Real Estate Cycles

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Macro Economic Factors driving R.E. Demand

Population Growth = \textbf{3 million people EACH year}

\begin{align*}
\text{GDP Growth}^1 \\
\text{Employment Growth}^2
\end{align*}

\footnotesize
\textsuperscript{1} Source: U.S. Bureau of Economic Analysis, 2015; Moody's, 2015.
Macro Economic Factors driving R.E. Costs

Positive GDP Leads Employment Recovery

Recessions last a year or less - Recovery & Growth cycles can be short or long

**GDP & EMP Growth**

Real Estate Occupancy is Demand Driven by Employment Growth

Real Estate — a Delayed Mirror of the Economy

Source: CoStar Portfolio Strategy, January 2015. Employment & Property Occupied Stock is the top 54 MSA’s covered by PPR
US Commercial Real Estate Cycle
Follows US Economic Cycles

3 Key Metrics:
• Occupancies
• Rents
• Property Prices

Source: Glenn Mueller, PhD
Market Cycle Analysis

Physical Cycle

Demand & Supply drive Occupancy

Occupancy drives Rental Growth

Occupancy + Rent = Income Growth
Market Cycle Quadrants

Phase 1 - Recovery

Phase 2 - Expansion

Phase 3 - Hyper-supply

Phase 4 - Recession

Demand/Supply Equilibrium Point

Long Term Occupancy Average

Source: Mueller, Real Estate Finance 1995
Physical Market Cycle Characteristics

Phase 1 - Recovery

Phase 2 - Expansion

Phase 3 – Hyper-supply

Phase 4 - Recession

1. Negative Rental Growth

2. Below Inflation Rental Growth

3. Below Inflation & Negative Rent Growth

4. Cost Feasible New Construction Rents

5. Rent Growth Positive But Declining

6. Rent Growth in Tight Market

7. Rents Rise Rapidly Toward New Construction Levels

8. Demand/Supply Equilibrium

9. Long Term Average Occupancy

10. Positive But Declining

11. Positive But Declining

12. Below Inflation & Negative Rent Growth

13. Below Inflation & Negative Rent Growth


15. Below Inflation & Negative Rent Growth

16. Below Inflation & Negative Rent Growth

Time
30 year Historic National Office Rental Growth

30 Year Cycle - Periods 1968-1997

Long Term Average Occupancy

Phase 1 - Recovery
Phase 2 - Expansion
Phase 3 – Hyper-supply
Phase 4 - Recession

Source: Mueller, Real Estate Finance 1998
30 year Historic National Industrial Rental Growth %

Phase 1 - Recovery

Phase 2 - Expansion

Phase 3 – Hyper-supply

Phase 4 - Recession

Long Term Avg Occupancy

30 Year Cycle - Periods 1968-1997
National Property Type Cycle Locations

Phase 2 — Expansion

Phase 1 — Recovery

Phase 3 — Hypersupply

Phase 4 — Recession

4th Qtr 2016

Source: Mueller, 2017
Office Market Cycle Analysis
4th Quarter, 2016

Recovery

Expansion

Hypersupply

Source: Mueller, 2017

LT Average Occupancy

Recession
Industrial Market Cycle Analysis
4th Quarter, 2016

Source: Mueller, 2017
Apartment Market Cycle Analysis
4th Quarter, 2016

LT Average Occupancy

Expansion

Hypersupply

Recession

Source: Mueller, 2017
Retail Market Cycle Analysis
4th Quarter, 2016

Source: Mueller, 2017
Hotel Market Cycle Analysis
4th Quarter, 2016

LT Average Occupancy

Expansion

Hypersupply

Recovery

Recession

Source: Mueller, 2017
1970s Cycle

• Factors Driving The First Half Cycle (5 Year)
  • Strong Demand from the 1960s that stopped
  • Recession 1974
  • Capital Flow - Mortgage REITs produced oversupply

• Factors Driving The Second Half Cycle (5 Year)
  • Baby Boom Generation Goes to Work = Demand
  • Capital Flow Shut Down = no supply = Lenders Recover
  • Markets tighten and reach peak occupancy 1979 (5% vacancy)
1970s Office Demand & Supply

Source: FW Dodge, CB Commercial, BLS, Mueller
1980s Cycle

• Factors Driving The First Half Cycle (5 Year)
  • 1979 Tight market pushed rents & prices up
  • Inflation pushed prices higher
  • 1981 Tax Act attracted taxable investors
  • Thrift Deregulation allowed capital to flow

• Factors Driving The Second Half Cycle (5 Year)
  • 1986 Tax Act slowed taxable investors - not tax free
  • Poor stock market attracted Pension & Foreign capital
  • Rising R.E. prices masked poor income returns
1980s Office Demand & Supply

Source: FW Dodge, CB Commercial, BLS, Mueller

Oversupply Years
1990s Cycle

• Factors Driving The First Half Cycle (5 Year)
  • Moderate / stable demand growth (1991 recession minor)
  • Oversupply & Foreclosures shut down construction
  • Excess space Absorbed – “Markets Recover”

• Factors Driving The Second Half Cycle (5 Year)
  • Moderate Demand growth Continued
  • Oversupply Absorbed - Return Performance improved
  • Construction “Constrained” caused rents & prices to rise
  • More “Efficient Markets” matched supply to demand
1990s Office Demand & Supply

<table>
<thead>
<tr>
<th>Year</th>
<th>Demand</th>
<th>Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>1.5%</td>
<td>1.2%</td>
</tr>
<tr>
<td>1991</td>
<td>1.0%</td>
<td>1.0%</td>
</tr>
<tr>
<td>1992</td>
<td>0.5%</td>
<td>0.5%</td>
</tr>
<tr>
<td>1993</td>
<td>0.5%</td>
<td>0.5%</td>
</tr>
<tr>
<td>1994</td>
<td>1.0%</td>
<td>1.2%</td>
</tr>
<tr>
<td>1995</td>
<td>1.0%</td>
<td>1.2%</td>
</tr>
<tr>
<td>1996</td>
<td>0.5%</td>
<td>1.0%</td>
</tr>
<tr>
<td>1997</td>
<td>1.5%</td>
<td>1.5%</td>
</tr>
<tr>
<td>1998</td>
<td>2.0%</td>
<td>2.0%</td>
</tr>
<tr>
<td>1999</td>
<td>2.5%</td>
<td>2.5%</td>
</tr>
</tbody>
</table>

Source: FW Dodge, CB Commercial, BLS, Mueller
2000s Cycle

• “Globalization” – stable but slower U.S. economic growth

• Technology vs manufacturing economy

• Market Data available
  • Feedback loop = demand / supply balance

• Millennial Generation started entering workforce

• Public Markets (R.E. Capital markets more efficient)

• Supply Constraints (labor, steel & concrete costs, infrastructure)
2000s US Office Demand & Supply

Office Demand & Supply

Supply Reacted to Demand Slow Down
Supply Reacted to Demand Pick Up

2010s Cycle

- Slow Economic Growth – 2% GDP the norm?
- Economic Cycle Longer?
- Low Interest Rate Environment – 2% 10/Year Treasury average?
- Millennial Generation workforce
- Millennial Generation consumer
- Technology
- Baby Boomers retiring
- Sustainability
- Employment Growth drives commercial demand
Stock Growth Recovering

- Supply growth started increase in 2013 from a 42 year low

Source: Costar Portfolio Strategy, January 2015
2010s US Office Demand & Supply

Supply Reacted to Demand Pick Up

Forecast

Occupancy Rent Correlation 79%
Office Market Cycle FORECAST
4th Quarter, 2017 Estimates

Source: Mueller, 2017
Occupancy Rent Correlation 79%

Rents Overall +40.1%
Industrial Market Cycle FORECAST
4th Quarter, 2017 Estimates

LT Average Occupancy

Expansion

Recovery

Recession

Source: Mueller, 2017
Recession

Occupancy Rent Correlation 70%

Rents Overall +55.3%
Apartment Market Cycle FORECAST
4th Quarter, 2017 Estimates

LT Average Occupancy

Source: Mueller, 2017
Occupancy Rent Correlation 67%

Rents Overall +31.5%
Retail +15.3%
Recession -12.8%
Recession -10.1%

http://www.pdf-tools.com
Retail Market Cycle FORECAST
4th Quarter, 2017 Estimates

LT Average Occupancy

Source: Mueller, 2017
Occupancy Rent Correlation 73%

Recession +38.4%
Recession +28.4%
Recession +26.0%

Rents Overall +75.2%

US Hotel Cycle

http://www.pdf-tools.com
Hotel Market Cycle FORECAST
4th Quarter, 2017 Estimates

Source: Mueller, 2017
Financial Cycle

$Capital$ Flows affect Prices
Market Cycle Capital Flow Impact

Capital Flows to Existing Properties

- Cost Feasible Rents Reached

Hyper Supply

LT Occupancy Avg.

Property Market Cycle

Total Capital Flow Cycle

Capital Flows to New Construction
Why Real Estate Fits an Investment Portfolio = SIZE

U.S. Real Estate vs. Other Asset Classes

Source: Bonds = SIFMA, January 2015; Equities = World Federation of Exchanges for Equities, January 2015; U.S. Real Estate = Moody’s Real CPPI, January 2015. Commercial real estate are subject to real estate risks associated with operating and leasing properties. Additional risks include changes in economic conditions, interest rates, property values, and supply and demand, as well as possible environmental liabilities, zoning issues and natural disasters.
Nominal Returns during Low & High Inflation Periods

Asset Class Returns (nominal = without inflation)

Real Returns during Low & High Inflation Periods

REAL Asset Class Returns (inflation-adjusted)

<table>
<thead>
<tr>
<th>Asset Class</th>
<th>Low Inflation CPI (&lt;3.37%)</th>
<th>High Inflation CPI (&gt;3.37%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Stock</td>
<td>13.68</td>
<td>18.31</td>
</tr>
<tr>
<td>Small-Cap U.S. Stock</td>
<td>14.85</td>
<td>10.78</td>
</tr>
<tr>
<td>Non-U.S. Stock</td>
<td>12.06</td>
<td>9.37</td>
</tr>
<tr>
<td>U.S. Bonds</td>
<td>4.88</td>
<td>6.66</td>
</tr>
<tr>
<td>U.S. Cash</td>
<td>2.18</td>
<td>1.21</td>
</tr>
<tr>
<td>Real Estate</td>
<td>1.16</td>
<td>0.86</td>
</tr>
<tr>
<td>Commodities</td>
<td>0.86</td>
<td>1.21</td>
</tr>
<tr>
<td>7-Asset Portfolio</td>
<td>6.66</td>
<td>1.21</td>
</tr>
<tr>
<td>60% Stock/40% Bonds</td>
<td>2.67</td>
<td></td>
</tr>
</tbody>
</table>

Lump-Sum Performance

$10,000 investment in 12 asset classes vs equally weighted portfolio for the 15-year period.

Lump-sum Performance - August 1, 1999 – July 31, 2014

Bond Values DROP as Interest Rates Rise
10 Year Treasury Yields 1953 - 2016

Average Total Return 1953-1981 Peak = 3.9%

Average Total Return 1981-2013 = 8.7%

Average Yield = 5.95%

Average Total Return 1953-1973 = 1.9%

U.S. Commercial Property Prices & Transaction Volume

Real Commercial Property Price Index

Current Price Recovery to 2007 Peak %

- **CBD Office** — 134%
- **Apartment** — 139%
- **Industrial** — 103%
- **Retail** — 99%
- **Suburban Office** — 89%

Property Price Cycle Cap Rates

Historic Cap Rates

Cap Rates


Wide Yield to Bonds Attracting Capital

Spread Between Cap Rates and 10-Year Treasury by Sector

Source: Real Capital Analytics, 1Q 2016.
PLENTY OF CAPITAL FROM ALL SECTORS

Buyer Composition

http://www.rcanalytics.com
Debt Capital: Credit Conditions Improving

Composition of Lenders 2015

- **Office**
  - CMBS: 17%
  - Insurance: 9%
  - Financial: 34%
  - Int’l Bank: 13%
  - Gov’t Agency: 18%
  - Nat’l Bank: 8%

- **Industrial**
  - CMBS: 8%
  - Insurance: 6%
  - Financial: 30%
  - Int’l Bank: 8%
  - Gov’t Agency: 27%
  - Nat’l Bank: 16%

- **Retail**
  - CMBS: 38%
  - Insurance: 5%
  - Financial: 26%
  - Int’l Bank: 11%
  - Gov’t Agency: 12%
  - Nat’l Bank: 7%

- **Apartment**
  - CMBS: 5%
  - Insurance: 65%
  - Financial: 8%
  - Int’l Bank: 5%
  - Gov’t Agency: 11%

- **Hotel**
  - CMBS: 34%
  - Insurance: 8%
  - Financial: 6%
  - Int’l Bank: 17%
  - Gov’t Agency: 27%
  - Nat’l Bank: 6%
## GLOBAL CAPITAL TRENDS 2016

<table>
<thead>
<tr>
<th>Rank</th>
<th>Source</th>
<th>Destination</th>
<th>Vol ($m)</th>
<th>YOY Chg</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>China</td>
<td>United States</td>
<td>14,355</td>
<td>54%</td>
</tr>
<tr>
<td>2</td>
<td>United States</td>
<td>United Kingdom</td>
<td>8,894</td>
<td>-61%</td>
</tr>
<tr>
<td>3</td>
<td>United States</td>
<td>Germany</td>
<td>6,881</td>
<td>-30%</td>
</tr>
<tr>
<td>4</td>
<td>Germany</td>
<td>United States</td>
<td>5,996</td>
<td>-15%</td>
</tr>
<tr>
<td>5</td>
<td>United States</td>
<td>France</td>
<td>3,938</td>
<td>-37%</td>
</tr>
<tr>
<td>6</td>
<td>South Korea</td>
<td>United States</td>
<td>3,800</td>
<td>14%</td>
</tr>
<tr>
<td>7</td>
<td>Singapore</td>
<td>United Kingdom</td>
<td>3,428</td>
<td>4%</td>
</tr>
<tr>
<td>8</td>
<td>Singapore</td>
<td>United States</td>
<td>3,263</td>
<td>-78%</td>
</tr>
<tr>
<td>9</td>
<td>Switzerland</td>
<td>United States</td>
<td>3,245</td>
<td>4%</td>
</tr>
<tr>
<td>10</td>
<td>United States</td>
<td>Australia</td>
<td>3,197</td>
<td>7%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rank</th>
<th>Source</th>
<th>Destination</th>
<th>Vol ($m)</th>
<th>YOY Chg</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Qatar</td>
<td>United States</td>
<td>3,179</td>
<td>-31%</td>
</tr>
<tr>
<td>12</td>
<td>United States</td>
<td>Japan</td>
<td>3,011</td>
<td>-33%</td>
</tr>
<tr>
<td>13</td>
<td>United States</td>
<td>Netherlands</td>
<td>2,848</td>
<td>24%</td>
</tr>
<tr>
<td>14</td>
<td>Hong Kong</td>
<td>United Kingdom</td>
<td>2,701</td>
<td>-7%</td>
</tr>
<tr>
<td>15</td>
<td>Canada</td>
<td>United Kingdom</td>
<td>2,655</td>
<td>-45%</td>
</tr>
<tr>
<td>16</td>
<td>Qatar</td>
<td>Singapore</td>
<td>2,477</td>
<td>n/a</td>
</tr>
<tr>
<td>17</td>
<td>Israel</td>
<td>United States</td>
<td>2,469</td>
<td>44%</td>
</tr>
<tr>
<td>18</td>
<td>Canada</td>
<td>Germany</td>
<td>2,342</td>
<td>-38%</td>
</tr>
<tr>
<td>19</td>
<td>Hong Kong</td>
<td>United States</td>
<td>2,304</td>
<td>50%</td>
</tr>
<tr>
<td>20</td>
<td>Japan</td>
<td>United States</td>
<td>2,283</td>
<td>88%</td>
</tr>
</tbody>
</table>
2017 Physical Cycle

- Cycles can be *Long or Short*
- LONG economic expansion means *LONG* real estate *UP Cycle*
- Cycles can be driven by *Demand or Supply*
- Supply growth slowest in 2013 - now increasing moderately
- Growth phase of cycle 2014-2020? (depending on market & property type)

2016 Financial Cycle

- Capital flows affect prices — volatile stock market & low bond rates
- Real estate more *Stable & Safer* investment?
- Debt financing *harder* in this cycle – more cash down
- Low new construction

*Differentiate* residential ownership *versus* commercial real estate to your investors!
QUESTIONS?
Topics Covered

**Economic Fundamentals**
5 key Macro Economic Drivers of Real Estate Performance
Economic Base Analysis

**Real Estate Physical Cycle Fundamentals**
Demand for Real Estate
Supply of Real Estate
Occupancy Cycles
Rent Cycles

**Real Estate Financial Cycle Fundamentals**
Interest Rates
Capital Flows
Buyers
Real Estate Prices
Cap Rates