



REAL ESTATE STRATEGY SEMI-ANNUAL REPORT (OPEN SESSION) AS OF Q3 2018

California State Teachers' Retirement System
February 18, 2019

The information contained in this report is confidential, may be legally privileged, and is intended only for the use of the CalSTRS.

RCLCO
FUND ADVISORS

CONTENTS

Goals and Objectives	3
Executive Summary	4
Appendices	10
<i>Current Portfolio Performance Attribution</i>	<i>10</i>
<i>Key Real Estate Market Trends</i>	<i>20</i>
Disclaimers	35

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CALSTRS Q3 2018 OPEN SESSION REPORT

GOALS AND OBJECTIVES

The objective of this semi-annual report is to provide the Committee with an evaluation of the real estate portfolio's alignment with CalSTRS' established goals and policies and the investment opportunities presented by property and capital markets.

To accomplish the above objective, we reviewed the CalSTRS portfolio, policies and limitations, previous recommendations and activities, as well as current and forecasted economic, capital market, and property market conditions.

Current long-term goals and objectives that the semi-annual report evaluates include:

- ▶ A real estate allocation target of 12%, with a longer-term target of 13%;
- ▶ Target a net return benchmarked to the NCREIF NFI-ODCE Index for the core portfolio, 50 basis points over the ODCE for the value add portfolio, and 300 basis points over the ODCE for the opportunistic portfolio;
- ▶ Allocation based on property stage – stable and value creation (lease-up/reposition and construction) – to maintain an appropriate risk profile; and
- ▶ An appropriate level of leverage.

FUNDING STATUS AND COMPLIANCE

AS OF Q3 2018

- ▶ The CalSTRS Real Estate portfolio had a NAV of \$30.4 billion as of Q3 2018, representing 14.2% of the total CalSTRS fund (~\$213.9 billion), which is above the current target allocation to real estate of 12%, but within the policy range of 9%-15%.
- ▶ The Real Estate portfolio has generated TWRs of 2.7%, 10.2%, and 9.2% over 10-, 5-, and 3-year time horizons, respectively, outperforming the ODCE across the 5- and 3-year periods.
- ▶ The Real Estate portfolio has generally outperformed its target return benchmarks, with the exception of riskier value add and opportunistic investments over longer time horizons. The Legacy assets within the portfolio have continued to negatively impact total returns over 1-, 3-, 5-, and 10-year investment horizons, although these assets have been steadily liquidating, and will have a diminished impact going forward.
- ▶ The portfolio is compliant with the targeted allocation by investment strategy and is within the permitted leverage limits as outlined by the CalSTRS Investment Policy Statement (“IPS”).

Portfolio Performance¹

TIME WEIGHTED RETURNS								
	Including Legacy				Excluding Legacy			
	1 Yr	3 Yr	5 Yr	10 Yr	1 Yr	3 Yr	5 Yr	10 Yr
Core	9.7%	9.3%	10.7%	6.1%	9.7%	9.3%	10.7%	6.1%
Value Add	11.8%	13.4%	15.4%	3.8%	11.5%	13.3%	15.9%	4.0%
Opportunistic	9.0%	6.8%	7.0%	0.0%	10.4%	11.4%	13.1%	1.2%
Total	9.9%	9.2%	10.2%	2.7%	10.1%	10.4%	12.0%	4.4%
Benchmark (ODCE)	7.7%	7.8%	9.7%	4.6%	7.7%	7.8%	9.7%	4.6%

¹Green cells denote outperformance of the target return metric. The Core portfolio has a net target return benchmarked to the ODCE, while the Value Add and Opportunistic portfolios have net target returns of 50 basis points and 300 basis points over the ODCE, respectively.

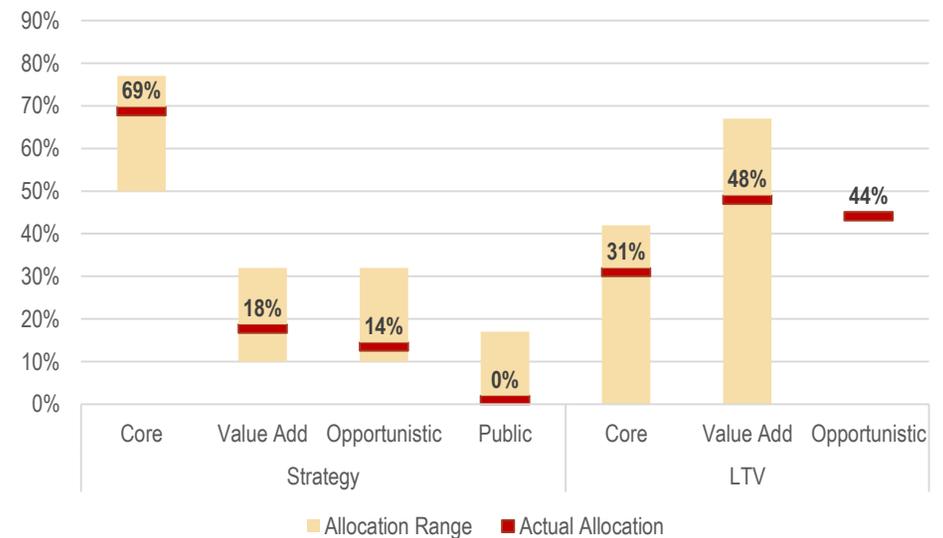
SOURCE: CalSTRS; State Street; NCREIF

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PORTFOLIO ALLOCATION

	\$ Billions	% of Total Portfolio
Total Portfolio NAV	\$213.9	N/A
Target Real Estate Allocation	\$25.7	12.0%
Actual Real Estate NAV	\$30.4	14.2%

Compliance – Strategy and Leverage

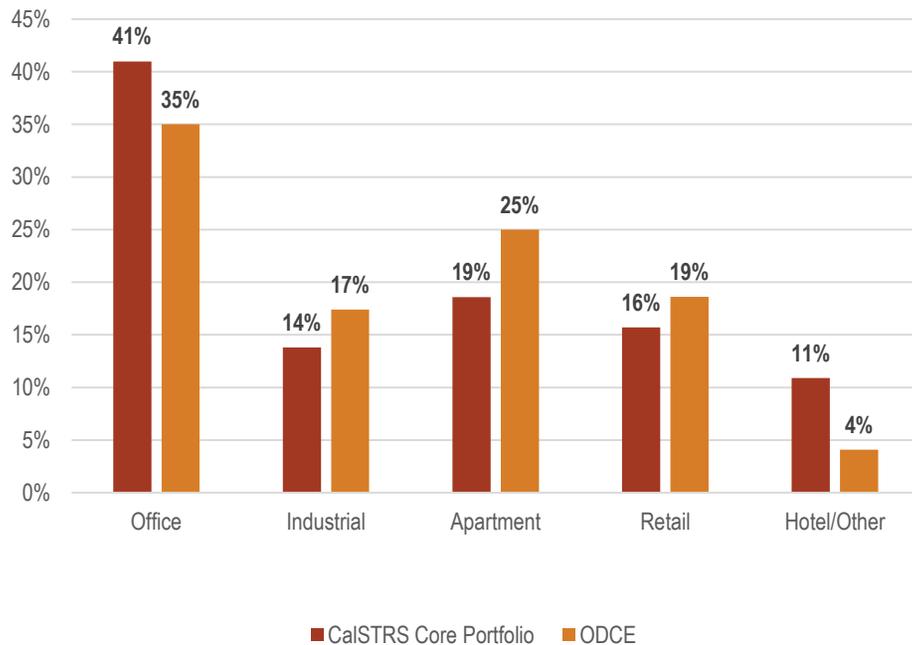


CORE PORTFOLIO

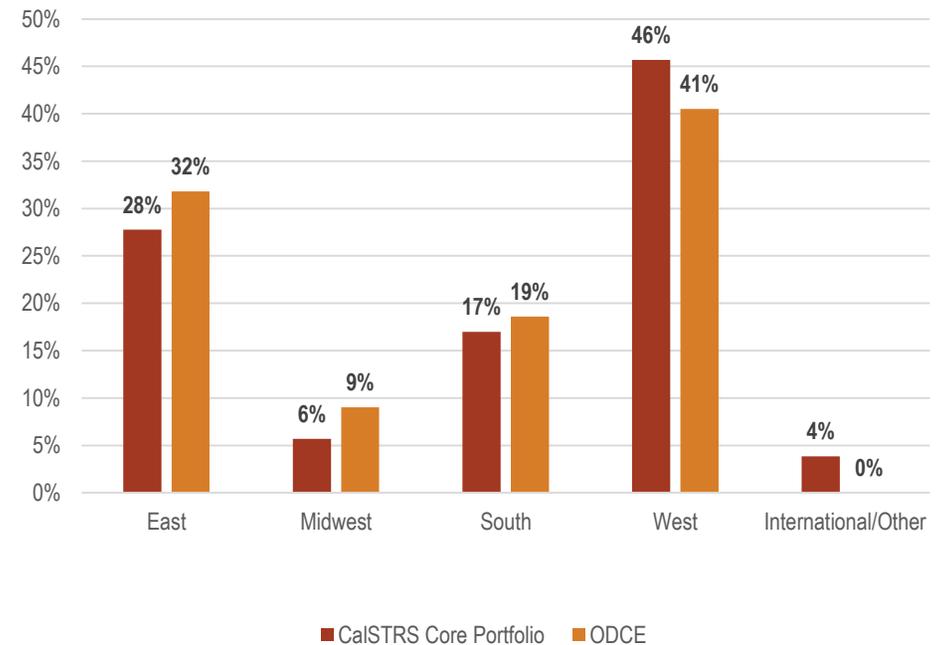
PROPERTY TYPE AND GEOGRAPHIC DIVERSIFICATION

- ▶ The CalSTRS core portfolio has property type and geographic diversification targets of $\pm 5\%$ of the benchmark ODCE Index, while the value add and opportunistic portfolios do not have location and property type targets.
- ▶ CalSTRS increased its allocation to office investments since the Q1 2018 Semi-Annual Report, with the allocation increasing from 35% of the core portfolio in Q1 2018 to 41% in Q3 2018. As a result, the core portfolio is overexposed to office investments by 6.0% and underexposed to apartment investments by 6.4% relative to the ODCE—both beyond the specified 5% deviation per the policy.
- ▶ Regionally, the core portfolio is overexposed in the West by 5.2% and slightly underweight across the other regions compared to the ODCE. Although the ODCE only includes assets within the United States, the core portfolio's international allocation of 3.8% is within the specified deviation.
- ▶ Although the real estate portfolio currently has property type and geographic variances beyond the permitted $\pm 5\%$ deviation per the IPS, we believe that certain allocation variances should be permitted based on an evaluation of the long-term trends, opportunities, and risks, rather than mechanically investing to benchmark the ODCE.

Property Type



Geographic

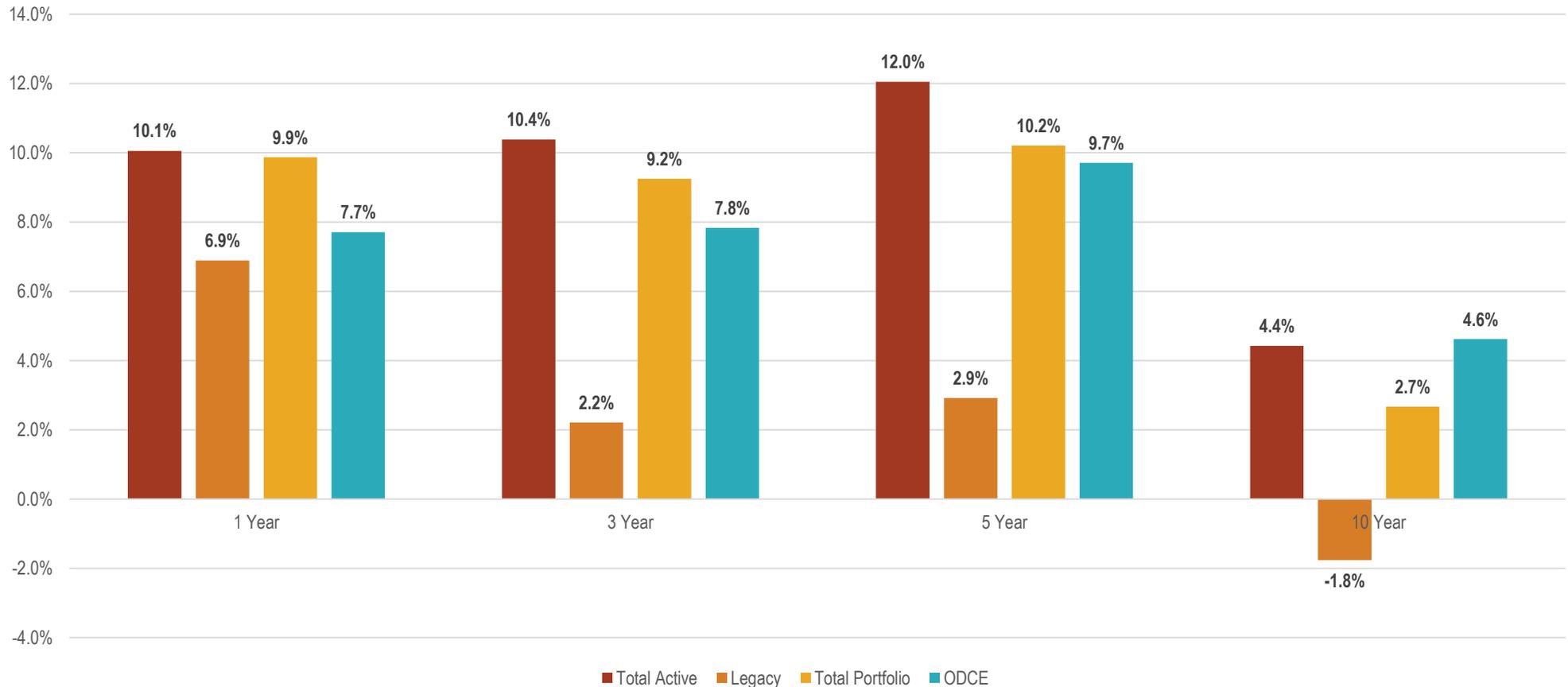


HISTORICAL RETURNS

AS OF MARCH 31, 2018

- ▶ While the active portfolio (excluding Legacy assets) underperformed the ODCE by 20 basis points over the past 10 years, it has exhibited much stronger recent performance, outperforming the ODCE by at least 230 basis points over the 1-, 3-, and 5-year periods.
- ▶ The Legacy portfolio has had a continued negative impact on total returns, resulting in a drag on returns of 184 basis points and 176 basis points over the 5- and 10-year periods, respectively. Despite this negative impact on returns, the Legacy portfolio has been steadily liquidating and comprises just 5.5% of the portfolio as of Q3 2018, down from roughly 8.7% one year prior. As the Legacy portfolio's assets are disposed of, its effects are diminishing, with its drag on the total portfolio return over the 1-year period declining to just 20 basis points.

Historical Net Time-Weighted Returns

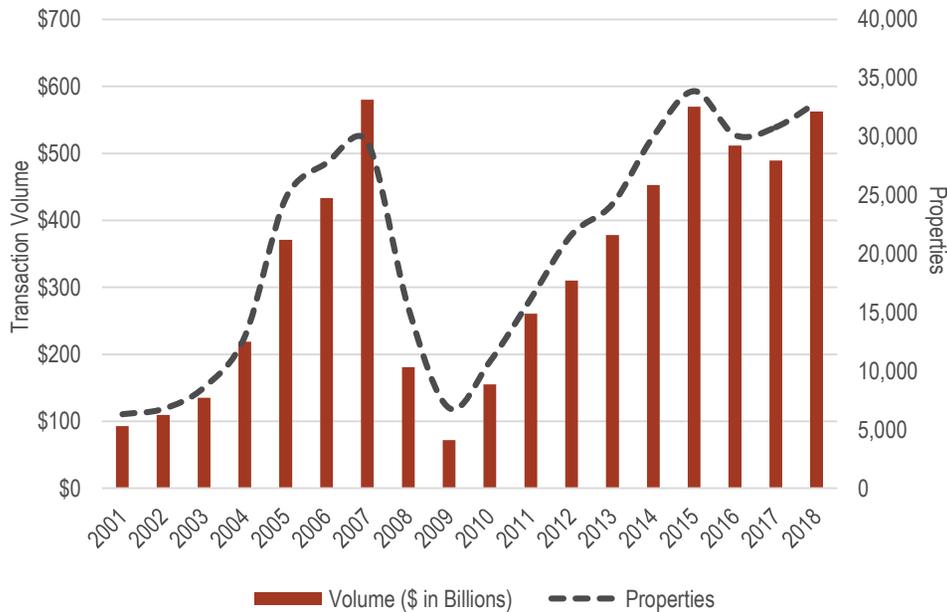


MARKET OUTLOOK

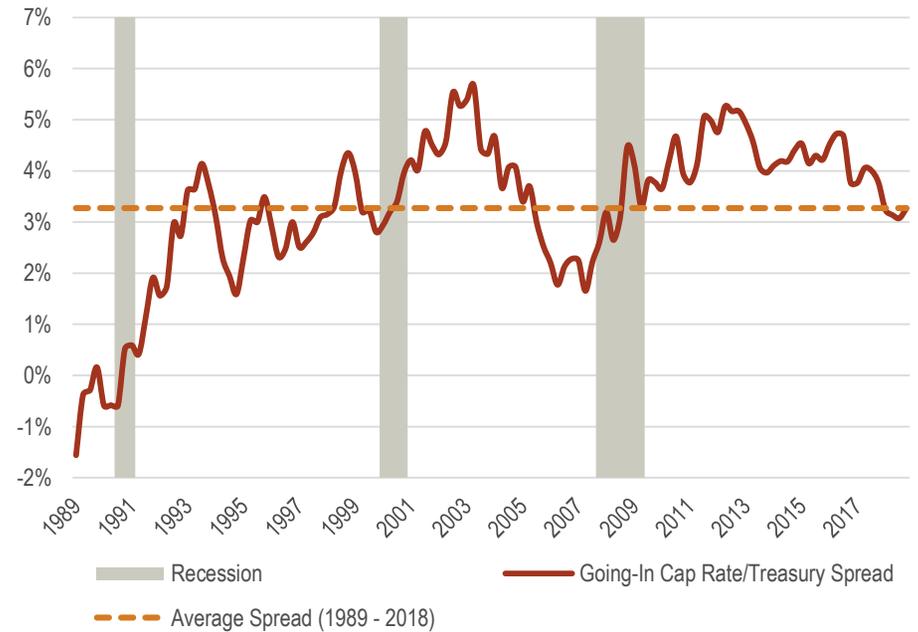
MACROECONOMIC CONDITIONS

- ▶ **Economic Cycle:** RCLCO's point of view is that we continue to be in the "late stable" stage of the market cycle for most property types and geographies, which may endure through the end of 2019. Pricing is well above peak values among all product types, especially for multifamily and central business district (CBD) office assets. Meanwhile, construction activity remains below historical averages for all product types with the exception of industrial assets, which also witnessed a decrease in completions in 2018.
- ▶ **Capital Markets:** Fundraising levels remain high while dry powder continues to accumulate to record levels, suggesting that institutions may be preserving capital for investment in the event of a downturn. Nonetheless, transaction volume for 2018 reached a new high, increasing by 15% YoY and reversing a three year trend of decreasing volume. Offshore investment within the US also remains strong, with capital flows increasing by 60% in 2018 YoY. Although lending standards have tightened over the past several years and CMBS issuances have decreased through Q3 2018 YoY, lending standards have not moved over the past two quarters and debt flows remain well above historical averages.
- ▶ **Cap Rates:** Average going-in cap rates marginally compressed in 2018 while interest rates and treasury yields increased. Although the spread between cap rates and treasury yields declined below the historical average in 2018 for the first time in the current cycle, history suggests that the spread can continue to narrow in the late cycle. The Federal Reserve has recently indicated that it intends to be patient with future interest rate increases, potentially easing upward pressure on cap rates.

Total Transaction Volume (\$ in Billions)



Spread Between 10-Year Treasury Yield and Going-In Cap Rate; 1989 – 2018

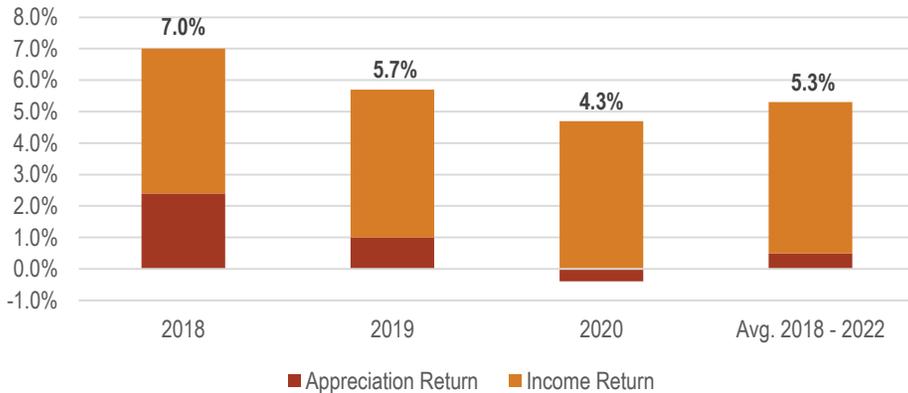


MARKET OUTLOOK

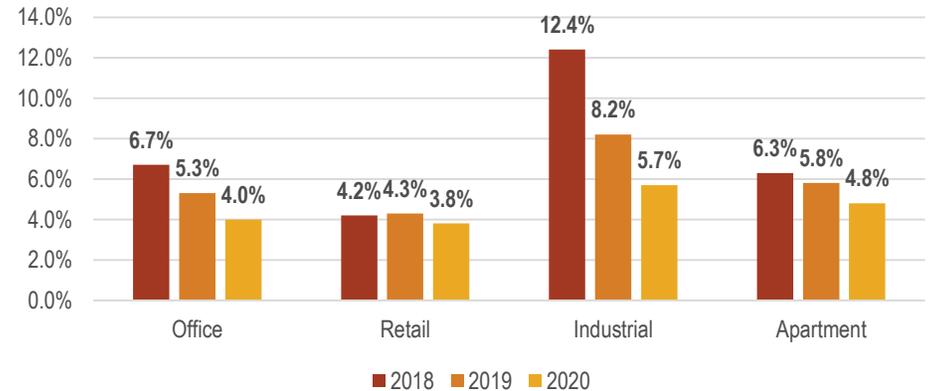
PROPERTY TYPE OUTLOOK

- ▶ **Multifamily:** RCLCO's view is that multifamily remains the furthest along in the economic cycle amongst the four main property types. Despite significant deliveries over the past five years, the average vacancy rate has declined to 6.0% through 2018, its lowest point since 2000, largely due to low unemployment rates and continued increases in household formations which have contributed to strong persistent demand. However, multifamily cap rates have compressed the most among any product type since their previous peak, suggesting that valuations may soften in the event of a downturn.
- ▶ **Office:** RCLCO also views office near top of market, with CBD cap rates currently stabilizing and suburban cap rate compression slowing. Market fundamentals support this view, with significant office deliveries since 2016 and the deceleration of rent growth over the same timeframe. Nonetheless, the steady rise of office-using employment since the Great Recession and the historically low current unemployment rate have maintained occupancy levels.
- ▶ **Retail:** Retail continues to exhibit disciplined construction activity benefiting neighborhood and community retail operating performance, but, as noted in prior reports, certain retail types (primarily power centers and suburban malls) and locations are suffering from "structural obsolescence," largely thanks to e-commerce. Due to the uncertain and negative perception of retail, cap rates have remained somewhat flat or begun to slightly expand across most retail sectors.
- ▶ **Industrial:** Industrial remains the healthiest major property sector, though absorption has continued to decelerate since 2016. Despite this deceleration, increases in e-commerce and the desire for more convenient delivery options continues to push long-term demand forecasts. However, strong investor activity in the space has compressed cap rates well below pre-recession lows and transactions have continued to set record highs.
- ▶ **Expected Returns:** Market participants are expecting declining levels of return, as evidenced by the latest investor survey results compiled by the Pension Real Estate Association (PREA). While income returns are expected to remain fairly steady over the next few years, returns from appreciation are anticipated to decline from 2.4% in 2018 to -0.4% in 2020 as cap rates expand. Participants are expecting industrial returns to decline the most by 2020 amongst real estate product types, although they are still expecting outsized industrial returns compared to all other product types.

Forecasted NPI Returns¹



Forecasted NPI Returns by Product Type¹



LONGER-TERM TRENDS & THEMES

	TRENDS AND THEMES	REAL ESTATE STRATEGIES
LIVE	<ul style="list-style-type: none"> ▶ Aging Millennials and Baby Boomers with longer lifespans ▶ Growing single-family demand from aging Millennials ▶ Gen Z to replace existing Millennials, but Gen X too small to replace existing Baby Boomers ▶ Housing inventory at 30-year low suggesting pent up demand ▶ Ownership increasingly unaffordable compared to renting ▶ Continuously increasing income inequality 	<ul style="list-style-type: none"> ▶ Need for active adult/age-targeted product as Baby Boomers age into retirement ▶ Lower density rental products for aging Millennials that cannot afford ownership/renters-by-choice ▶ Additional high-density multifamily for Millennials/Gen Z in supply constrained markets ▶ For-sale housing development to alleviate housing shortage
WORK	<ul style="list-style-type: none"> ▶ Office landscape increasingly dictated by consumer preferences (lease flexibility, health/wellness amenities, locations near housing) ▶ Growing acceptance of virtual interactions and increase demand/ability to work from home ▶ Technology-enabled flexibility (WeWork, AirBnB, etc.) ▶ Large percentage of existing office stock may be structurally obsolete ▶ Growing need/demand for health care as Baby Boomers retire 	<ul style="list-style-type: none"> ▶ Investment in modernized office in attractive locations and flexible floor plans/renovation capabilities ▶ Potential master leases to accommodate sub-lease landscape and more flexible lease terms ▶ Disposition of structurally obsolete office (older Class B) ▶ Healthcare/MOB product to facilitate aging Baby Boomers
SHOP	<ul style="list-style-type: none"> ▶ Industrial is the “new retail” through e-commerce ▶ Consumers increasingly desiring experiences over material belongings ▶ Increasing obsolescence of many retail centers ▶ Exponential growth in data usage and traffic 	<ul style="list-style-type: none"> ▶ Logistics-based industrial, from “Super Bulk” to “Last Mile” ▶ Experiential retail to challenge growing online sector (entertainment, unique retailers, etc.) ▶ Emphasis on needs based retail (coffee shops, groceries), which are more e-commerce resistant ▶ Infrastructure investments to support technologically advancing society (data centers, autonomous vehicle storage, etc.)

APPENDIX: CURRENT PORTFOLIO

CURRENT PORTFOLIO SUMMARY

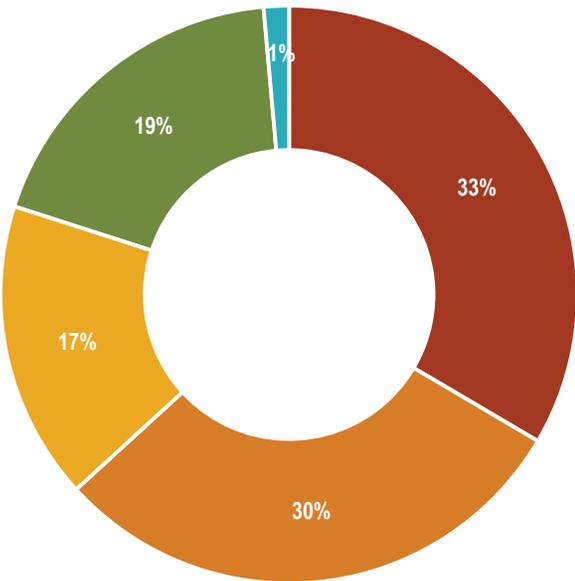
- ▶ Real estate NAV totaled \$30.4 billion as of Q3, 2018, representing 14.2% of the total CalSTRS fund fund (~\$213.9 billion), which is above the current target allocation to real estate of 12%, but within the policy range of 9%-15%.
- ▶ Since the Q1 2018 Semi-Annual Report, the Real Estate portfolio grew by \$2.1 billion (7.6% increase in portfolio size) resulting from a \$2.2 billion increase in controlled assets, a \$200 million increase in non-controlled assets, and a \$300 million decrease in non-controlled Legacy assets.
- ▶ The CalSTRS real estate portfolio has achieved a net time-weighted return (“TWR”) of 10.2% over the past five years and 9.9% over the past year, outperforming the ODCE by 50 and 200 basis points, respectively. Over the past ten years, the portfolio has achieved a net TWR of 2.7%, largely due to the negative impacts of the Great Recession, trailing the ODCE 200 basis points. As noted in the previous Semi-Annual Report, CalSTRS has reduced its exposure to commingled closed-end opportunistic funds coming out of the Great Recession, and placed a greater emphasis on retaining discretion within its portfolio by investing primarily through separate accounts and joint ventures, resulting in significantly improved performance. Since inception, the portfolio has achieved a net TWR of 6.5% and 7.1% with and without Legacy assets, outperforming the ODCE by 10 and 65 basis points, respectively.
- ▶ Assets of older vintage (prior to 2009) comprise a sizeable share of the portfolio—\$4.3 billion of \$30.4 billion in real estate—while resulting in a drag on overall returns; these assets have an average since inception time weighted return of 5.2%, compared to an average since inception TWR of 9.4% for assets of newer vintage.² Assets acquired during the early parts of the current decade (2010-2013) have resulted in the highest returns due to their relatively low cost basis coming out of the Recession.
- ▶ The allocation of assets by risk-factor has remained mostly unchanged since the previous Semi-Annual report, with a current distribution of 64% to core, 18% to value-add, and 13% to opportunistic risk-factor assets, with Legacy assets comprising roughly 5% of the portfolio. By 2020, the allocation of the Legacy portfolio is anticipated to decline to 1%, while the Opportunistic portfolio is expected to increase to 17% over the same time period.
- ▶ The portfolio remains relatively concentrated; the top 15 separate account managers (by size) comprise approximately 81% of the total NAV of the portfolio, with the top two managers—Principal and CBRE—together comprising nearly 30% of the total portfolio. The average IRR of the portfolio’s largest separate account managers exceeds the overall portfolio by roughly 200 basis points, which is biased downward by the Legacy portfolio.
- ▶ Approximately 14% of the real estate portfolio, or \$4.2 billion, is allocated to international investments. Of the \$4.2 billion international portfolio, roughly \$600 million is allocated through direct investment vehicles, with the remaining \$3.6 billion invested through commingled funds. European and Asian investments comprise 40% and 30% of the international allocation, respectively, while other global regions and emerging markets represent the remaining 30% of the international portfolio. Looking forward, total unfunded commitments for international investments within commingled funds amount to \$1.9 billion. The vast majority of these commitments will be allocated to the global portfolio (71%), followed by the Asian portfolio (28%), and then the European portfolio (<1%).

STATUS OF CALSTRS REAL ESTATE PORTFOLIO

PORTFOLIO ALLOCATIONS

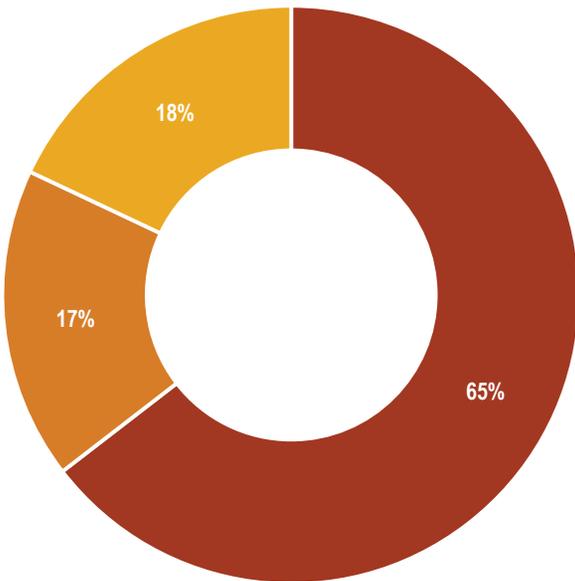
- ▶ Real estate NAV totaled \$30.4 billion as of Q3, 2018, representing 14.2% of the total CalSTRS fund fund (~\$213.9 billion), which is above the current target allocation to real estate of 12%, but within the policy range of 9%-15%.
- ▶ The direct portfolio, which includes separate accounts and joint ventures, comprises 63% of the total fund, while the remaining 37% is allocated to funds and other investment vehicles.
- ▶ Approximately 64% of the portfolio is allocated to core assets, with 36% of the portfolio being in value creation through value add and opportunistic assets. Though the allocation of core investments would be expected to increase over the next few years as construction projects and value creation investments convert to core investments through lease-up and stabilization, these transitioning assets will likely be offset by future value add and opportunistic investments given that 60% of current unfunded commitments, or \$9.0 billion in capital, are dedicated to these higher risk-profiles.

Allocation by Vehicle



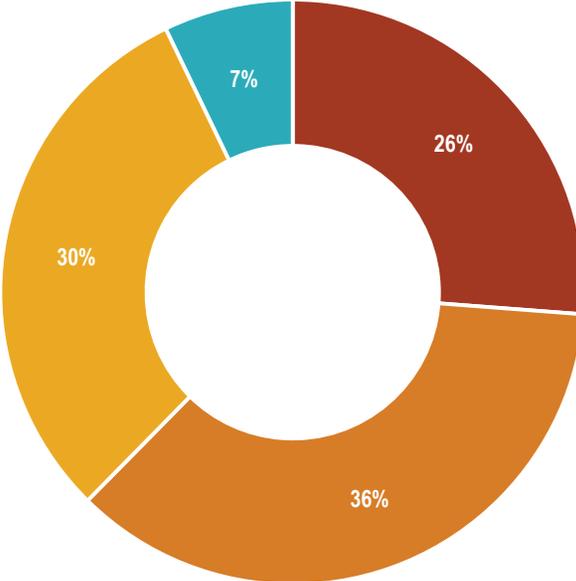
JV SA OE Fund Fund Co-Invest/Other

Allocation by Risk-Profile



Core Value Added Opportunistic

Allocation by Property Category



Where People Live Where People Work
Where People Shop Other



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¹ Allocations by risk and investment vehicle as of Q4 2017.
SOURCE: State Street

REAL ESTATE FUND

HISTORICAL PERFORMANCE

- ▶ The CalSTRS Real Estate portfolio has achieved attractive returns over the past five years, experiencing net time weighted returns (TWR) of 10.2% and 12.0% with and without Legacy assets, respectively, outperforming the ODCE by 230 and 50 basis points, respectively. The portfolio continues to perform strongly, having achieved TWRs well in excess of the ODCE benchmark over the past year and quarter.
- ▶ The impacts of the Great Recession are still visible over the 10-year investment horizon, reducing annualized returns to only 4.4% for the active portfolio and 2.7% for the overall portfolio (including Legacy), trailing the ODCE index by 20 basis points and 190 basis points, respectively.
- ▶ Since inception, the overall portfolio has achieved a net TWR of 6.5% and 7.1% with and without Legacy assets, outperforming the ODCE by 10 and 70 basis points, respectively.
- ▶ While the core and value add portfolios have consistently exceeded their respective benchmarks over time, the opportunistic portfolio has not achieved excess returns (ODCE + 300 bps) over the past year or quarter. Opportunistic assets have outperformed the ODCE + 300 bps benchmark over the three and five year periods, however not the 10 year period..

	CURRENT COMPOSITION		NET TIME WEIGHTED RETURNS						SINCE INCEPTION NET IRR
	NAV (\$ millions)	% OF TOTAL	CURRENT QUARTER	1-YEAR	3-YEAR	5-YEAR	10-YEAR	INCEPTION	
Core	19,756	65.0%	2.3%	9.7%	9.3%	10.7%	6.1%	7.7%	8.1%
Value Add	5,101	16.8%	2.8%	11.5%	13.3%	15.9%	4.0%	7.3%	4.4%
Opportunistic	3,887	12.8%	2.6%	10.4%	11.4%	13.1%	1.2%	-0.2%	1.5%
Public	0	0.0%	N/A	N/A	N/A	N/A	N/A	-4.1%	-0.1%
Legacy	1,663	5.5%	-0.4%	6.9%	2.2%	2.9%	-1.8%	6.7%	N/A
Total (Including Legacy)	30,408	100.0%	2.3%	9.9%	9.2%	10.2%	2.7%	6.5%	5.7%
Total (Excluding Legacy)	28,744	94.5%	2.4%	10.1%	10.4%	12.0%	4.4%	7.1%	N/A
Target Return (ODCE)			1.9%	7.7%	7.8%	9.7%	4.6%	6.4%	N/A



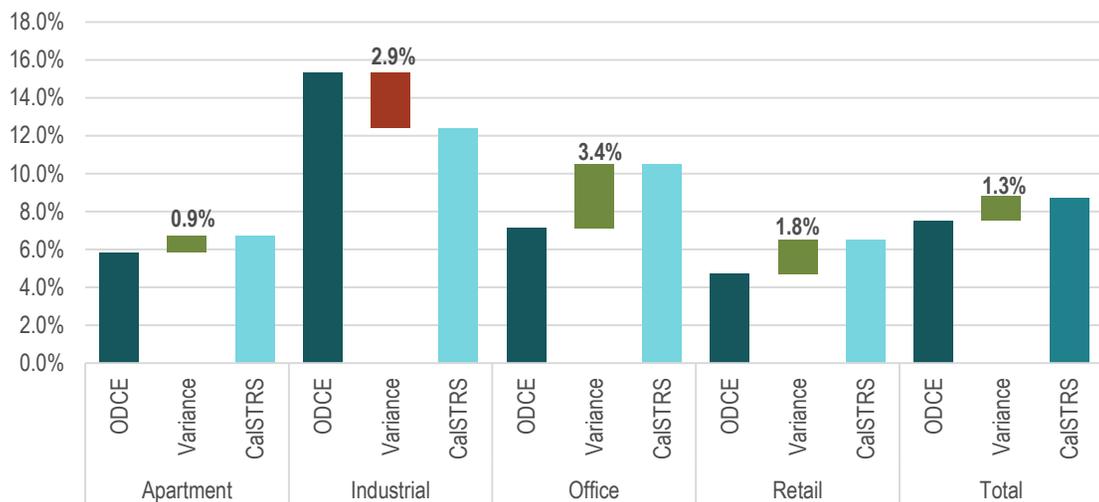
¹Green cells denote outperformance of the target return metric. The Core portfolio has a net target return benchmarked to the ODCE, while the Value Add and Opportunistic portfolios have net target returns of 50 basis points and 300 basis points over the ODCE, respectively.
SOURCE: State Street

REAL ESTATE FUND (CORE PORTFOLIO)

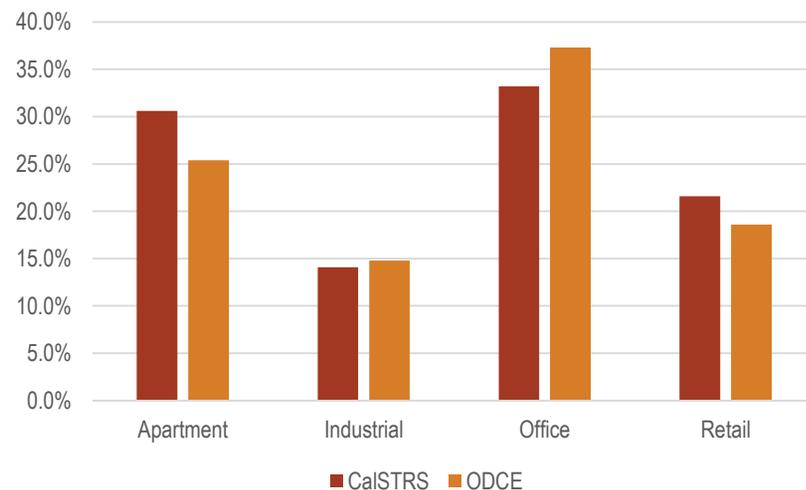
Q3 2018 YOY RETURN ATTRIBUTION ANALYSIS

- ▶ From Q4 2017 to Q3 2018, CalSTRS benefitted from the selection of outperforming investments more so than the allocation to certain sectors, as demonstrated by a +1.5% selection effect (i.e., which assets it invests in within a particular sector compared to the benchmark) and -0.2% allocation effect (i.e., which sectors it invests in compared to the benchmark), resulting in overall outperformance of 1.3% for the core portfolio compared to the benchmark.^{1,2}
- ▶ **Selection Effect:**¹ While the industrial portfolio exhibited the strongest return amongst product types of 12.4%, CalSTRS underperformed the ODCE within this sector by 2.9%. Meanwhile, the remaining product types all exhibited positive selection effects (i.e., CalSTRS outperformed the ODCE across all other product types), with the office portfolio achieving the highest outperformance of 3.4% relative to the ODCE, with a total return of 10.5%.
- ▶ **Allocation Effect:**² The core portfolio benefitted from having a high allocation to office investments, which achieved an annual rate of return of 10.5%—the second highest amongst the various product types (for both the index and CalSTRS). Meanwhile, returns could have been enhanced through having larger allocations towards industrial investments, which achieved the highest annual return of 12.4%, or having reduced allocations to apartment or retail investments. Regardless, portfolio allocation targets should be constructed based on long-term supply, demand, and demographic fundamentals rather than historical rates of return.
- ▶ CalSTRS has effectively generated excess returns over the benchmark through the selection of high-performing assets compared to the benchmark over the past year (with the exception of industrial assets). Moving forward, staff should continue to seek out exceptional assets in high-growth markets and continue to introduce value add and opportunistic assets to the portfolio in order to generate excess returns.

Performance by Product Type (Selection Effect)



Product Mix (Allocation Effect)³



¹Selection effect measures the portion of performance attributable to the selection of assets within a sector relative to the benchmark.

²Allocation effect measures the portion of performance attributable to the allocation of assets to various sectors relative to the benchmark.

³Data provided by Altus Analytics, which differs from State Street's product mix.

SOURCE: Altus Analytics

REAL ESTATE FUND

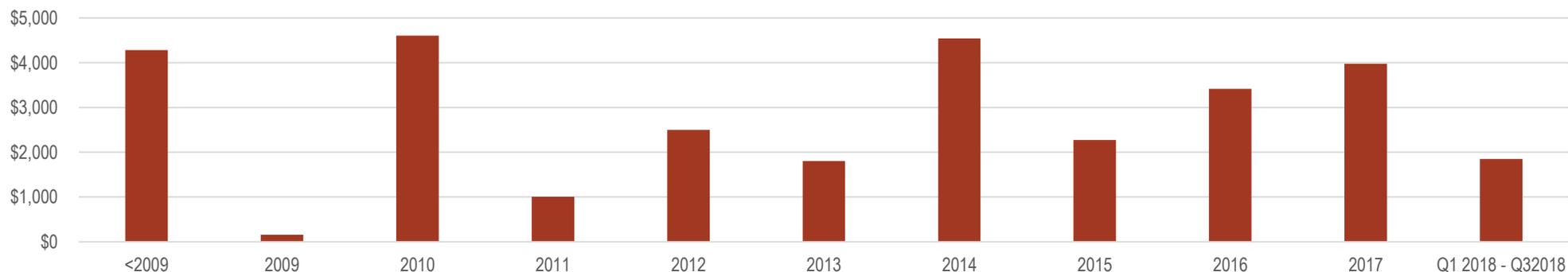
ASSET VINTAGE

- ▶ Assets of older vintage (prior to 2009) now comprise a relatively small amount of the real estate the portfolio (15%, or \$4.3 billion), yet continue to have a drag on overall returns; these assets have a since inception net TWR of 5.2%, compared to 9.4% for assets of newer vintage.¹ That said, the vast majority of the portfolio is relatively new and has consistently generated excess returns over the benchmark.
- ▶ Assets acquired during the early parts of the current decade (2010-2013) have resulted in the highest returns, due in large part to their relatively low cost basis coming out of the Recession.

Performance by Vintage Year

VINTAGE	NAV (millions)	NET TIME WEIGHTED RETURNS							NET IRR
		Q3 2018	1-Year	2-Year	3-Year	5-Year	10-Year	Inception	
Q1 2018 - Q32018	\$1,850	1.9%						-0.2%	2.8%
2017	\$3,977	2.0%	8.6%					8.0%	8.7%
2016	\$3,416	2.3%	9.8%	7.8%				6.5%	7.5%
2015	\$2,271	3.6%	17.5%	15.7%	12.7%			12.3%	11.1%
2014	\$4,541	2.9%	10.9%	9.9%	11.1%			2.5%	10.9%
2013	\$1,803	2.1%	10.3%	10.3%	11.7%	13.1%		12.2%	12.7%
2012	\$2,501	1.7%	9.2%	9.0%	9.4%	9.4%		12.5%	10.8%
2011	\$1,004	3.4%	12.9%	13.1%	14.5%	17.4%		17.9%	16.8%
2010	\$4,603	2.8%	9.6%	9.2%	10.2%	12.4%		13.2%	13.4%
2009	\$158	2.5%	8.9%	7.2%	8.4%	12.0%		10.2%	11.9%
Newer Vintage (≥2009)¹	\$26,125	2.5%	10.8%	10.2%	11.1%	12.8%	N/A	9.4%	N/A
Older Vintage (<2009)¹	\$4,283	0.3%	3.5%	3.0%	4.0%	5.6%	2.5%	5.2%	N/A

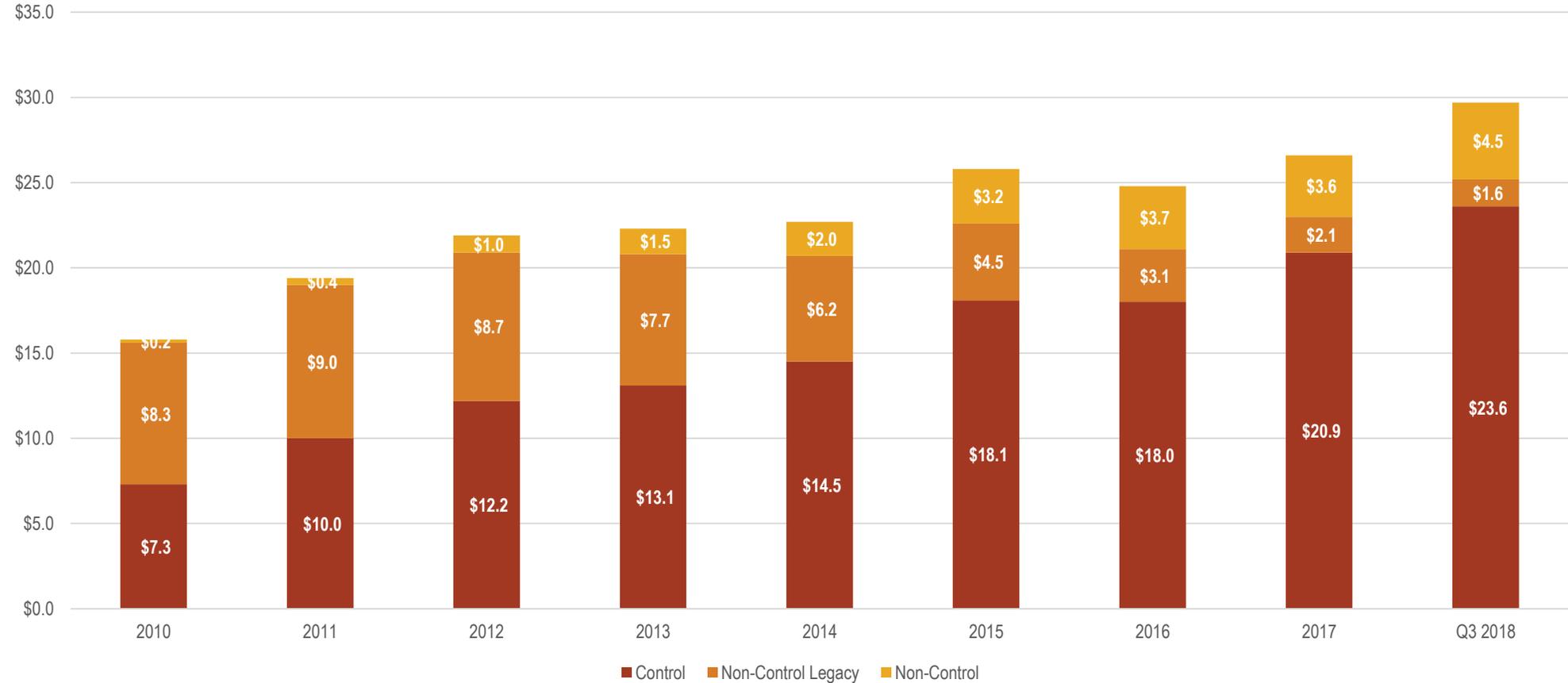
NAV by Vintage (millions)



REAL ESTATE FUND

PORTFOLIO NAV BY CONTROL

- ▶ The CalSTRS real estate portfolio has grown from \$15.8 billion in 2010 to \$29.7 billion as of Q3 2018, equating to a CAGR of 8.5%.¹
- ▶ Since the Q1 2018 Semi-Annual Report, the Real Estate portfolio grew by \$2.1 billion (7.6% increase in portfolio size) resulting from a \$2.2 billion increase in controlled assets, a \$200 million increase in non-controlled assets, and a \$300 million decrease in non-controlled Legacy assets.
- ▶ Portfolio composition continues to shift in favor of controlled investments, which, as of Q3 2018, represent 79% of the portfolio (including co-investments), up from only 46% in 2010.

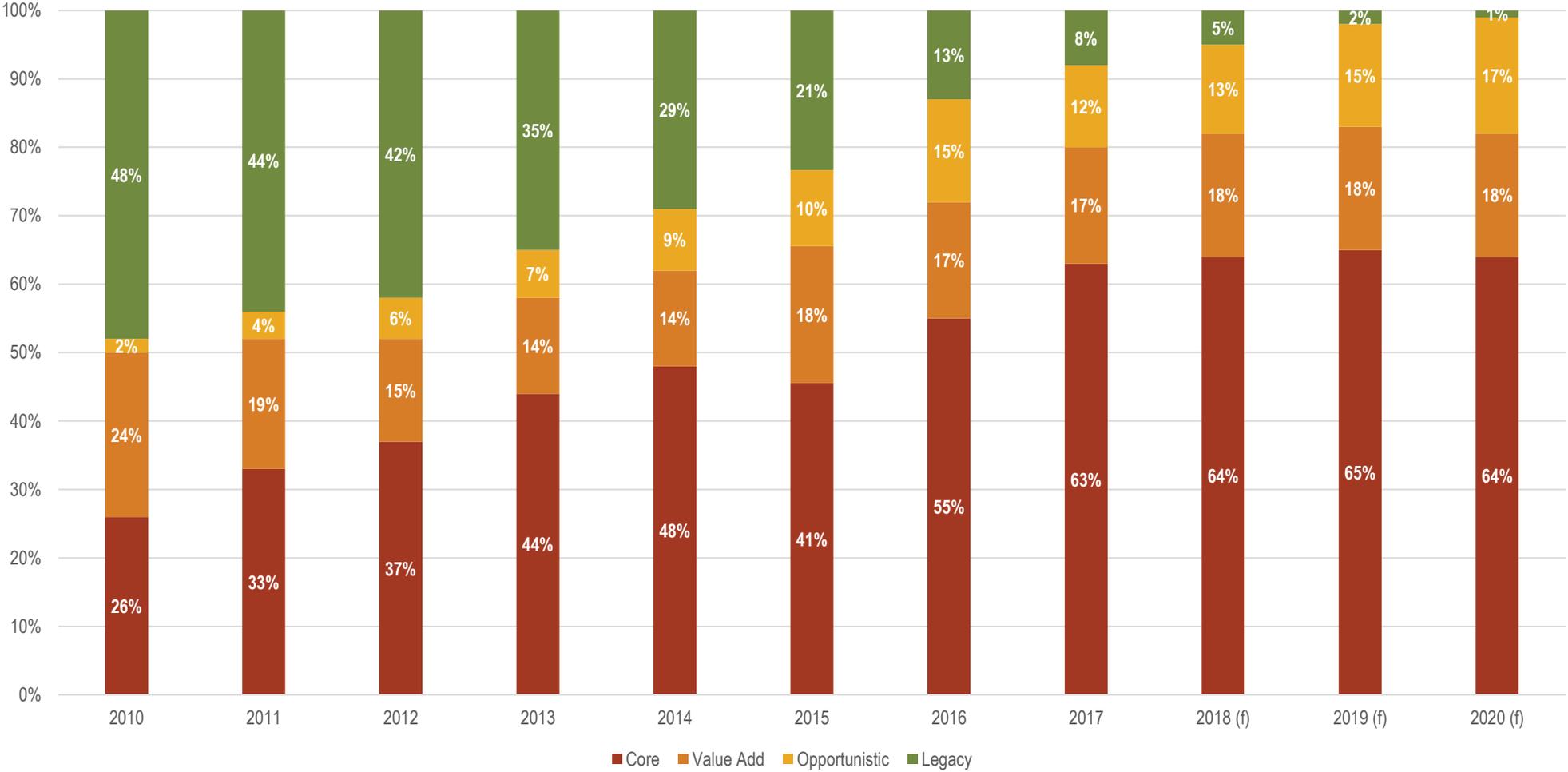


¹Portfolio NAV provided from CalSTRS, which differs from State Street's estimate of \$30.4 billion.
SOURCE: CalSTRS

REAL ESTATE FUND

PORTFOLIO ALLOCATION BY RISK PROFILE

- ▶ The distribution of core and value add assets is expected to remain relatively unchanged over the next few years. Meanwhile, the distribution of Legacy assets is expected to continue to decline to only 1% by 2020, while the allocation of Opportunistic investments is anticipated to increase to 17% over the same time period.
- ▶ It is necessary for CalSTRS to continue to introduce Value Add and Opportunistic assets within the portfolio in order to maintain the appropriate level of risk needed to exceed the return benchmark.



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NOTE: (f) denotes forecasted estimate.
SOURCE: CalSTRS

REAL ESTATE FUND

TOP 15 MANAGERS BY NAV

- ▶ The top 15 managers (by NAV) comprise 81% of the total NAV of the portfolio.
- ▶ The top two managers—Principal and CBRE—together comprise nearly 30% of the total portfolio; however, with divergent responsibilities. While Principal largely acts as an independent fiduciary, CBRE directly invests in real estate on behalf of CalSTRS.
- ▶ Since the Q1 2018 report, Principal's NAV increased by \$460 million—the most of any manager—followed by Beacon Capital and Pacific Cost Capital, which increased by \$365 million and \$350 million, respectively. Meanwhile, Fortress' and Fairfield's allocations declined the most among top managers by \$275 million and \$220 million, respectively, due to several large dispositions; however, through Q3 2018, CalSTRS has committed additional capital of \$350M to Fortress and \$500M to Fairfield.
- ▶ The portfolio of the largest managers achieved an average weighted since inception IRR of 7.7%, which is 200 basis points higher than the total portfolio since inception IRR of 5.7%.¹

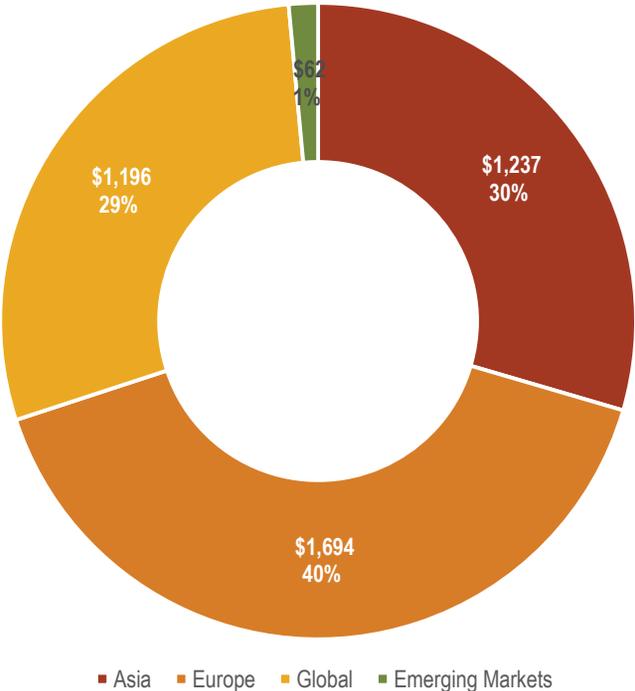
MANAGER	RELATIONSHIP	STYLE	NAV (millions)	% TOTAL	SINCE INCEPTION IRR
Principal	SA / JV	Industrial / Retail / Student Housing	\$5,572	19%	7.3%
CB Richard Ellis	SA / JV	Office / Industrial	\$3,064	10%	5.4%
Blackstone	Fund	Multiple	\$1,951	6%	10.6%
BlackRock	SA / JV	Residential	\$1,862	6%	10.6%
GI Partners	SA / JV	Residential	\$1,576	5%	11.2%
ING Clarion	SA / JV	Office	\$1,516	5%	8.9%
Lionstone	SA / JV	Office	\$1,440	5%	8.7%
Pacific Coast Capital	Platform	Residential / Office / Retail	\$1,423	5%	4.0%
Beacon Capital	JV	Office	\$984	3%	3.7%
JP Morgan	SA / JV	Office	\$982	3%	10.6%
Fairfield	Platform	Residential	\$943	3%	7.7%
LaSalle	SA / JV	Office	\$922	3%	7.6%
Fortress	Fund / JV	Debt	\$773	3%	2.4%
Invesco Core Real Estate USA	Fund	Multiple	\$667	2%	6.4%
Divco	Fund	Office / Multiple	\$657	2%	9.4%
Subtotal/Weighted Average¹			\$24,333	81%	7.7%
Fund Total (including Legacy assets)			\$30,408	100%	5.7%
Fund Total (excluding Legacy assets)			\$27,081	89%	N/A

REAL ESTATE FUND

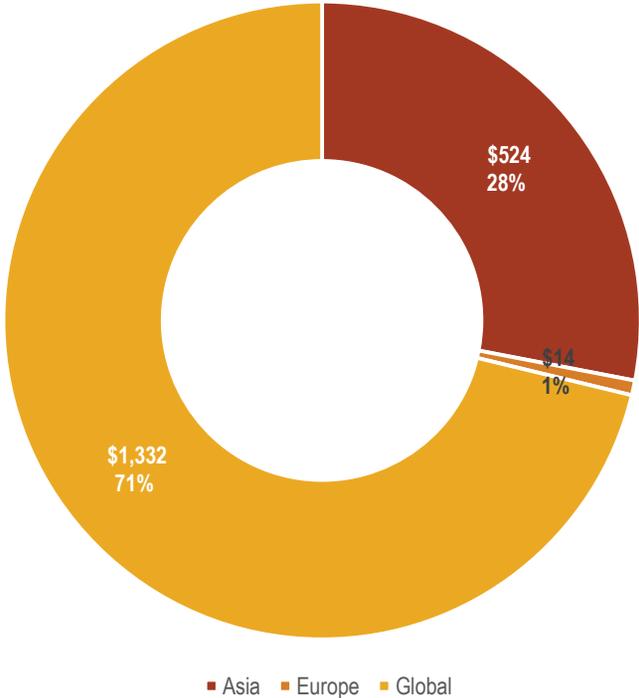
INTERNATIONAL ALLOCATION

- ▶ The international portfolio has a NAV of \$4.2 billion as of Q3 2018 (up \$400 million from Q1 2018) comprising 14% of the current portfolio. Investments in Europe and Asia comprise 40% and 30% of the international portfolio, respectively, while other global regions and emerging markets represent the remaining 30% of the international portfolio.¹
- ▶ Of the \$4.2 billion international portfolio, roughly \$600 million is allocated through direct investment vehicles, with the remaining \$3.6 billion invested through commingled funds.
- ▶ Looking forward, total unfunded commitments for international investments within commingled funds amount to \$1.9 billion. The vast majority of these commitments will be allocated to the global portfolio (71%), followed by the Asian portfolio (28%), and then the European portfolio (<1%).

NAV by Region (millions)¹



Unfunded Commitments by Region – Commingled Funds (millions)



¹These other markets, in descending order by allocation, include Australia, South America, Canada, Central America, Caribbean, and other international markets. SOURCE: CalSTRS

APPENDIX: KEY REAL-ESTATE MARKET TRENDS

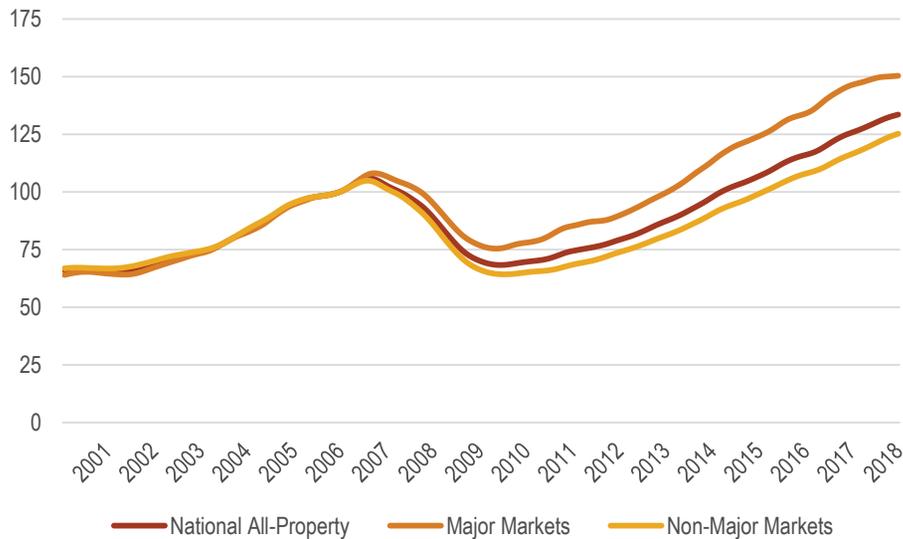
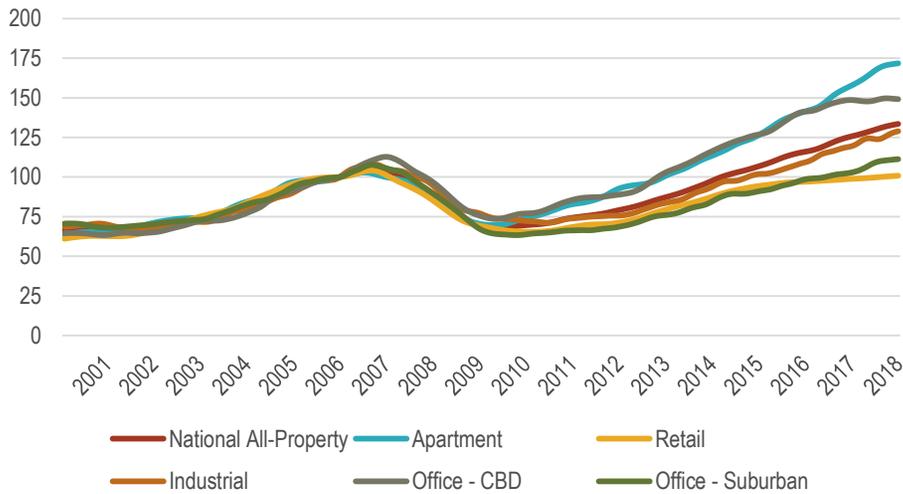
REAL-ESTATE MARKET TRENDS SUMMARY

- ▶ RCLCO continues to assume that we are in the “late stable” stage of the market cycle for most property types and geographies, which may endure through the rest of 2019.
- ▶ Pricing is well above pre-Recession peak values with the exception of retail and suburban office. Meanwhile, apartments and CBD office exceed their pre-Recession values by 67% and 32% respectively.
- ▶ Construction activity has declined below historical averages for all product types with the exception of industrial. All product types witnessed considerable declines in activity in 2018.
- ▶ As a result of global economic volatility and weakened inflation pressures, the Federal Reserve has recently indicated that it intends to be patient with future interest rate increases, maintaining its target rate at 2.25% to 2.50%. Meanwhile, real estate fundamentals remain strong:
 - » Though the spread between average going-in cap rates and the 10-Year U.S. Treasury declined below the historical average in 2018 for the first time in the current cycle, history suggests that this spread can become narrower in the late cycle.
 - » Fundraising levels remain high while dry powder continues to accumulate to record levels, suggesting that institutions may be preserving capital for investment in the event of a downturn. Nonetheless, transaction volume for 2018 reached a new high, increasing by 15% YoY and reversing a three year trend of decreasing volumes.
 - » Offshore investment within the US also remains strong, with capital flows increasing by 60% in 2018 YoY. Although lending standards have tightened over the past several years and CMBS issuances have decreased through Q3 2018 YoY, it appears that banks are now comfortable with lending standards and debt flows remain well above historical averages.
- ▶ Average going-in cap rates marginally compressed in 2018.
 - » Average rates continued to decline in five of the six major metros.¹
 - » Cap rates remained relatively flat across product types, having decreased slightly across CBD office and industrial warehouse, but increasing slightly for anchored retail and full service hotels.
 - » Spreads between markets and product types remain wide, suggesting that effective market and product type selection, in combination with efficient operations, will have a greater impact on returns compared to past periods when cap rates were much more homogenous.
- ▶ Global real estate transaction volume totaled \$1.7 trillion annually as of Q3 2018—representing a 12.5% YoY increase—primarily driven by growth in Asian markets. Meanwhile, pricing for commercial real estate worldwide continues to expand as Real Capital Analytics’ Global Commercial Property Price Index has increased by 6.1% from Q3 2017 to Q3 2018. However, this pace of annual growth is down from 2017, as several markets worldwide have posted flat or modest declines through Q3 2018. As appreciation has begun to slow after several years of double-digit expansion in many markets globally, international investment should focus on opportunities in markets with strong economic fundamentals driven by job growth.

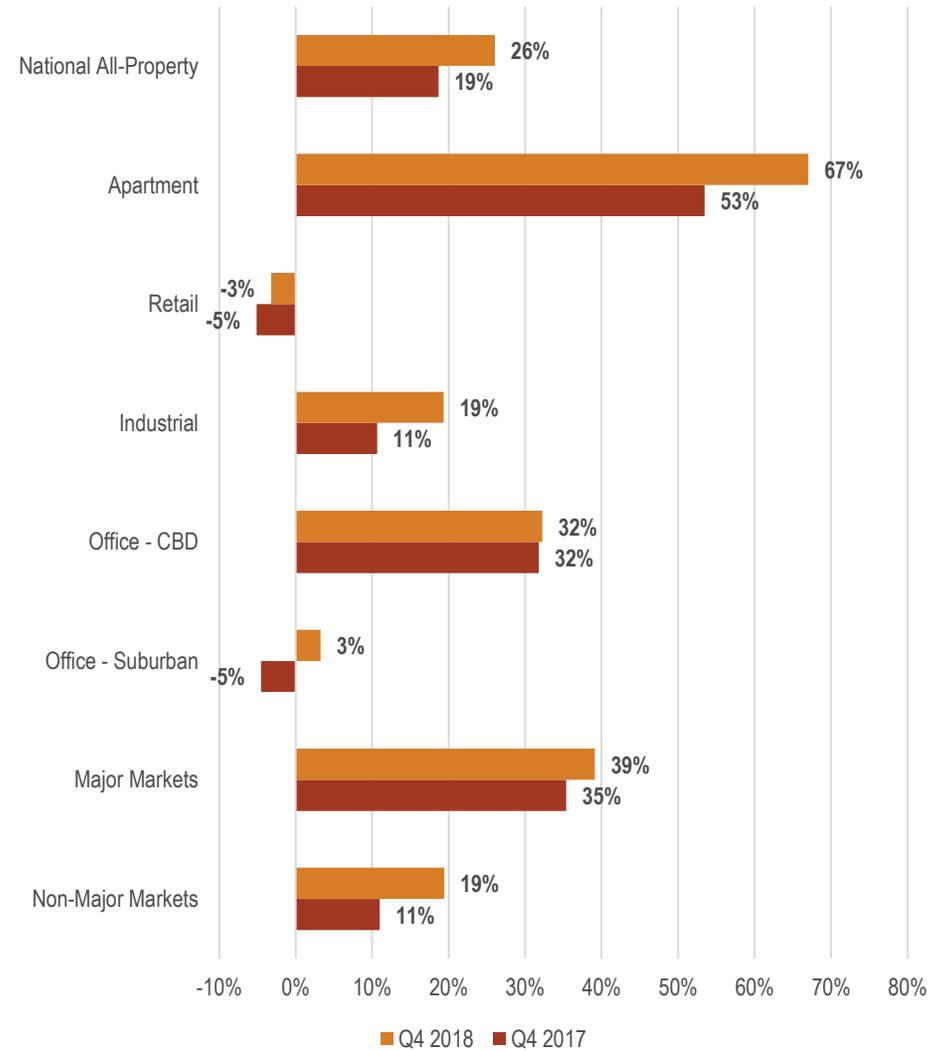
PRICING LARGELY EXCEEDS PREVIOUS "PEAK"

APARTMENTS, 'MAJOR MARKETS,' AND CBD OFFICE LEAD THE WAY

Commercial Property Price Index; January 2001 – December 2018



Price Difference from Previous Peak



NOTE: Previous peak looks at the maximum value between 2005 and 2009

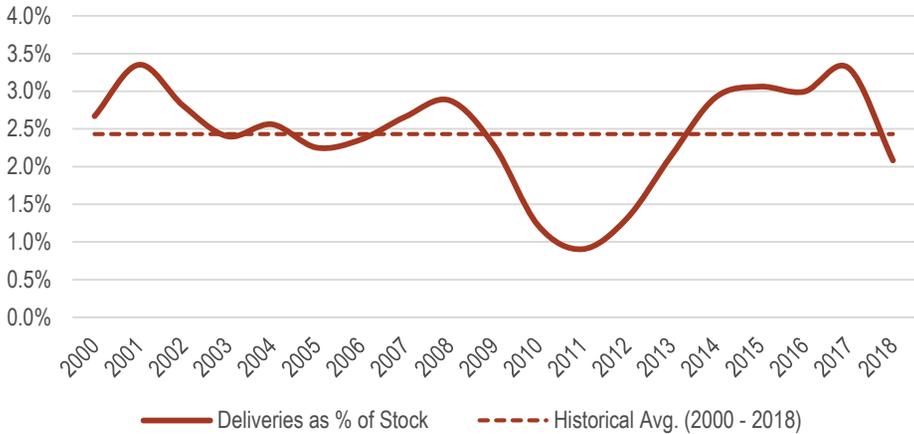
SOURCE: Moody's; RCA

CONSTRUCTION CYCLE HAS PEAKED

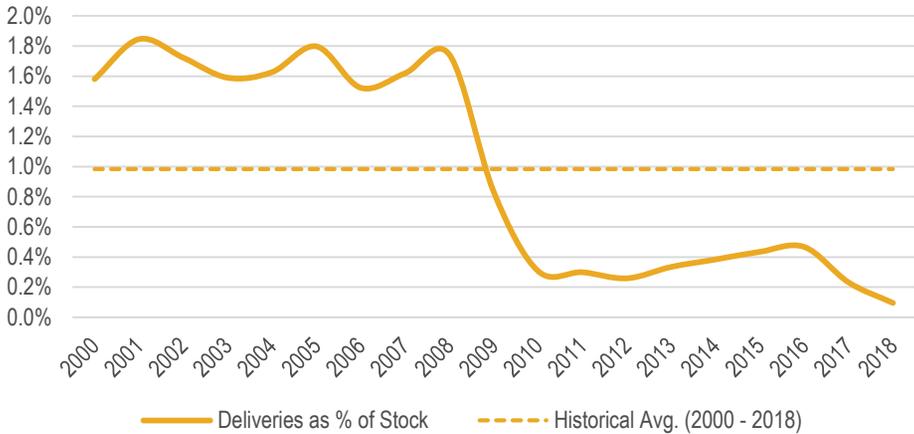
ONLY INDUSTRIAL ACTIVITY STILL ABOVE HISTORICAL AVERAGE

New Completions (% of Stock)

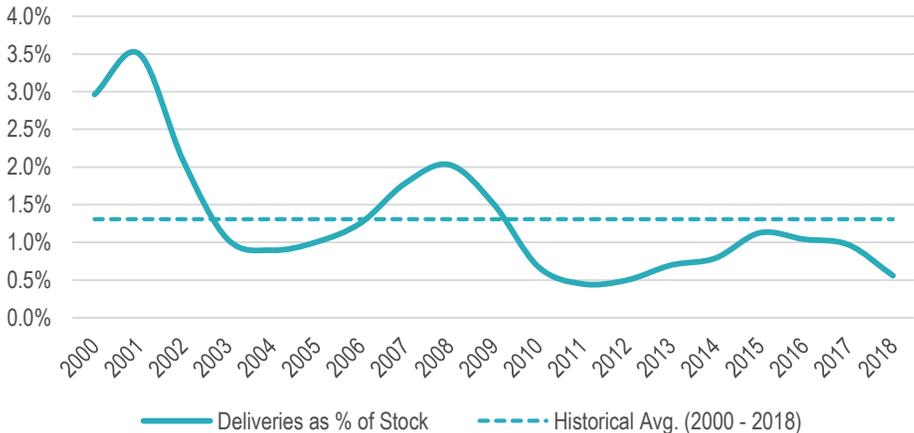
Apartment



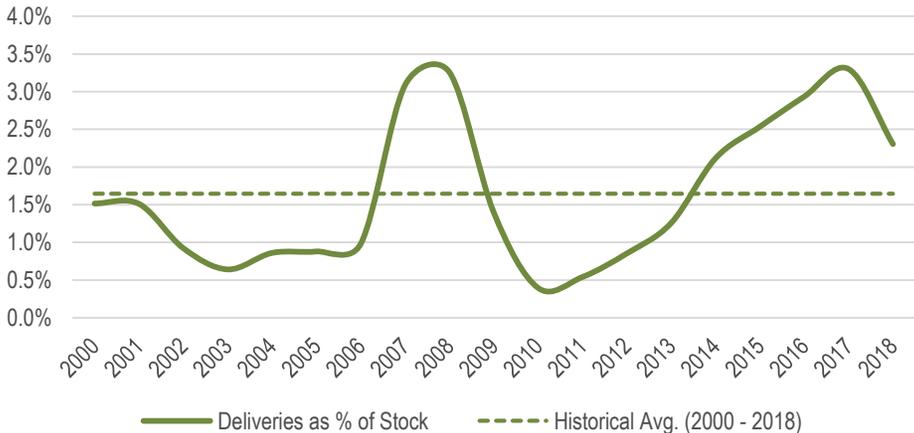
Retail



Office



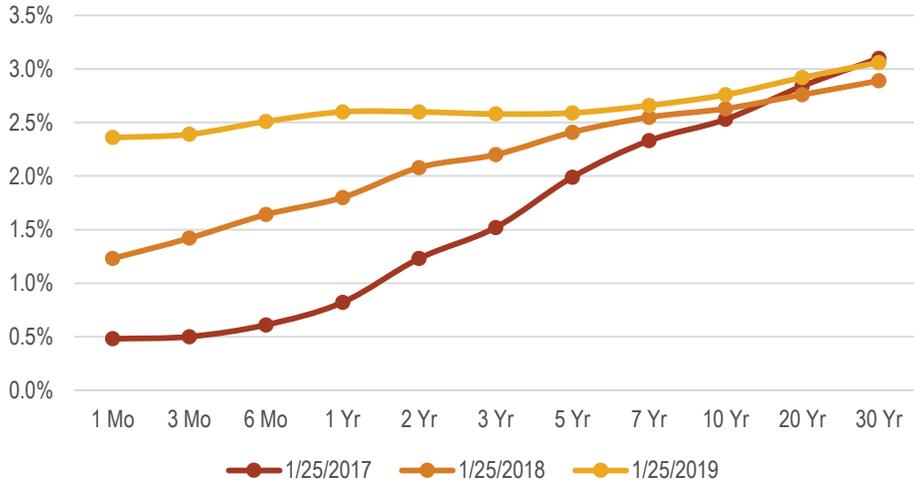
Industrial



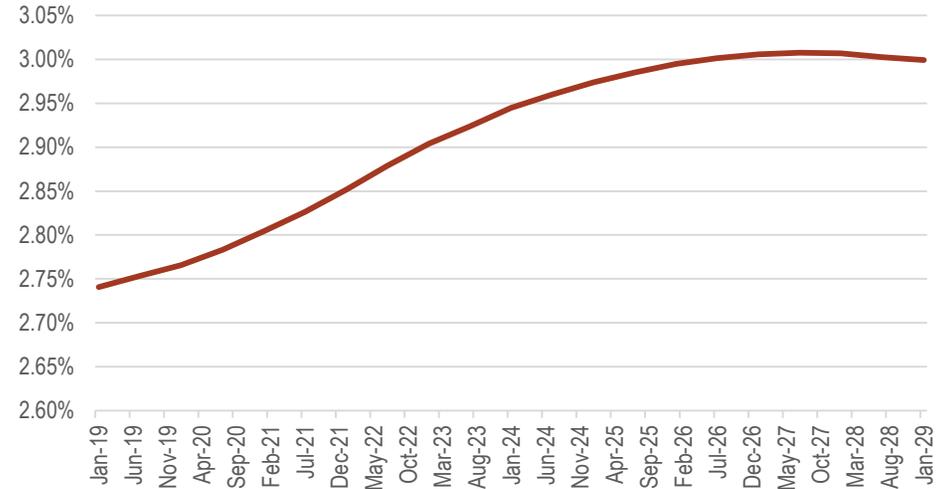
FED PUTS A PAUSE ON RATE HIKES

FLATTENING YIELD CURVE OFTEN PRECEDES DOWNTURN

Yield Curve; January 2017 - January 2019



Implied 10-Year Treasury Forward¹



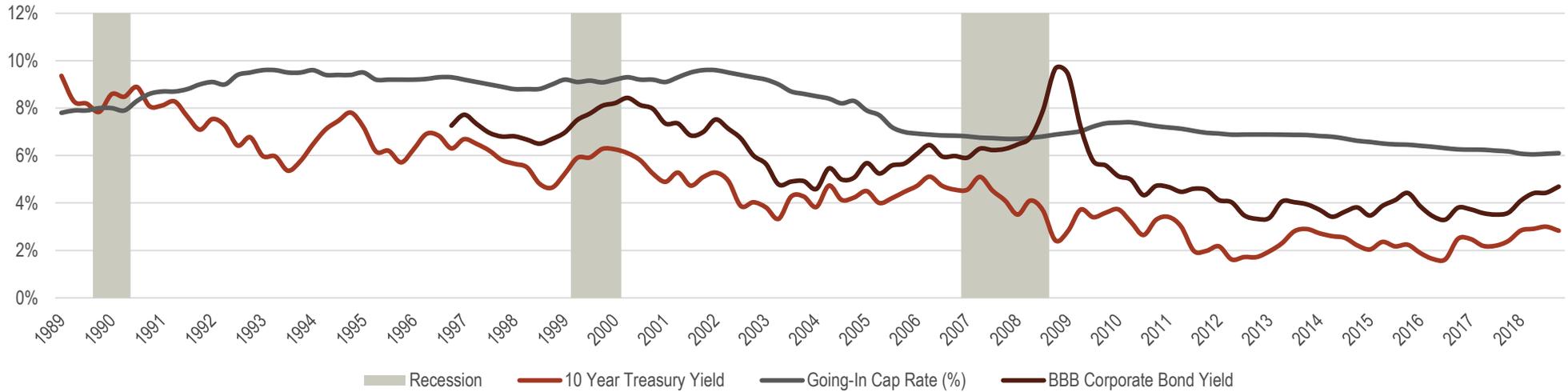
U.S. Federal Funds Rate and 10-Year Treasury Yield; Q1 1985 – Q4 2018



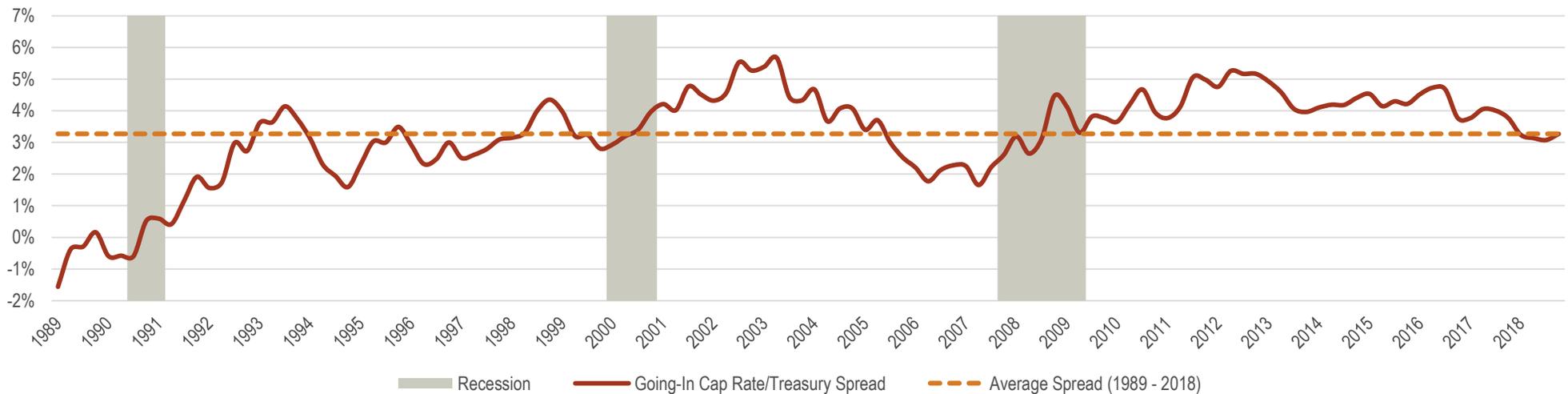
2018 CAP RATE SPREAD BELOW HISTORICAL AVERAGE

THERE IS LIKELY ROOM FOR ADDITIONAL COMPRESSION

10-Year Treasury Yield and Going-In Cap Rate; Q1 1989 – Q4 2018

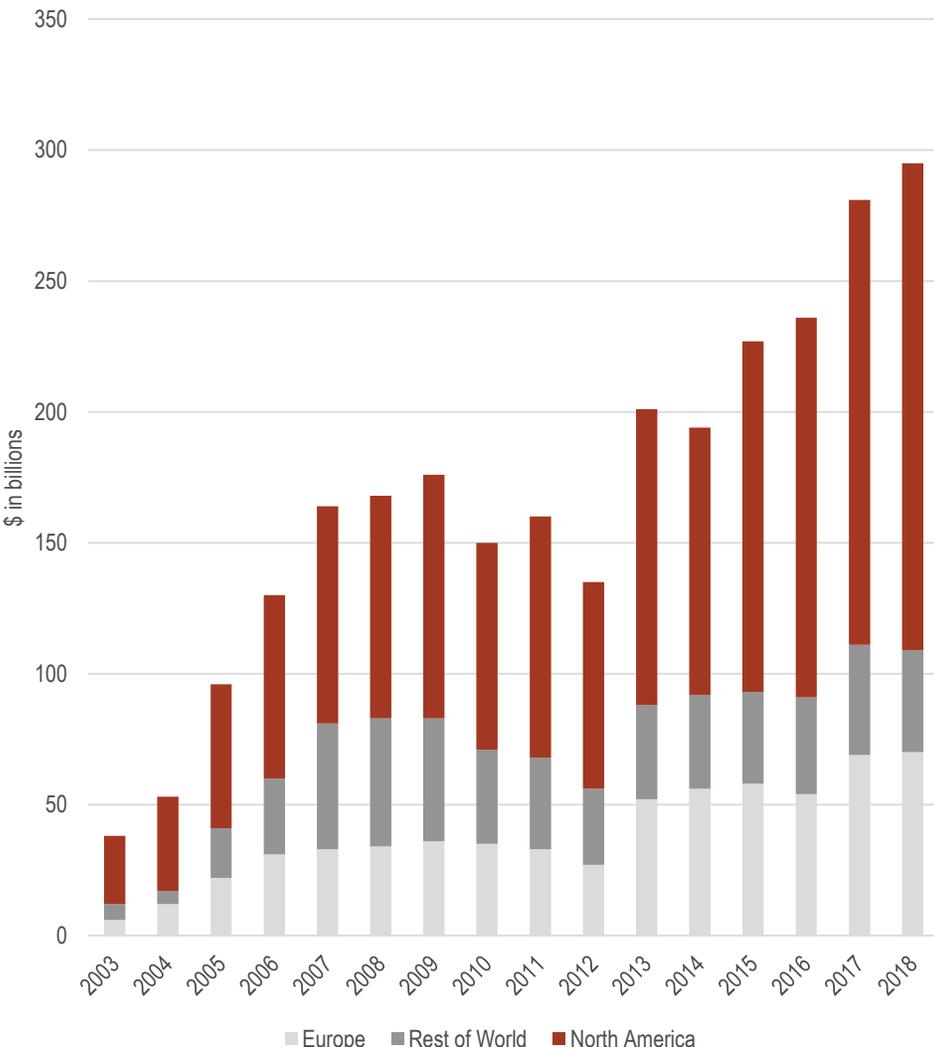


Spread Between 10-Year Treasury Yield and Going-In Cap Rate; Q1 1989 – Q4 2018

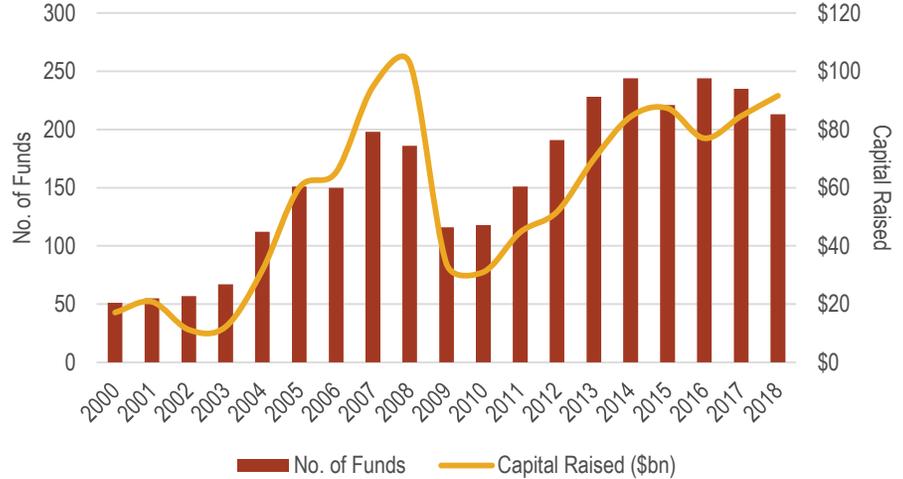


UNPRECEDENTED DRY POWDER AND MODERATING FUNDRAISING REFLECT LATE STAGE IN CYCLE

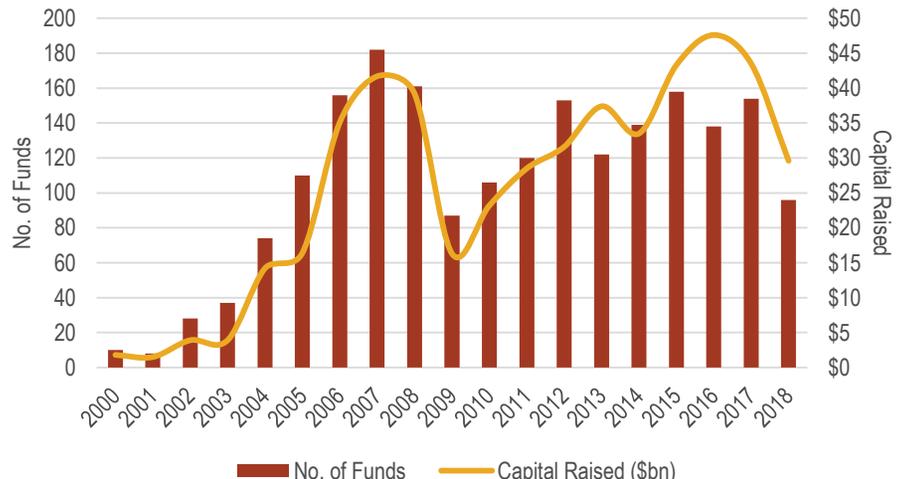
Dry Powder by Region*



United States RE Fundraising



International (Non-U.S.) RE Fundraising

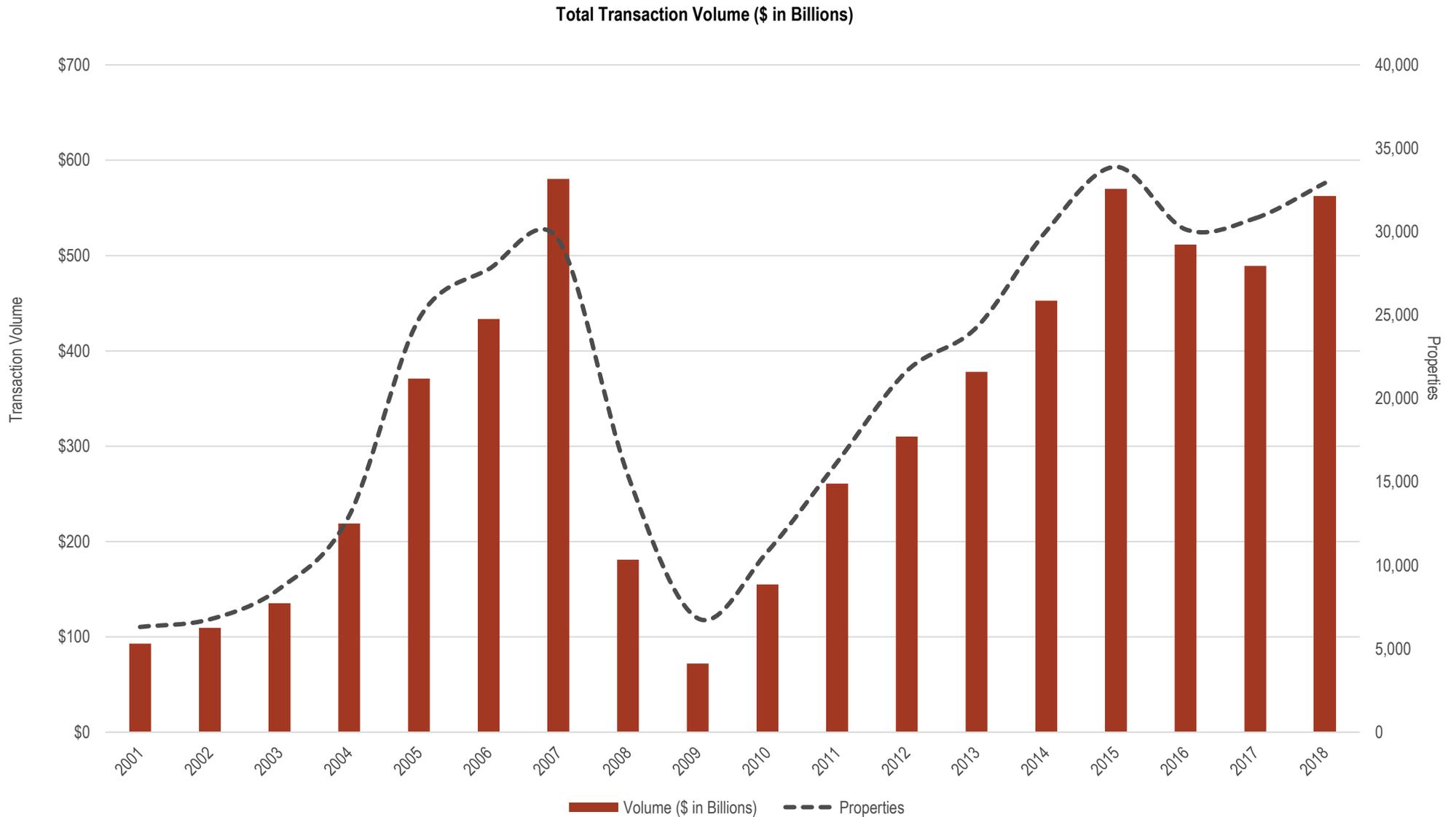


The information contained in this report is confidential, may be legally privileged, and is intended only for the use of the CalSTRS.

¹Cumulative private equity cash reserves held to fund future obligations
Source: Preqin

TRANSACTION VOLUME REMAINS STRONG

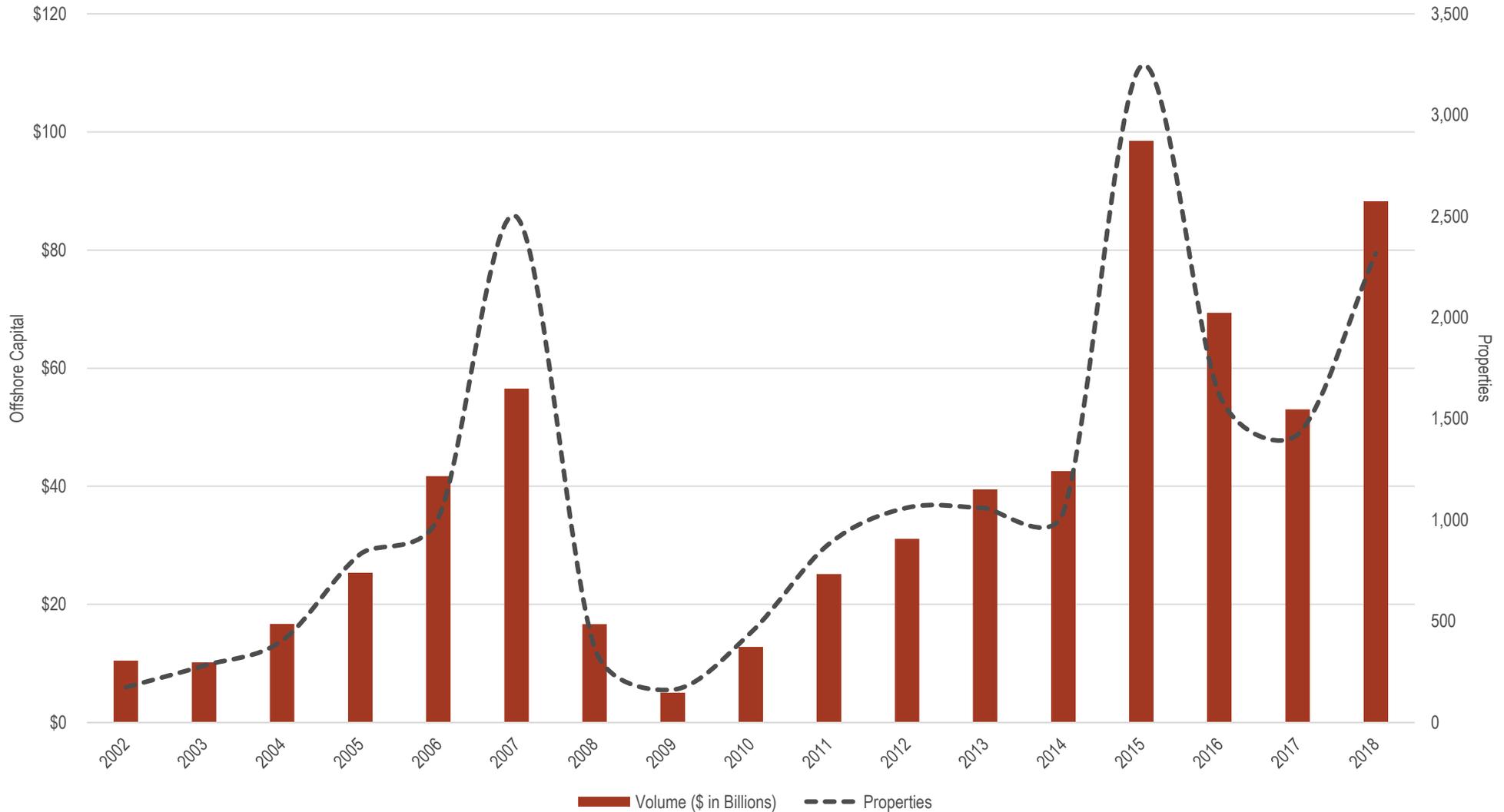
2018 TRANSACTION VOLUME UP BY 15% YOY



OFFSHORE CAPITAL FLOW INCREASES

YOY TRANSACTION VOLUME INCREASED BY 1.6X IN 2018

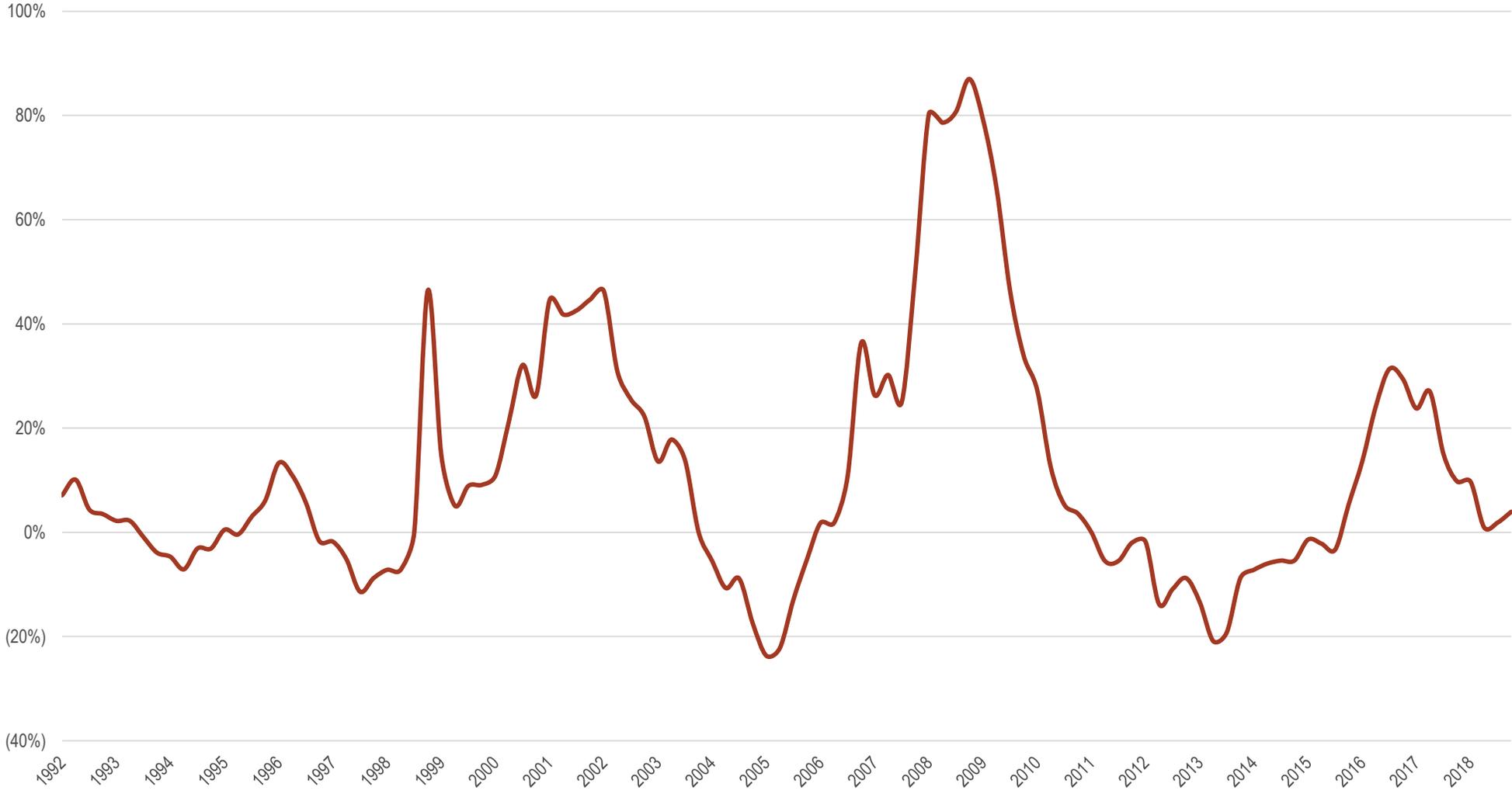
Offshore Capital in United States (\$ in Billions)



BANKS COMFORTABLE WITH LENDING STANDARDS

STANDARDS UNCHANGED FROM Q2'18 TO Q3'18

Net % of Banks Tightening Lending Standards; Q1 1992 – Q3 2018



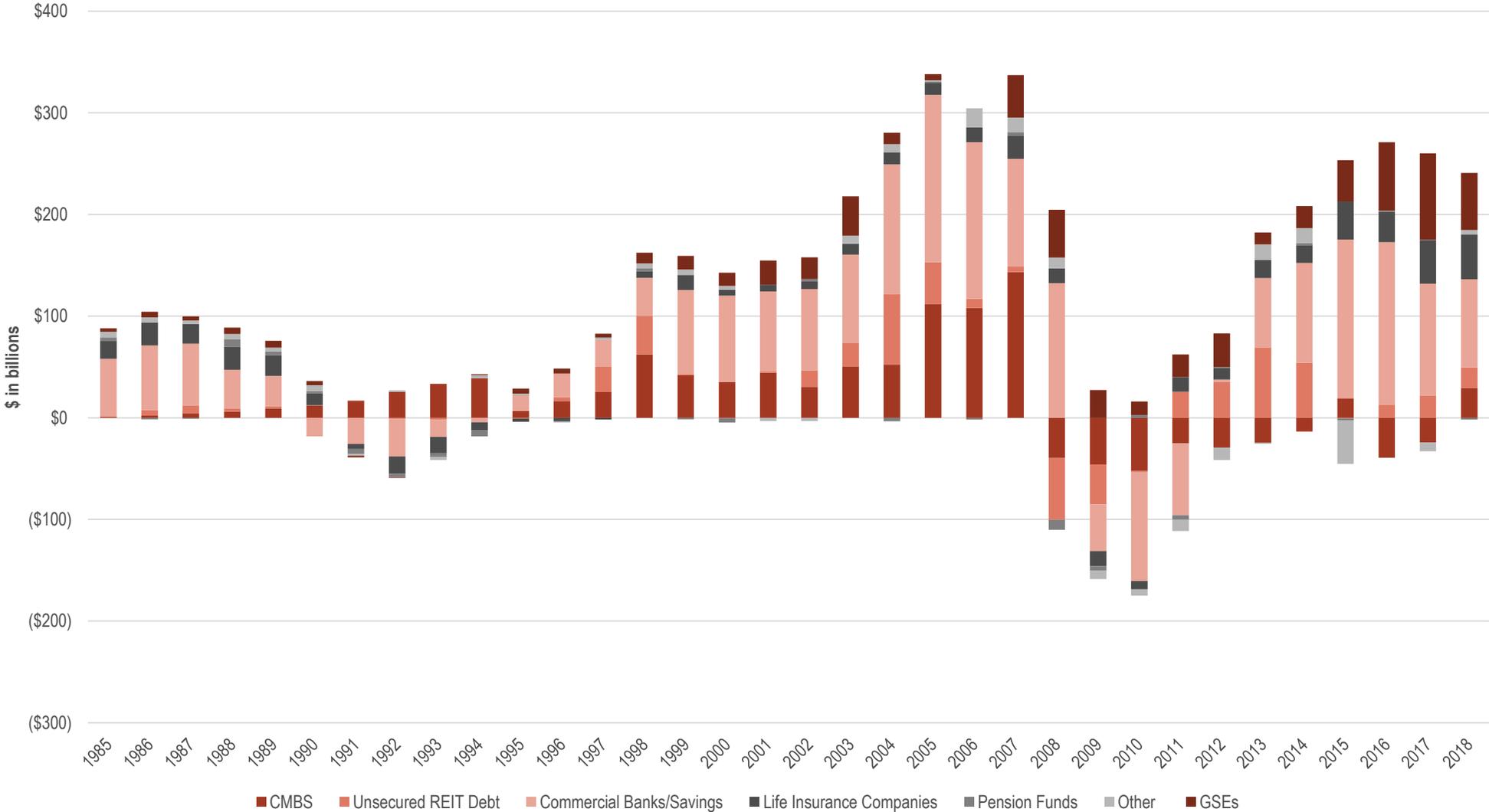
NOTE: As of Q4 2013, the U.S. Federal Reserve separated this data into three categories (construction / development, nonfarm nonresidential, and multifamily residential), depending on the type of structure for which the loan is intended. For these time periods, the data shown on the graph represents the average of these three categories. SOURCE: U.S. Federal Reserve

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GIVEN COMFORT WITH STANDARDS, FLOWS HIGH

DEBT FLOWS LED BY COMMERCIAL BANKS AND GSEs

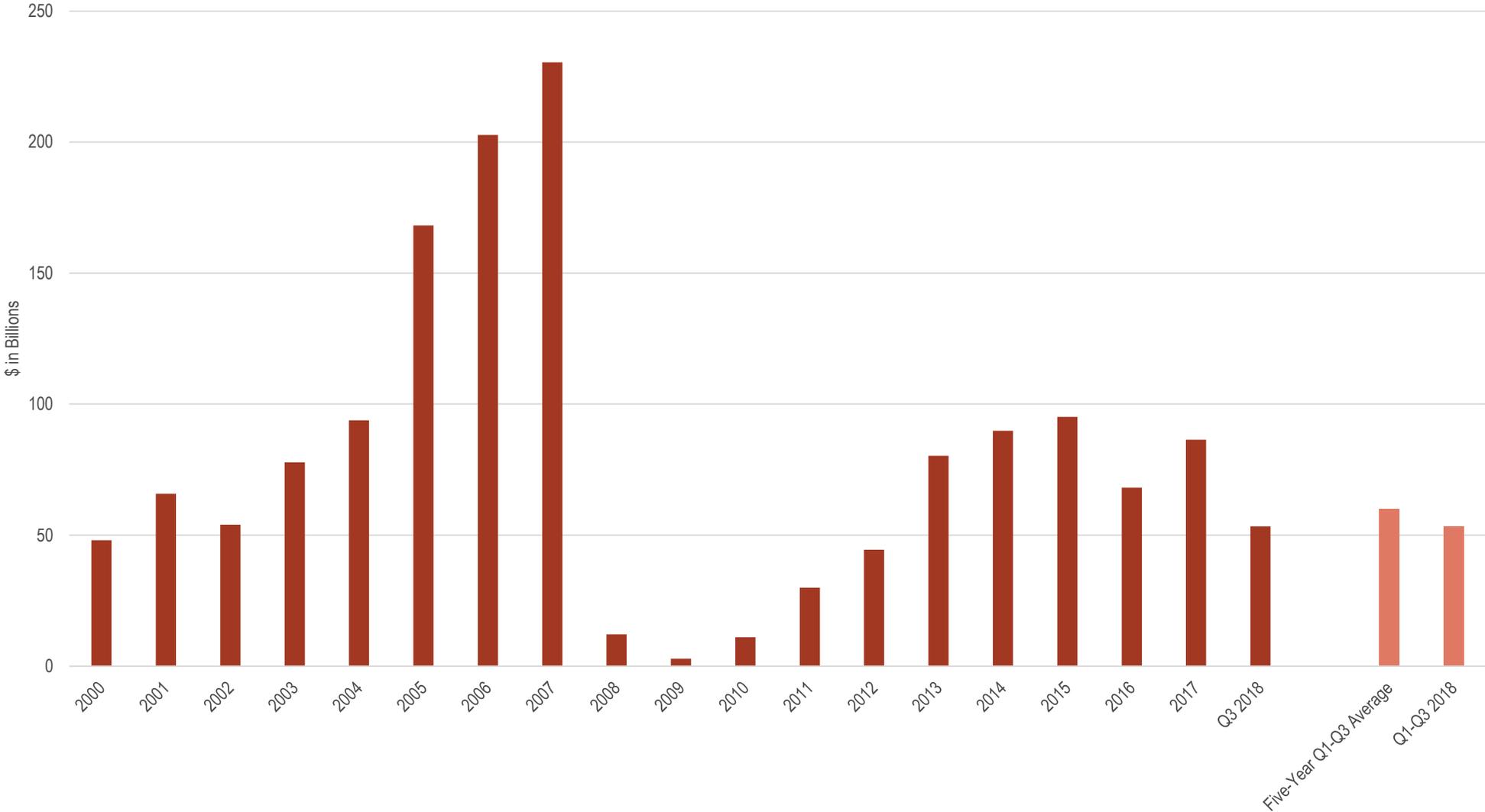
U.S. Commercial RE Debt Markets – Net Capital Flows; 1985 – 2018



DECREASE IN CMBS ISSUANCES IN 2018

Q1 '18 – Q3 '18 SLIGHTLY BELOW 5-YEAR Q1-Q3 AVERAGE

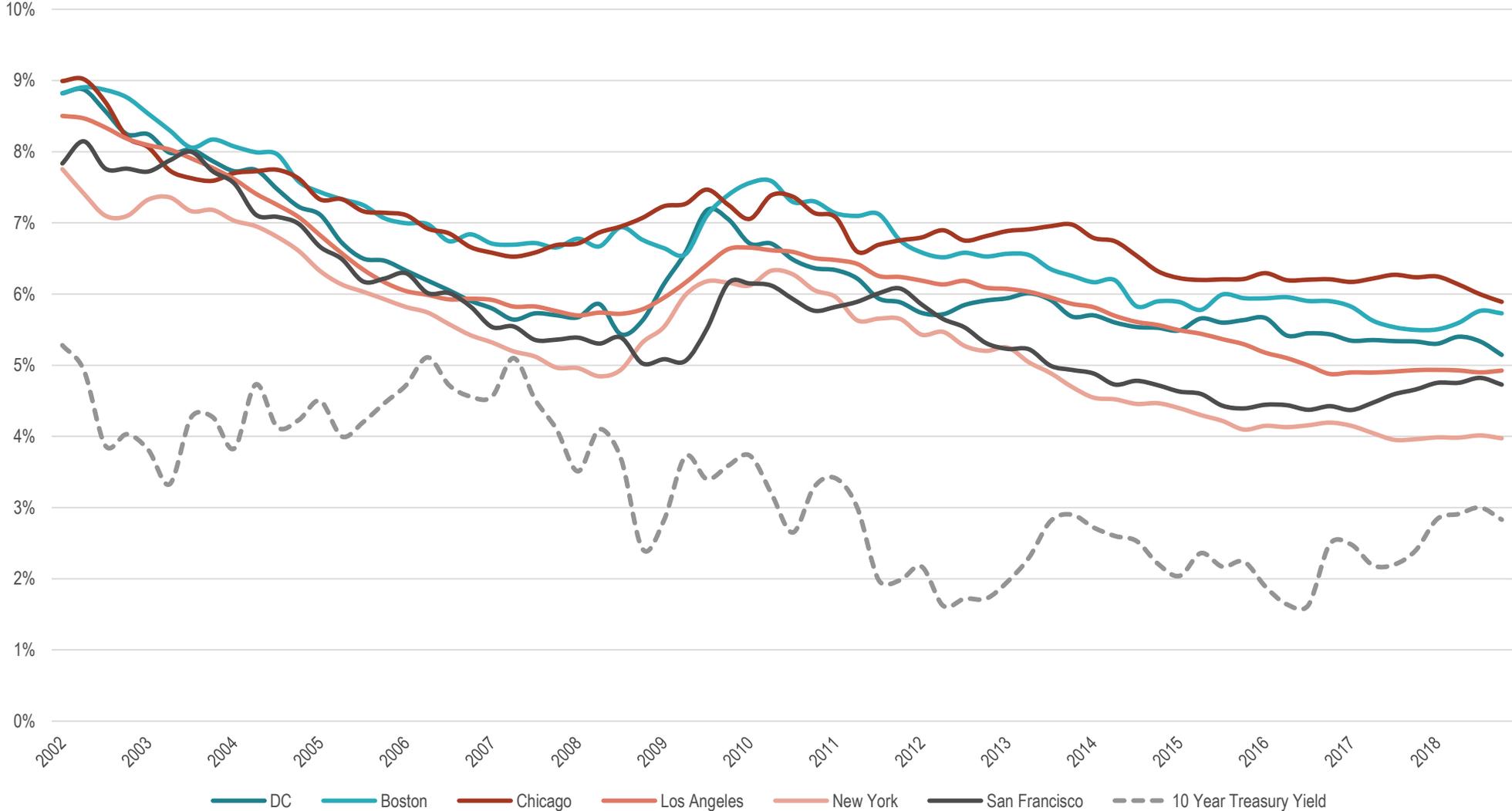
US Annual CMBS Issuances; Q1 2000 – Q3 2018



CAP RATES DECLINE IN 5 OF 6 MAJOR METROS

SPREAD BETWEEN MARKETS REMAINS WIDE

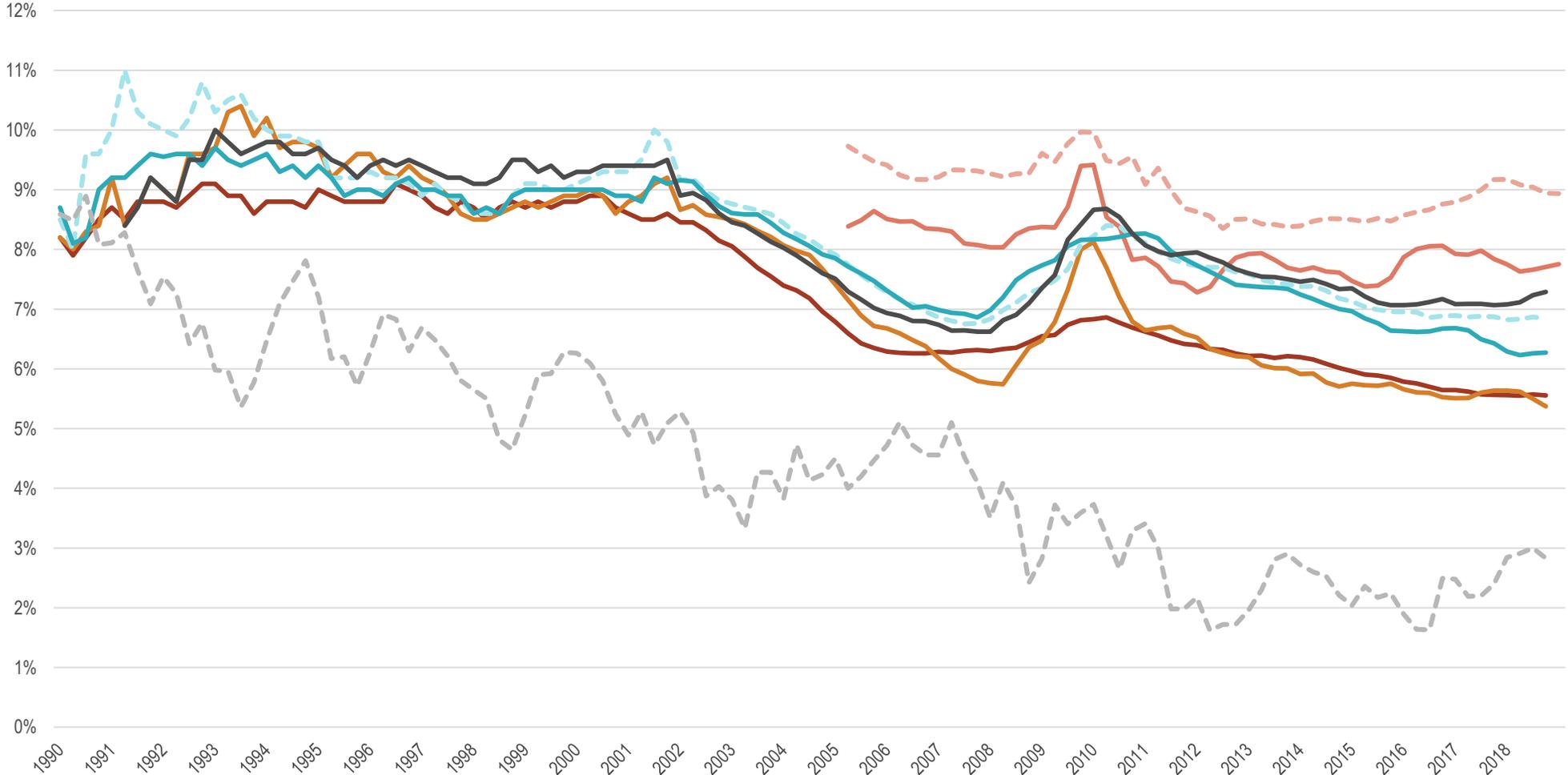
Cap Rates by Metro; Q1 2002 – Q4 2018



CAP RATES MOSTLY FLAT ACROSS PRODUCT TYPES

CBD OFFICE, WAREHOUSE RATES SLIGHTLY COMPRESS

Cap Rates by Property Type ; Q1 1990 - Q4 2018



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Source: RERC; RCA

INTERNATIONAL GLOBAL MARKETS TRENDS

- ▶ Global real estate transaction volume totaled \$1.7 trillion annually as of Q3 2018, representing a 12.5% YoY increase. This increase was largely driven by strong growth in Asia Pacific over the past two years, although this rapid pace of growth may be moderating as flows in Q3 2018 were down by 11% from Q2 2017—the first decrease in quarterly YoY transaction volume since Q2 2015.
- ▶ Pricing for commercial real estate worldwide continues to expand as RCA's Global CPPI (price index) has increased by 6.1% from Q3 2017 to Q3 2018. However, this pace of annual growth is down from 2017 as several markets worldwide have posted flat or modest declines through Q3 2018.
- ▶ As appreciation has begun to slow after several years of double-digit expansion in many markets globally, international investment should focus on opportunities in markets with strong economic fundamentals driven by job growth.
- ▶ Historical and forecasted GDP growth and population growth are provided below for the 10 largest countries by GDP in Asia-Pacific and the European Union. Within Asia-Pacific, India, China, and Indonesia are expected to witness the strongest economic and population growth over the next five years. Most markets in the European Union are expected to exhibit strong economic growth moving forward, with Poland, Germany, and Spain having the most optimistic economic outlooks.

Asia Pacific – Population & GDP Growth (10 Largest Countries)

	GROSS DOMESTIC PRODUCT			POPULATION		
	CURRENT (billions)	CAGR (2012-2017)	CAGR (2018-2023)	CURRENT (millions)	CAGR (2012-2017)	CAGR (2018-2023)
China	\$13,457	7.0%	7.8%	1,397.0	0.5%	0.3%
Japan	\$5,071	-4.7%	3.1%	126.4	-0.1%	-0.4%
India	\$2,690	7.3%	10.0%	1,334.2	1.3%	1.3%
South Korea	\$1,656	4.7%	4.4%	51.7	0.5%	0.4%
Australia	\$1,428	-2.5%	4.7%	25.2	1.6%	1.7%
Indonesia	\$1,005	2.0%	7.5%	265.3	1.3%	1.3%
Taiwan	\$603	2.9%	5.1%	23.6	0.2%	0.1%
Thailand	\$490	2.8%	5.9%	69.2	0.3%	0.1%
Iran	\$430	2.0%	-2.3%	82.4	1.4%	1.0%
Hong Kong	\$360	5.4%	5.9%	7.5	0.7%	0.7%

European Union – Population & GDP Growth (10 Largest Countries)

	GROSS DOMESTIC PRODUCT			POPULATION		
	CURRENT (billions)	CAGR (2012-2017)	CAGR (2018-2023)	CURRENT (millions)	CAGR (2012-2017)	CAGR (2018-2023)
Germany	\$4,029	1.4%	4.1%	82.8	0.5%	0.0%
United Kingdom	\$2,809	0.4%	3.0%	66.5	0.7%	0.5%
France	\$2,795	-0.1%	3.8%	65.1	0.4%	0.5%
Italy	\$2,087	-0.4%	2.8%	60.8	0.1%	0.0%
Spain	\$1,437	1.1%	4.1%	46.3	-0.2%	-0.1%
Netherlands	\$910	0.7%	4.0%	17.2	0.5%	0.3%
Sweden	\$555	-0.9%	3.8%	10.3	1.2%	1.0%
Poland	\$549	0.9%	7.5%	38.0	0.0%	-0.1%
Belgium	\$536	0.6%	3.5%	11.4	0.5%	0.5%
Austria	\$459	1.3%	4.0%	8.9	0.9%	0.6%

DISCLAIMERS

CRITICAL ASSUMPTIONS

Our analysis depends on the correctness and completeness of data available as of the date of this memo. The future performance of the global, national, and local economy and real estate market, and other factors similarly outside our control may vary. Given the fluid and dynamic nature of the economy and real estate markets, as well as the uncertainty surrounding particularly the near-term future, it is critical to monitor the economy and markets continuously. Stable and moderate growth patterns are historically not sustainable over extended periods of time; the economy is cyclical; and real estate markets are typically highly sensitive to business cycles. Further, it is very difficult to predict when an economic and real estate upturn will end.

Our analysis cannot predict unusual economic shocks on the national and/or local economy, potential benefits from major "booms" that may occur, or the residual impact on the real estate market and the competitive environment of such a shock or boom. Also, it is important to note that it is difficult to predict changing consumer and market psychology.

As such, we recommend the close monitoring of the economy and the marketplace, and updating this analysis as appropriate.

GENERAL LIMITING CONDITIONS

Reasonable efforts have been made to ensure that the data contained in this study reflect accurate and timely information and are believed to be reliable and comprehensive. This study is based on estimates, assumptions, and other information developed by RCLCO Fund Advisors from its independent research effort and general knowledge of the industry. No responsibility is assumed for inaccuracies in reporting by any data source used in preparing or presenting this study. This memo is based on information that to our knowledge was current as of the date of this memo, and RCLCO Fund Advisors has not undertaken any update of its research effort since such date.



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