</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Vanderbilt Real Estate II Index Fund</td>
<td>19.2%</td>
</tr>
<tr>
<td>2 American Tower Corp.</td>
<td>13.2%</td>
</tr>
<tr>
<td>3 Simon Property Group Inc.</td>
<td>9.3%</td>
</tr>
<tr>
<td>4 Crown Castle International Corp.</td>
<td>8.6%</td>
</tr>
<tr>
<td>5 Prologis Inc.</td>
<td>7.3%</td>
</tr>
<tr>
<td>6 Public Storage</td>
<td>6.9%</td>
</tr>
<tr>
<td>7 Equinix Inc.</td>
<td>5.9%</td>
</tr>
<tr>
<td>8 Welltower Inc.</td>
<td>5.5%</td>
</tr>
<tr>
<td>9 AvalonBay Communities Inc.</td>
<td>4.9%</td>
</tr>
<tr>
<td>10 Equity Residential</td>
<td>4.8%</td>
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</tbody>
</table>

Source: Vanguard
Appendix – Portfolio Construction
## Dividend Yield Exposure

<table>
<thead>
<tr>
<th>Long Position</th>
<th>Share Price</th>
<th>Dividend Per Share</th>
<th>Annualized Dividend Yield</th>
<th>Market Cap (in billions)</th>
<th>Weight</th>
<th>Weighted Dividend Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMT</td>
<td>162.87</td>
<td>0.79</td>
<td>1.94%</td>
<td>71,740</td>
<td>25.85%</td>
<td>0.50%</td>
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<tr>
<td>SBAC</td>
<td>169.26</td>
<td>-</td>
<td>0.00%</td>
<td>19,360</td>
<td>6.98%</td>
<td>0.00%</td>
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<tr>
<td>CCI</td>
<td>113.56</td>
<td>1.13</td>
<td>3.96%</td>
<td>47,670</td>
<td>17.18%</td>
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</tr>
<tr>
<td>DLR</td>
<td>115.51</td>
<td>1.01</td>
<td>3.50%</td>
<td>23,830</td>
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<td>0.62%</td>
</tr>
<tr>
<td>EQIX</td>
<td>387.45</td>
<td>2.28</td>
<td>2.35%</td>
<td>30,970</td>
<td>22.85%</td>
<td>0.54%</td>
</tr>
<tr>
<td>COR</td>
<td>98.33</td>
<td>1.03</td>
<td>4.19%</td>
<td>4,750</td>
<td>3.51%</td>
<td>0.15%</td>
</tr>
<tr>
<td>CONE</td>
<td>57.72</td>
<td>0.46</td>
<td>3.19%</td>
<td>6,110</td>
<td>4.51%</td>
<td>0.14%</td>
</tr>
<tr>
<td>QTS</td>
<td>41.09</td>
<td>0.41</td>
<td>3.99%</td>
<td>2,100</td>
<td>1.55%</td>
<td>0.06%</td>
</tr>
<tr>
<td>VNQ</td>
<td>82.01</td>
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<table>
<thead>
<tr>
<th>Short Position</th>
<th>Share Price</th>
<th>Dividend Per Share</th>
<th>Annualized Dividend Yield</th>
<th>Weight</th>
<th>Weighted Dividend Yield</th>
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<tbody>
<tr>
<td>AMT</td>
<td>162.87</td>
<td>0.79</td>
<td>1.94%</td>
<td>25.85%</td>
<td>0.50%</td>
</tr>
<tr>
<td>SBAC</td>
<td>169.26</td>
<td>-</td>
<td>0.00%</td>
<td>6.98%</td>
<td>0.00%</td>
</tr>
<tr>
<td>CCI</td>
<td>113.56</td>
<td>1.13</td>
<td>3.96%</td>
<td>17.18%</td>
<td>0.68%</td>
</tr>
<tr>
<td>DLR</td>
<td>115.51</td>
<td>1.01</td>
<td>3.50%</td>
<td>17.58%</td>
<td>0.62%</td>
</tr>
<tr>
<td>EQIX</td>
<td>387.45</td>
<td>2.28</td>
<td>2.35%</td>
<td>22.85%</td>
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<tr>
<td>COR</td>
<td>98.33</td>
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<td>0.15%</td>
</tr>
<tr>
<td>CONE</td>
<td>57.72</td>
<td>0.46</td>
<td>3.19%</td>
<td>4.51%</td>
<td>0.14%</td>
</tr>
<tr>
<td>QTS</td>
<td>41.09</td>
<td>0.41</td>
<td>3.99%</td>
<td>1.55%</td>
<td>0.06%</td>
</tr>
<tr>
<td>VNQ</td>
<td>82.01</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Long Position Dividend Yield:** 2.69%
- **Short Position Dividend Yield:** -1.67%
- **Net Dividend Yield Exposure:** 1.01%

Source: Data taken from S&P Global Market Intelligence & Vanguard
Appendix – Portfolio Backtesting
Backtesting – Long Vs Short

Appendix – Portfolio Backtesting

Source: Data taken from https://www.portfoliovisualizer.com/
Backtesting – Long Vs Short

Total Returns 2015 Through 2018

Source: Data taken from https://www.portfoliovisualizer.com/
Backtesting – Long Vs Short

Appendix – Portfolio Backtesting

Source: Data taken from https://www.portfoliovisualizer.com/
Backtesting – Portfolio Vs Long

Appendix – Portfolio Backtesting

Source: Data taken from https://www.portfoliovisualizer.com/
Backtesting – Portfolio Vs Long

Total Returns 2015 through 2018

- Portfolio Returns
- Long Only Returns

Source: Data taken from https://www.portfoliovisualizer.com/
Backtesting – Portfolio Vs Long

Appendix – Portfolio Backtesting

Source: Data taken from https://www.portfoliovisualizer.com/
Backtesting – Portfolio Vs Benchmarks

Returns 2007 Through 2018

Portfolio (With Short)
Technology
S&P 500

Source: Data taken from https://www.portfoliovisualizer.com/
Backtesting – Portfolio Vs Benchmarks

Appended – Portfolio Backtesting

Source: Data taken from https://www.portfoliovisualizer.com/
Backtesting – Portfolio Vs Benchmarks

Appendix – Portfolio Backtesting

Source: Data taken from https://www.portfoliovisualizer.com/
Backtesting - Statistics

<table>
<thead>
<tr>
<th>Portfolio Statistics (2007 Through 2018)</th>
<th>Annualized Returns</th>
<th>STD Deviation</th>
<th>Sharpe Ratio</th>
<th>Best Year</th>
<th>Worst Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portfolio (With Short)</td>
<td>17.38%</td>
<td>19.71%</td>
<td>0.7244</td>
<td>75.69%</td>
<td>-34.44%</td>
</tr>
<tr>
<td>Portfolio (Long Only)</td>
<td>15.71%</td>
<td>19.99%</td>
<td>0.6307</td>
<td>73.72%</td>
<td>-37.07%</td>
</tr>
<tr>
<td>Real Estate</td>
<td>4.97%</td>
<td>23.92%</td>
<td>0.0784</td>
<td>30.36%</td>
<td>-36.99%</td>
</tr>
<tr>
<td>Technology</td>
<td>12.06%</td>
<td>18.05%</td>
<td>0.4965</td>
<td>61.87%</td>
<td>-42.80%</td>
</tr>
<tr>
<td>S&amp;P 500</td>
<td>7.90%</td>
<td>14.43%</td>
<td>0.3327</td>
<td>32.31%</td>
<td>-36.81%</td>
</tr>
</tbody>
</table>

Note: Risk-Free Rate for Sharpe Ratio is the 10-year U.S. Treasury Yield which is roughly 3.10%

<table>
<thead>
<tr>
<th>Correlation</th>
<th>Real Estate</th>
<th>Technology</th>
<th>S&amp;P 500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portfolio (With Short)</td>
<td>0.53</td>
<td>0.62</td>
<td>0.56</td>
</tr>
<tr>
<td>Portfolio (Long Only)</td>
<td>0.68</td>
<td>0.67</td>
<td>0.64</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BETA</th>
<th>Real Estate</th>
<th>Technology</th>
<th>S&amp;P 500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portfolio (With Short)</td>
<td>0.44</td>
<td>0.68</td>
<td>0.76</td>
</tr>
<tr>
<td>Portfolio (Long Only)</td>
<td>0.57</td>
<td>0.74</td>
<td>0.89</td>
</tr>
</tbody>
</table>

Source: Data taken from https://www.portfoliovisualizer.com/
Backtesting - Statistics

Portfolio Statistics (2015 Through 2018)

<table>
<thead>
<tr>
<th></th>
<th>Annualized Returns</th>
<th>STD Deviation</th>
<th>Sharpe Ratio</th>
<th>Best Year</th>
<th>Worst Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portfolio (With Short)</td>
<td>19.70%</td>
<td>16.03%</td>
<td>1.0357</td>
<td>37.15%</td>
<td>0.18%</td>
</tr>
<tr>
<td>Portfolio (Long Only)</td>
<td>17.01%</td>
<td>14.87%</td>
<td>0.9354</td>
<td>31.46%</td>
<td>0.59%</td>
</tr>
<tr>
<td>Real Estate</td>
<td>4.57%</td>
<td>13.54%</td>
<td>0.1087</td>
<td>8.60%</td>
<td>2.29%</td>
</tr>
<tr>
<td>Technology</td>
<td>16.70%</td>
<td>15.10%</td>
<td>0.9008</td>
<td>37.08%</td>
<td>5.05%</td>
</tr>
<tr>
<td>S&amp;P 500</td>
<td>9.84%</td>
<td>10.69%</td>
<td>0.6307</td>
<td>21.71%</td>
<td>1.26%</td>
</tr>
</tbody>
</table>

Note: Risk Free Rate for Sharpe Ratio is the 10-year U.S. Treasury Yield which is roughly 3.10%

Correlation

<table>
<thead>
<tr>
<th></th>
<th>Real Estate</th>
<th>Technology</th>
<th>S&amp;P 500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portfolio (With Short)</td>
<td>0.42</td>
<td>0.34</td>
<td>0.37</td>
</tr>
<tr>
<td>Portfolio (Long Only)</td>
<td>0.60</td>
<td>0.36</td>
<td>0.41</td>
</tr>
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</table>

BETA

<table>
<thead>
<tr>
<th></th>
<th>Real Estate</th>
<th>Technology</th>
<th>S&amp;P 500</th>
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</thead>
<tbody>
<tr>
<td>Portfolio (With Short)</td>
<td>0.50</td>
<td>0.36</td>
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<tr>
<td>Portfolio (Long Only)</td>
<td>0.66</td>
<td>0.36</td>
<td>0.36</td>
</tr>
</tbody>
</table>

Appendix – Portfolio Backtesting

Source: Data taken from https://www.portfoliovisualizer.com/
Simulation of Fund Performance (2015-2018)

- Based on statistical characteristics from 2015 to present
- Expected fund IRR: 19.2%
- Cash-on-cash multiple for investors: 2.2x net of management fees and performance based fees

<table>
<thead>
<tr>
<th>Position</th>
<th>Return</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long position</td>
<td>17.0%</td>
<td>14.9%</td>
</tr>
<tr>
<td>Short position</td>
<td>4.6%</td>
<td>13.5%</td>
</tr>
<tr>
<td>Correlation</td>
<td>60.0%</td>
<td></td>
</tr>
</tbody>
</table>

Assumptions

Portfolio Backtesting

Appendix – Portfolio Backtesting
Sensitivity Analysis – Frequency of Outcomes

Frequency of outcomes given the statistical characteristics outlined in the backtesting section.

Appendix – Portfolio Backtesting
Appendix – Fees and Target Investors
Fee Structure (RE Downturn)

- 1% management fee on raised funds
- 8% preferred return on investors’ contributions
- 20% management participation above 8% return

Distribution of Proceeds (in $000s)

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Investment</td>
<td>100,000</td>
</tr>
<tr>
<td>Ending Value</td>
<td>74,173</td>
</tr>
<tr>
<td>Total Proceeds</td>
<td>74,173</td>
</tr>
<tr>
<td>Less Management Fees</td>
<td>5,101</td>
</tr>
<tr>
<td>Total Proceeds Net of Management Fees</td>
<td>69,072</td>
</tr>
<tr>
<td>Less Initial Investment</td>
<td>(100,000)</td>
</tr>
<tr>
<td>Total Returns net of Management Fees</td>
<td>(30,928)</td>
</tr>
</tbody>
</table>

Paid Preferred 8.0% 0

Left for Distribution
- Distributed to Investors 80% 0
- Distributed to GPs 20% 0

Total to Investors 69,072
Total to GPs 5,101

Data based on average returns, standard deviations, and correlations from a hypothetical Real Estate Scenario (Tech REITS -10%, RE -25%)
Fee Structure (2015-2018)

- 1% management fee on raised funds
- 8% preferred return on investors’ contributions
- 20% management participation above 8% return

Data based on average returns, standard deviations, and correlations from 2015-2018 (IRR = 19.2%)