CHICAGO BOOTH

The University of Chicago Booth School of Business

Gateway *v.* Non-Gateway Markets: A Mispriced Risk?

Joseph L. Pagliari, Jr.
Clinical Professor of Real Estate

November 7, 2019

13th Annual Real Estate Conference

Chicago, Illinois

A Mispriced Risk: State & Local Finances?

- What Does Theory Suggest?:
  - The equilibrium condition
  - The search for "alpha"
  - Consider some examples

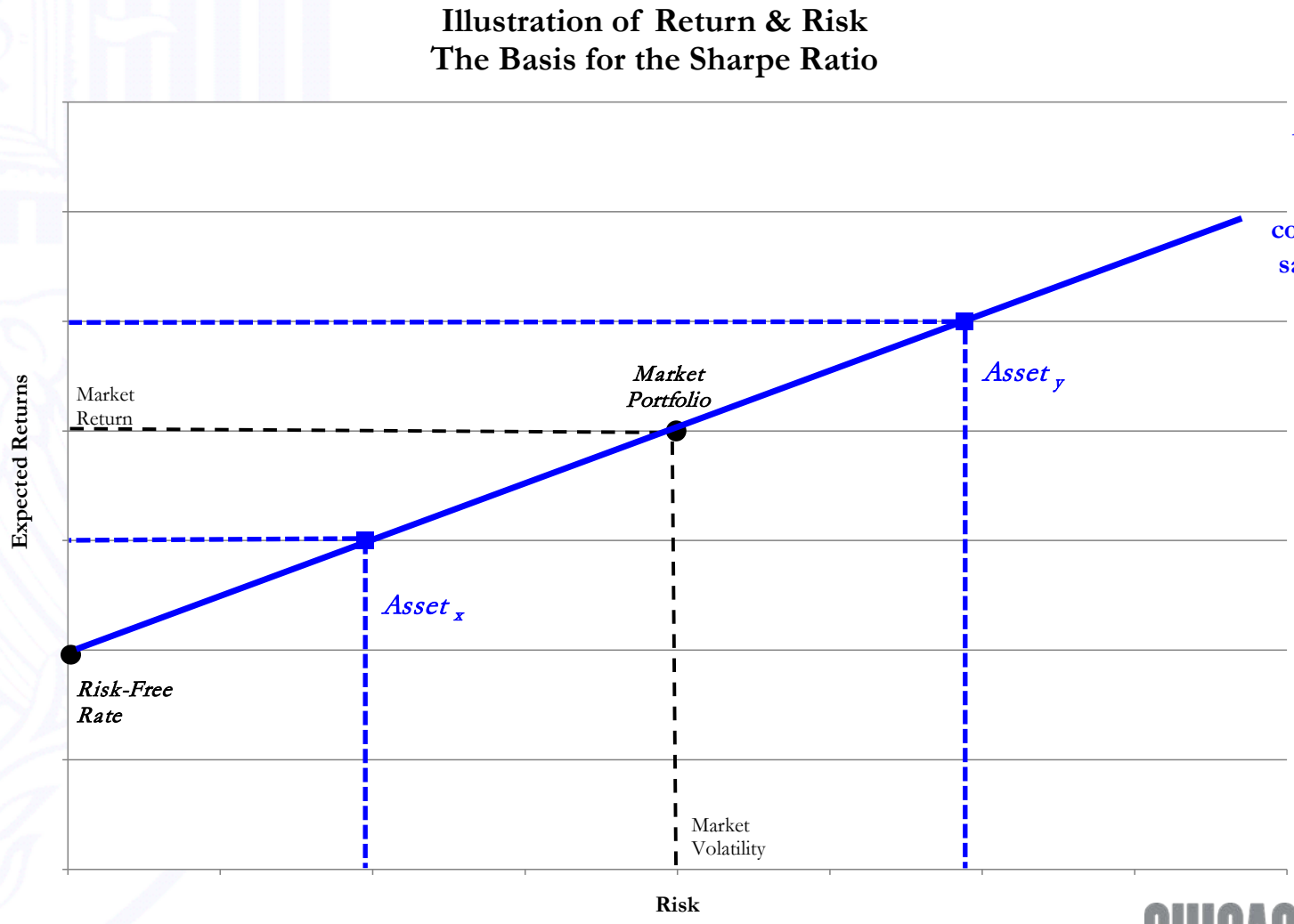
- A Closer Look at Theory:
  - Equivalent Sharpe ratios
  - Returns $=f(CF_0/P_0, g, \ldots)$
  - Indifference Curve

- Risk Factors & (Mis)Pricing?:
  - Pricing
  - Fiscal Solvency
  - Business Climate
  - Climate Change

- Trends ← Gateway *v.* Non-Gateway: Cap Rates & Appreciation:
  - Growth in Asset Values
  - Changes in Cap Rates

In Principle, Equal Risk-Adjusted Returns

- Financial theory suggests that savvy market participants push prices and expected returns (as a *f*(risk) towards an (ever-changing) equilibrium:



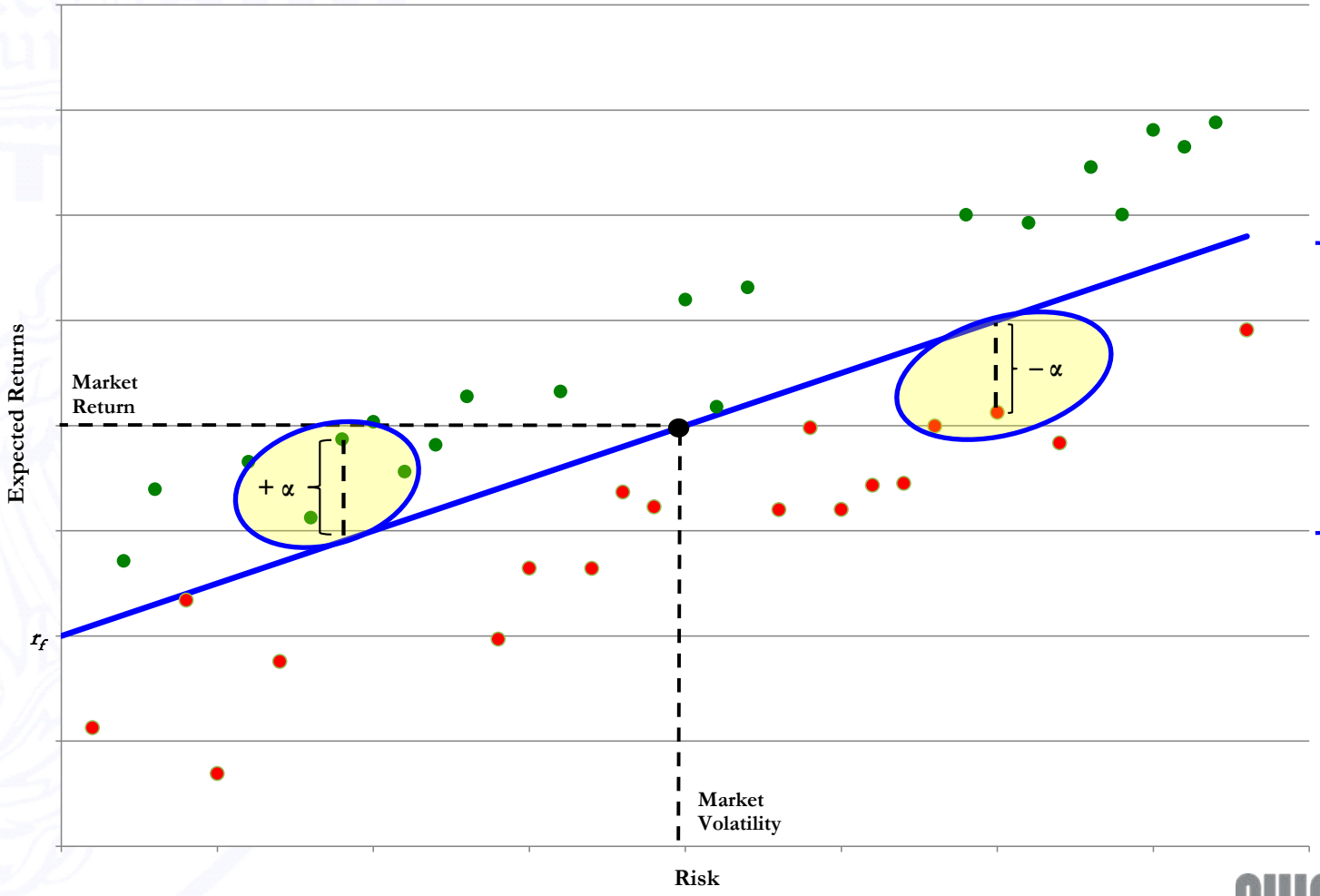
All assets on the equilibrium risk/return continuum have the same Sharpe ratio:

$$SR = \frac{E(k) - r_f}{\sigma}$$

Identifying "Alpha" (or Risk-Adjusted Returns)

- Practice is "noisy" in comparison to theory (skill *v.* luck, *ex ante v. ex post*, *etc.*)
- Active management → look to identify $+\alpha$ and avoid $-\alpha$:

Illustration of Alpha *vis-a-vis* Equilibrium Return & Risk



Some investors naively confuse with high returns with α; instead, α is (technically) based on risk-adjusted returns.

In practice, this is complicated by the difficulties of measuring risk.

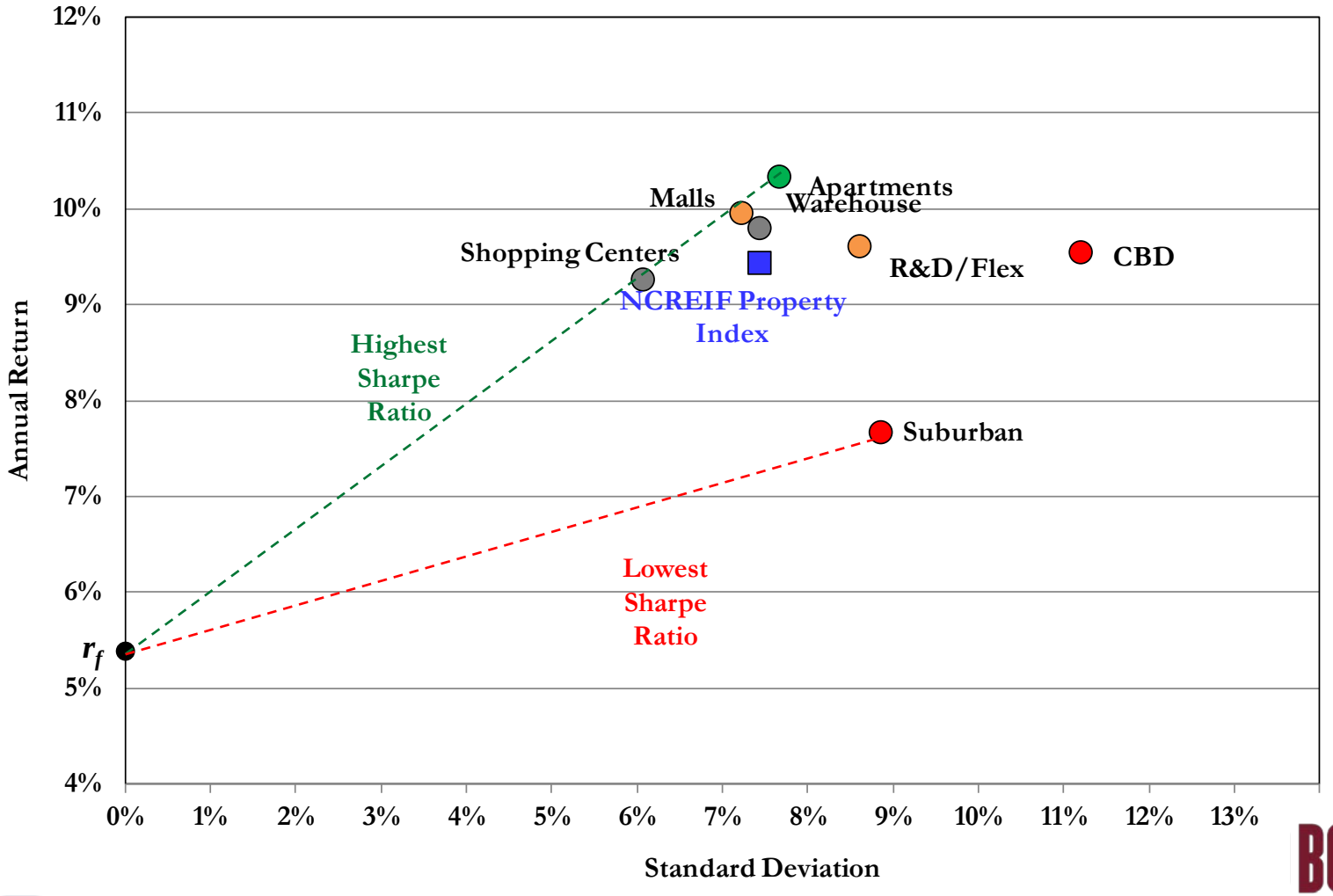
Looking for Positive α (or Exploiting Mispricings)!

- There are many ways to consider possible mispricing opportunities:
  - Core *v.* non-core property types,
  - Within core property types,
  - Geographies (*e.g.*, metropolitan areas),
  - Sensitivity to macro-economic factors,
  - Class A *v.* Class B (*v.* Class C) properties, *etc.*
- Let's look at a few examples:

The Quest for α | Within Core Property Types

- There are many ways to consider possible mispricing opportunities; *e.g.*, within core property types:

Historical Performance of the NCREIF Property Index and Various Property Types for the Period 1978 through 2018



The Quest for α | Within Apartment Metros

- There are many ways to consider possible mispricing opportunities:
  - Geographies (*e.g.*, metropolitan areas) :

INTERACTIVE PERFORMANCE (2018Q4)

15-YRS NPI BY CBSAS

15-Yr Summary Statistics

	Geomean	Mean	Active Return	Std Deviation	Beta	Jensen's Alpha	Correlation to NPI	Sharpe Ratio	Pct Bmk
Atlanta	8.1%	8.5%	-0.8%	8.8%	0.92	-0.2%	0.97	0.82	3.3%
Austin	9.4%	9.8%	0.5%	8.6%	0.86	1.5%	0.96	1.03	1.5%
Baltimore	8.6%	9.0%	-0.3%	9.2%	0.93	0.2%	0.95	0.86	1.4%
Boston	8.6%	9.1%	-0.3%	10.5%	1.07	-0.8%	0.97	0.78	5.2%
Bridgeport	5.9%	6.4%	-3.0%	10.1%	0.89	-2.1%	0.88	0.55	0.5%
Charlotte	8.6%	9.0%	-0.3%	9.2%	0.9	0.5%	0.93	0.87	0.7%
Chicago	8.1%	8.4%	-0.9%	8.2%	0.86	0.2%	0.99	0.89	6.4%
Cincinnati	7.6%	7.8%	-1.3%	6.4%	0.57	1.9%	0.86	1.05	0.4%
Columbus	6.6%	6.8%	-2.3%	6.3%	0.54	1.2%	0.76	0.83	0.3%
Dallas	8.6%	8.9%	-0.3%	7.7%	0.8	1.2%	0.97	1.00	4.2%
Denver	9.7%	10.1%	0.8%	9.1%	0.94	1.2%	0.96	0.99	2.5%
Detroit	5.3%	5.7%	-3.6%	9.3%	0.88	-2.7%	0.83	0.46	0.2%
Hartford	6.5%	7.0%	-2.5%	11.2%	1.1	-3.1%	0.92	0.53	0.1%
Houston	9.6%	9.8%	0.6%	7.9%	0.7	2.9%	0.86	1.14	3.6%
Indianapolis	8.0%	8.4%	-0.9%	8.5%	0.81	0.6%	0.91	0.87	0.4%
Jacksonville	6.9%	7.3%	-2.0%	9.0%	0.87	-1.0%	0.91	0.69	0.3%
Kansas City	6.9%	7.1%	-2.0%	5.9%	0.61	0.9%	0.98	1.01	0.3%
Las Vegas	8.1%	8.9%	-0.8%	12.5%	1.11	-1.3%	0.85	0.63	0.4%
Los Angeles	9.8%	10.4%	0.9%	10.7%	1.1	0.2%	0.99	0.89	9.9%
Memphis	8.1%	8.4%	-0.8%	7.1%	0.7	1.4%	0.93	1.01	0.3%
Miami	9.5%	9.9%	0.5%	10.1%	1.05	0.1%	0.99	0.89	3.9%
Minneapolis	6.8%	7.1%	-2.1%	7.5%	0.78	-0.5%	0.99	0.81	1.3%
Nashville	10.0%	10.3%	1.1%	7.4%	0.73	3.1%	0.95	1.27	0.4%
New York	8.4%	9.1%	-0.5%	12.1%	1.23	-2.1%	0.98	0.68	11.8%
Orlando	10.7%	11.2%	1.8%	10.4%	1.04	1.5%	0.95	0.98	1.2%
Oxnard	8.6%	9.2%	-0.3%	10.8%	1.07	-0.7%	0.96	0.77	0.2%
Philadelphia	8.4%	8.7%	-0.5%	8.3%	0.85	0.6%	0.99	0.95	1.5%
Phoenix	9.0%	9.7%	0.0%	12.0%	1.23	-1.5%	0.97	0.72	2.0%
Portland	9.7%	10.1%	0.8%	9.4%	0.92	1.4%	0.95	1.00	1.2%
Raleigh	8.0%	8.2%	-1.0%	7.7%	0.7	1.3%	0.88	0.95	0.4%
Riverside	11.1%	11.9%	2.1%	12.9%	1.36	-0.4%	0.97	0.83	2.4%
Sacramento	7.7%	8.1%	-1.2%	9.0%	0.91	-0.5%	0.97	0.79	0.5%
St. Louis	6.0%	6.2%	-2.9%	6.0%	0.55	0.5%	0.9	0.87	0.3%
Salt Lake City	9.4%	9.7%	0.5%	7.9%	0.69	2.9%	0.86	1.15	0.3%
San Antonio	8.8%	9.2%	-0.1%	8.3%	0.74	1.9%	0.85	0.97	0.3%
San Diego	10.0%	10.5%	1.1%	9.7%	0.99	1.2%	0.98	0.99	2.7%
San Francisco	10.6%	11.3%	1.7%	11.9%	1.23	0.1%	0.97	0.87	6.3%
San Jose	10.9%	11.4%	2.0%	10.4%	1.07	1.5%	0.96	1.00	2.0%
Seattle	9.8%	10.3%	0.9%	10.3%	1.04	0.7%	0.97	0.92	3.7%
Tampa	8.7%	9.3%	-0.2%	11.2%	1.11	-0.9%	0.95	0.75	0.7%
Washington, D.C.	8.4%	8.8%	-0.5%	9.8%	0.92	0.2%	0.91	0.81	9.3%
US (NPI)	8.9%	9.4%	0.0%	9.5%	1.00	0.0%	1.00	0.88	100.0%
Average	8.5%	9.0%	-0.4%	9.3%	0.91	0.3%	0.93	0.87	2.3%
Minimum	5.3%	5.7%	-3.6%	5.9%	0.54	-3.1%	0.76	0.46	0.1%
Maximum	11.1%	11.9%	2.1%	12.9%	1.36	3.1%	0.99	1.27	11.8%
StdDev	1.4%	1.5%	1.4%	1.8%	0.2	1.5%	0.05	0.17	2.9%

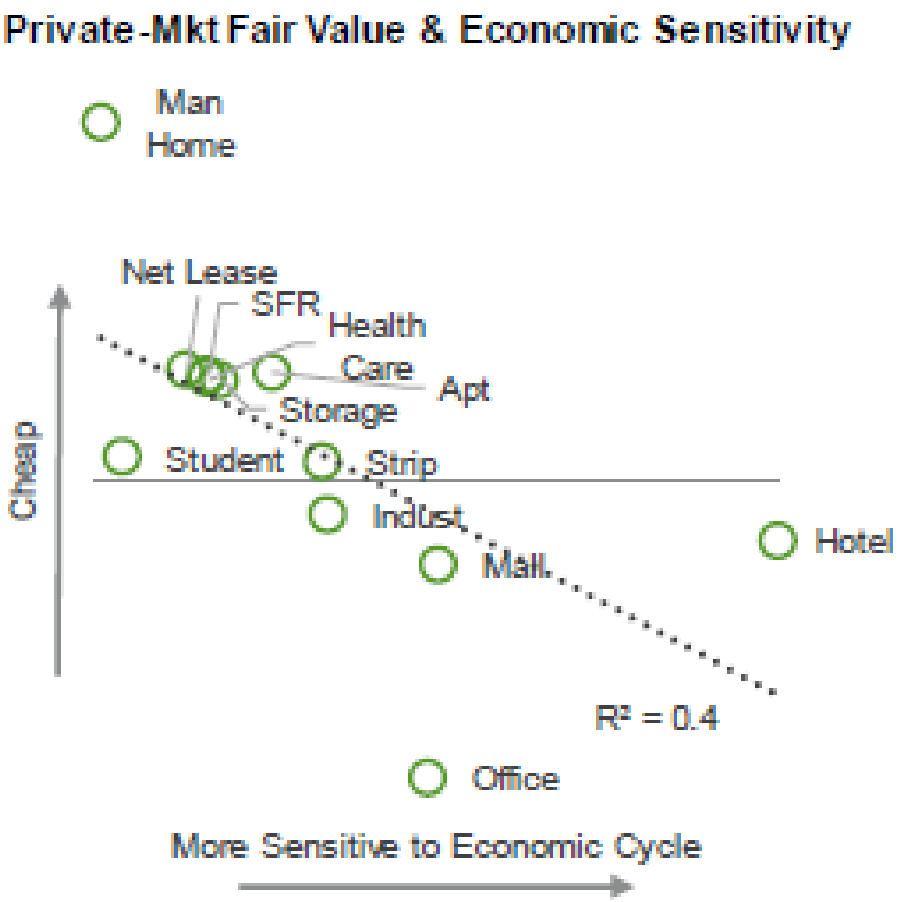
•Some surprises?

- Nashville (α = +3.1%)
- New York (α = –2.1%).
- As with all of these historical reviews: Past is not prologue!

CHICAGO BOOTH

The Quest for α | Betting on the Macro-Economic Cycle

- There are many ways to consider possible mispricing opportunities:
  - Sensitivity to macro-economic factors:

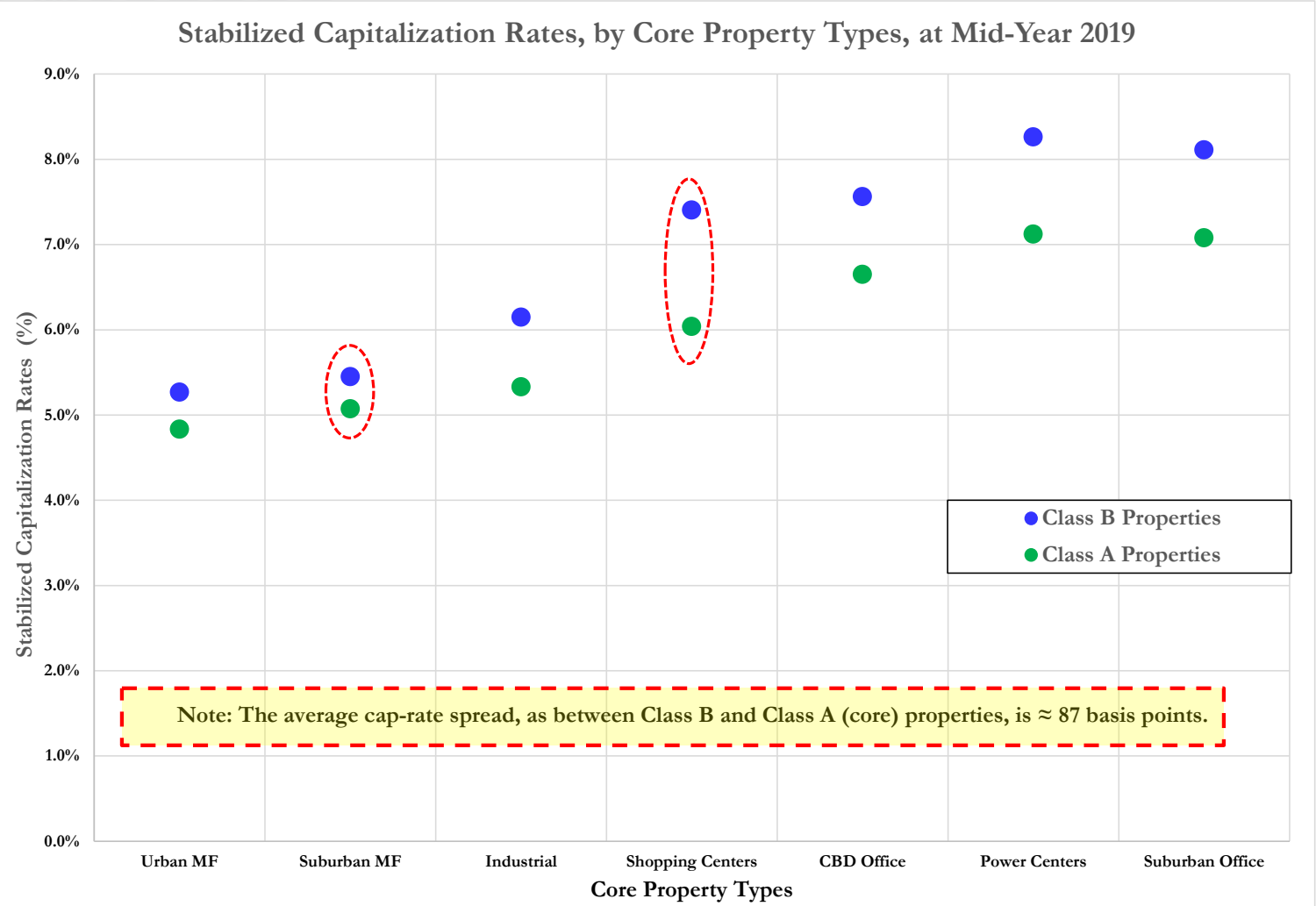


For example, the high β of the hotel sector may make for an interesting bet on a macro-economic recovering – but less so when facing a macro-economic decline.

Source: *Heard on the Beach*, Green Street Advisors, March 4, 2019.

The Quest for α | Across Property Quality

- There are many ways to consider possible mispricing opportunities:
  - Class A *v.* Class B properties (but excluding malls):



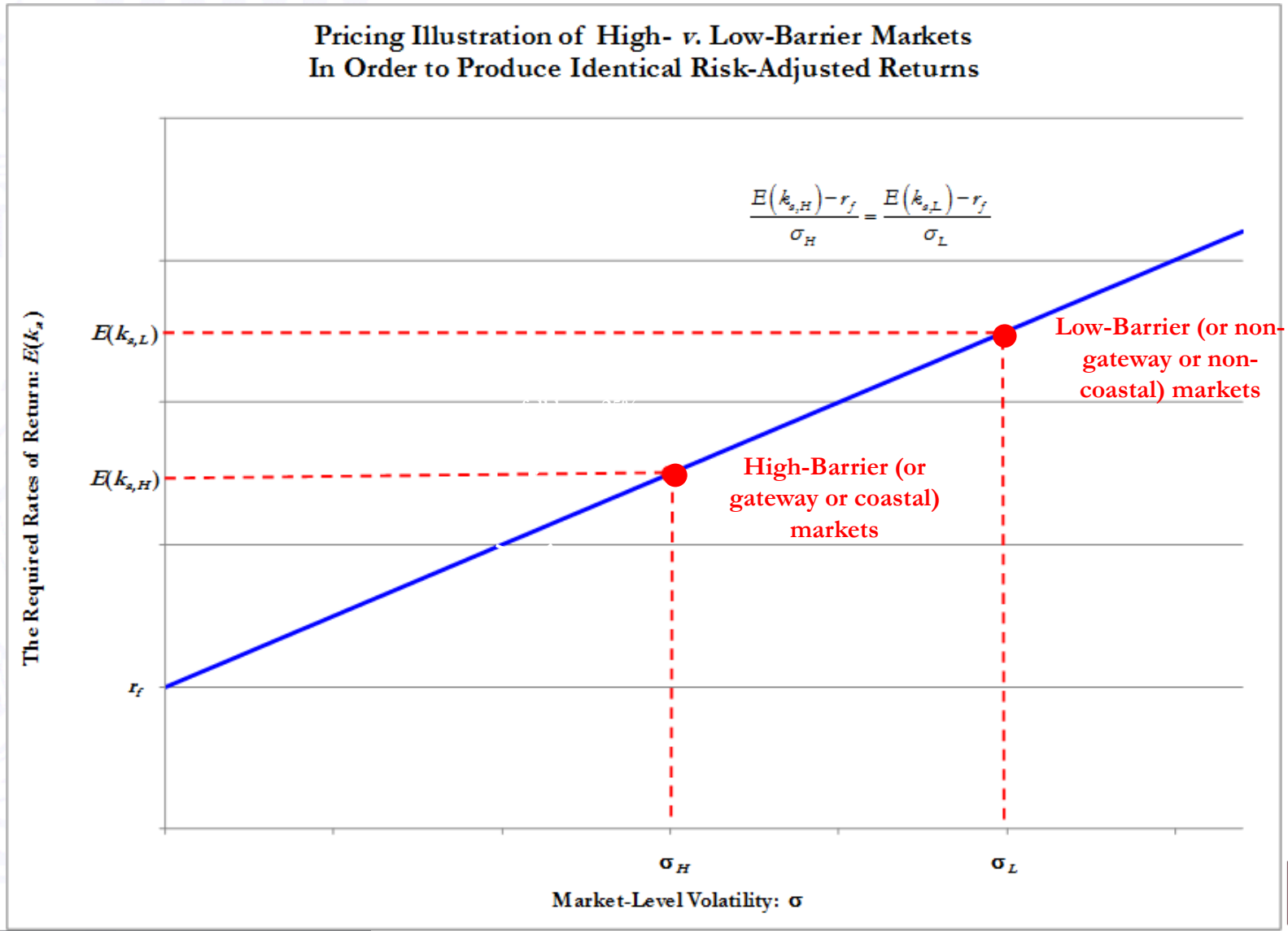
Source: CBRE North American Cap Rate Survery | Second Half of 2019 and Instructor's calculations.

A Mispriced Risk: State & Local Finances?

- What Does Theory Suggest?:
  - The equilibrium condition
  - The search for "alpha"
  - Consider some examples
- A Closer Look at Theory:
  - Equivalent Sharpe ratios
  - Returns $= f(CF_0/P_0, g, \ldots)$
  - Indifference Curve
- Risk Factors & (Mis)Pricing?:
  - Pricing
  - Fiscal Solvency
  - Business Climate
  - Climate Change
- Trends ← Gateway *v.* Non-Gateway: Cap Rates & Appreciation:
  - Growth in Asset Values
  - Changes in Cap Rates

Let's Revisit Risk-Adjusted Returns

•Among the many potential mispricing choices, let's consider geographical (a number of definitional choices) trade-offs:

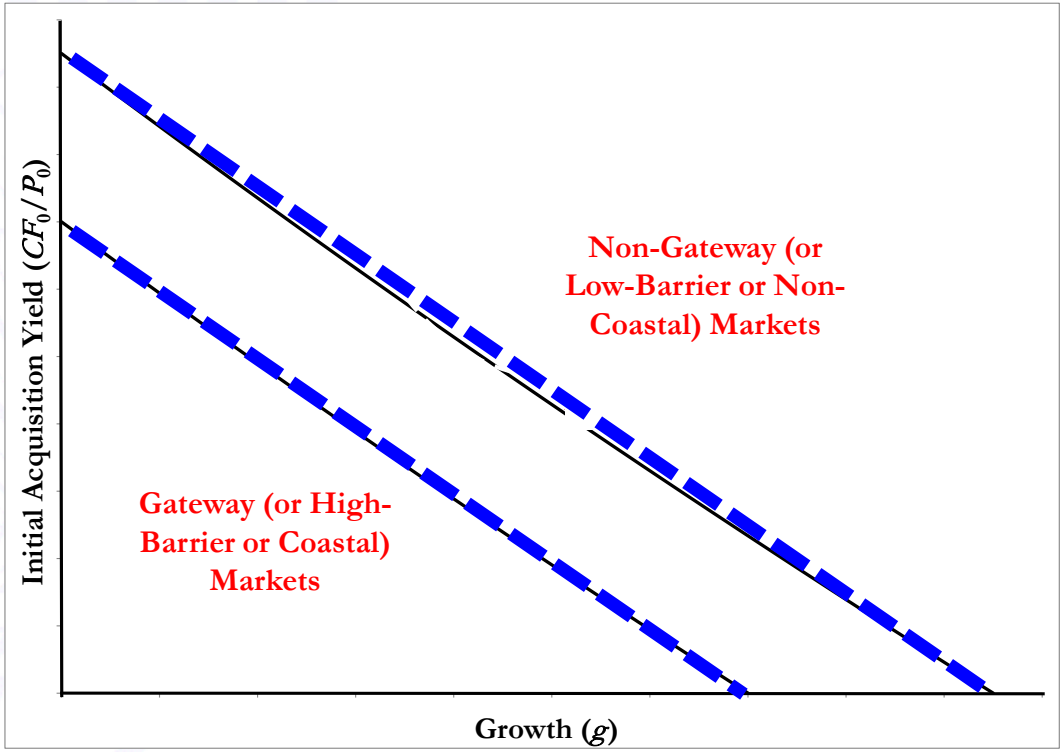


Let's Consider the Return Portion of Risk-Adjusted Returns

•Ignoring shifting cap rates (and making other simplifying assumptions):

$$E(k) = \frac{CF_1}{P_0} + E(g)$$

• The riskier market must have a higher initial yield $[CF_1/P_0]$ and/or higher expected cash-flow growth $[E(g)]$ – in order to offset its higher risk:



The non-gateway (or low-barrier) markets – which are assumed to be riskier – offer a combination of initial cash-flow yields $[CF_1/P_0]$ and expected cash-flow growth rates $[E(g)]$ which exceed that offered by gateway (or high-barrier) markets.

Let's Consider Equivalent Risk-Adjusted Returns

- Let's begin with equivalent Sharpe ratios (high- *v.* low-barrier markets):

$$\frac{E(k)_H - r_f}{\sigma_H} = \frac{E(k)_L - r_f}{\sigma_L}$$

- Let's convert total return [$E(k)$] into initial yield [CF_1/P_0] and expected cash-flow growth [$E(g)$]:

$$\frac{\left(\frac{CF_1}{P_0}\right)_H + E(g)_H - r_f}{\sigma_H} = \frac{\left(\frac{CF_1}{P_0}\right)_L + E(g)_L - r_f}{\sigma_L}$$

Recall: $E(k) = CF_1/P_0 + E(g)$

Let's Consider Equivalent Risk-Adjusted Returns (continued)

- Let's begin with equivalent Sharpe ratios (high- *v.* low-barrier markets):

$$\frac{E(k)_H - r_f}{\sigma_H} = \frac{E(k)_L - r_f}{\sigma_L}$$

- Let's convert total return [$E(k)$] into initial yield [CF_1/P_0] and expected cash-flow growth [$E(g)$]:

$$\frac{\left(\frac{CF_1}{P_0}\right)_H + E(g)_H - r_f}{\sigma_H} = \frac{\left(\frac{CF_1}{P_0}\right)_L + E(g)_L - r_f}{\sigma_L}$$

What's observable?

What's not?

- Let's "solve" (one equation with four unknowns) *wrt* what we observe:

Cash Flow-Yield Differential

Growth-Rate Differential

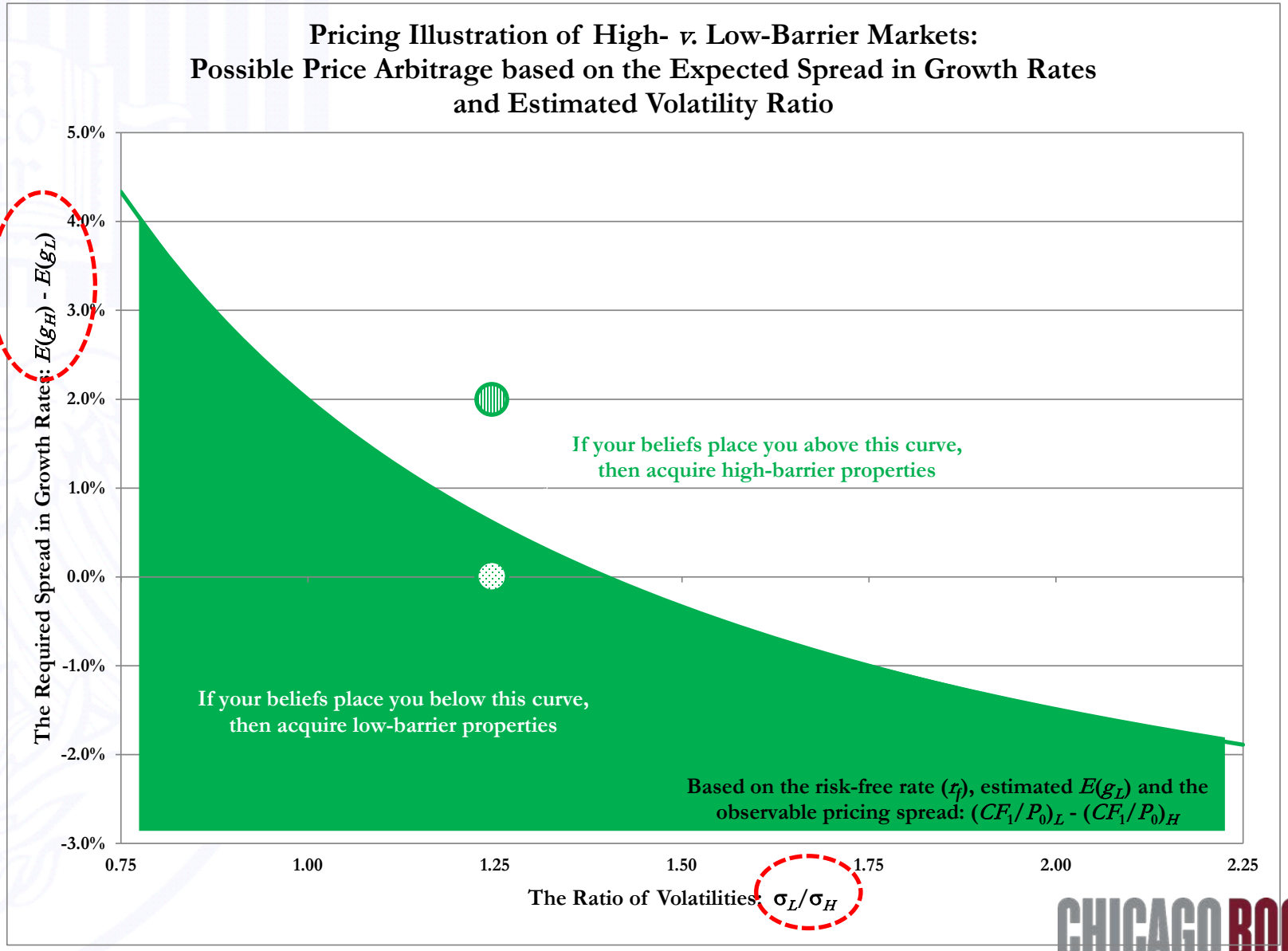
Volatility-Scaled Risk Premium

$$\underbrace{\left(\frac{CF_1}{P_0}\right)_L - \left(\frac{CF_1}{P_0}\right)_H}_{(\approx)\text{ Observable}} = \underbrace{\left[E(g)_H - E(g)_L\right] + \left(\frac{\sigma_L}{\sigma_H} - 1\right)\left[\left(\frac{CF_1}{P_0}\right)_H + E(g)_H - r_f\right]}_{\text{Unobservable} \leftarrow \text{We get paid to make judgments}}$$

CHICAGO BOOTH

Identifying the Indifference Curve

- Given "observables," we can identify the key unobservable factors:

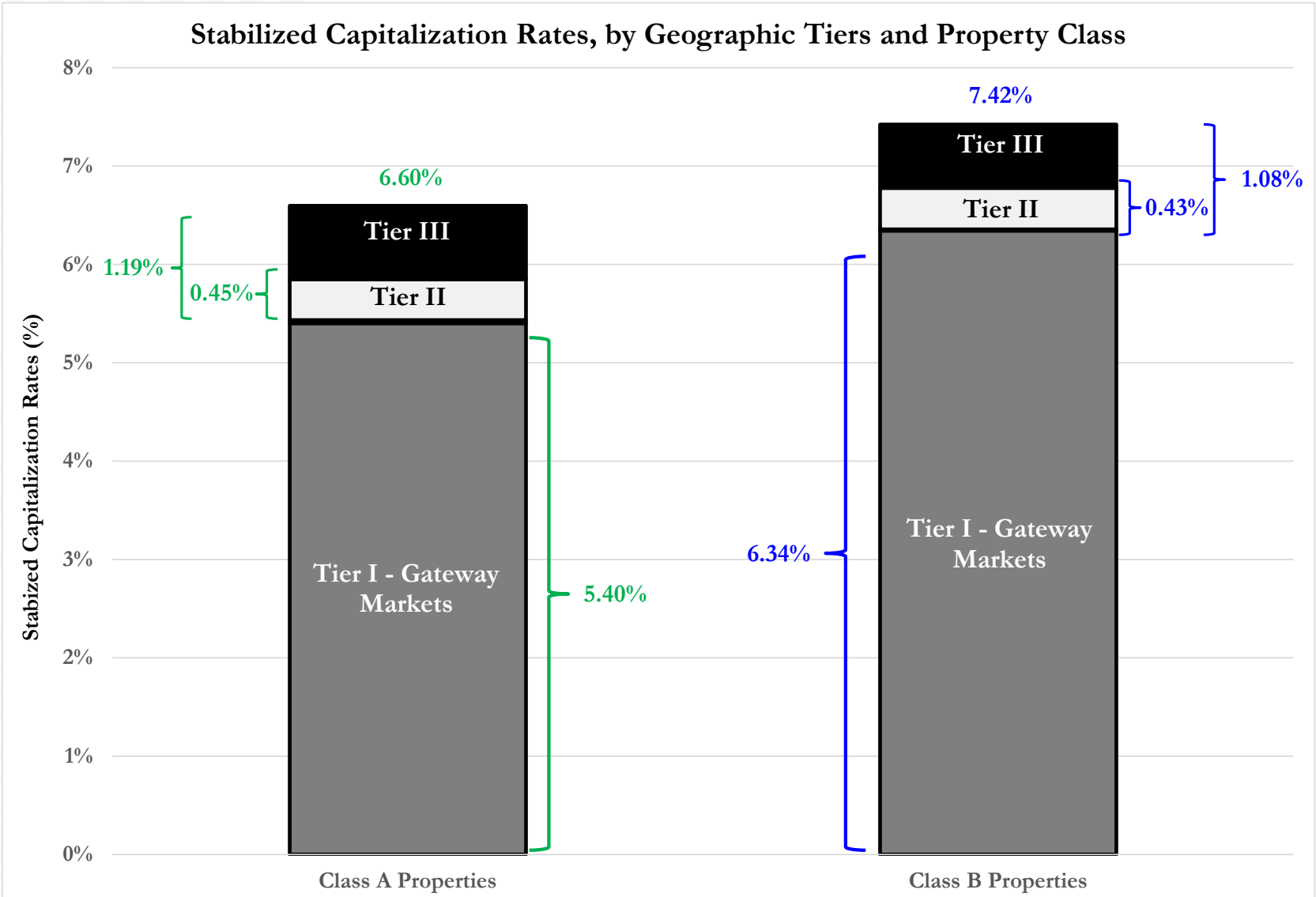


A Mispriced Risk: State & Local Finances?

- What Does Theory Suggest?:
  - The equilibrium condition
  - The search for "alpha"
  - Consider some examples
- A Closer Look at Theory:
  - Equivalent Sharpe ratios
  - Returns $=f(CF_0/P_0, g, \ldots)$
  - Indifference Curve
- Risk Factors & (Mis)Pricing?:
  - Pricing
  - Fiscal Solvency
  - Business Climate
  - Climate Change
- Trends ← Gateway *v.* Non-Gateway: Cap Rates & Appreciation:
  - Growth in Asset Values
  - Changes in Cap Rates

Let's Consider Pricing by Geographic Tier (I *v.* II)

- Consider aggregate (core) pricing:



Source: CBRE North American Cap Rate Survery | First Half of 2019 and Instructor's calculations.

An Aside: CBRE's Geographic Classifications

- While the classifications can change by property type, here CBRE's geographic classification for CBD office:

CLASS AA

		CAP RATES FOR STABILIZED PROPERTIES (%)		CHANGE[1]
		Low	High	
TIER I	Boston *	4.50	5.25	◀▶
	Chicago *	4.75	5.50	◀▶
	Dallas/Ft. Worth	5.75	6.75	▲
	N. CA: Oakland *	4.50	5.75	▲
	N. CA: San Francisco *	4.00	4.75	◀▶
	N. CA: San Jose *	4.50	5.25	◀▶
	NY: Fairfield County, CT *	-	-	-
	NY: New York City *	4.50	4.75	▲
	S. CA: Los Angeles *	3.50	4.50	◀▶
	S. CA: Orange County *	3.50	4.50	◀▶
	S. FL: Miami[2]	-	-	-
	San Diego	5.50	6.00	◀▶
	Seattle	4.25	4.75	◀▶
	Washington, D.C. *	4.25	4.50	◀▶

CLASS AA

		CAP RATES FOR STABILIZED PROPERTIES (%)		CHANGE[1]
		Low	High	
TIER II	Atlanta	5.25	6.00	◀▶
	Austin	5.00	5.50	◀▶
	Denver	4.75	5.25	◀▶
	Houston	6.00	6.50	◀▶
	Philadelphia	6.00	6.25	◀▶
	Phoenix	5.25	6.25	◀▶

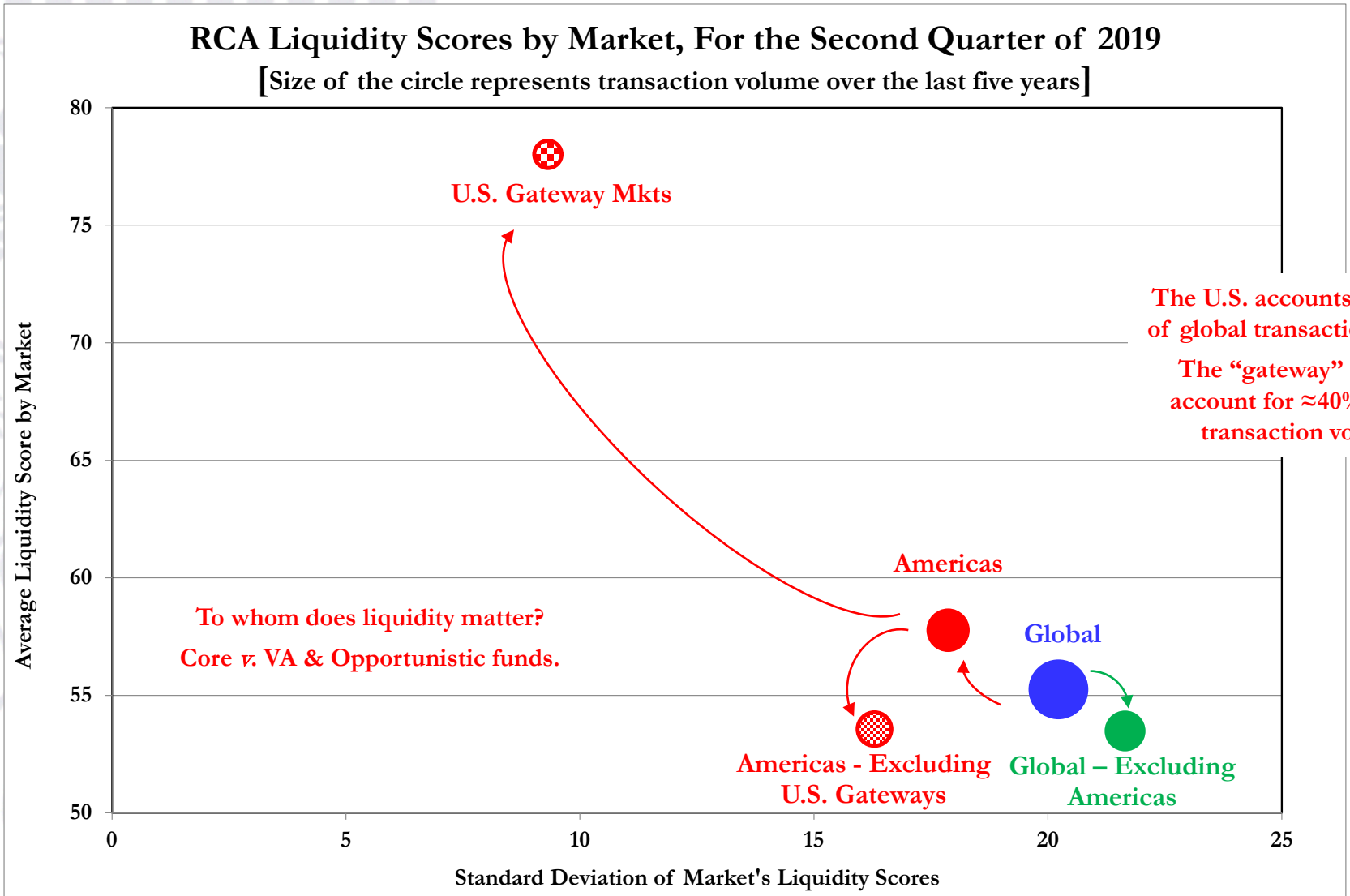
CLASS AA

		CAP RATES FOR STABILIZED PROPERTIES (%)		CHANGE[1]
		Low	High	
TIER III	Albuquerque	8.50	9.00	◀▶
	Baltimore	6.75	7.50	◀▶
	Charlotte	5.50	6.25	◀▶
	Cincinnati	5.75	6.25	◀▶
	Cleveland	7.75	8.25	◀▶
	Columbus	-	-	-
	Detroit	-	-	-
	Indianapolis	-	-	-
	Jacksonville	-	-	-
	Kansas City	-	-	-
	Las Vegas	7.00	7.50	◀▶
	Memphis	-	-	-
	Minneapolis/St. Paul	5.00	5.50	◀▶
	Nashville	6.00	6.50	◀▶
	Oklahoma City	-	-	-
	Orlando	6.50	6.75	◀▶
	Pittsburgh	6.50	7.00	◀▶
	Portland	4.75	5.25	◀▶
	Raleigh-Durham	5.50	6.00	◀▶
	Richmond	-	-	-
	Sacramento	5.75	6.75	▲
	Salt Lake City	5.50	6.00	◀▶
	San Antonio	6.25	6.75	-
	St. Louis	-	-	-
	Tampa	-	-	-

* Gateway market

An Aside: Finance Doesn't Say Much About Liquidity

- **But liquidity certainly varies by real estate market:**

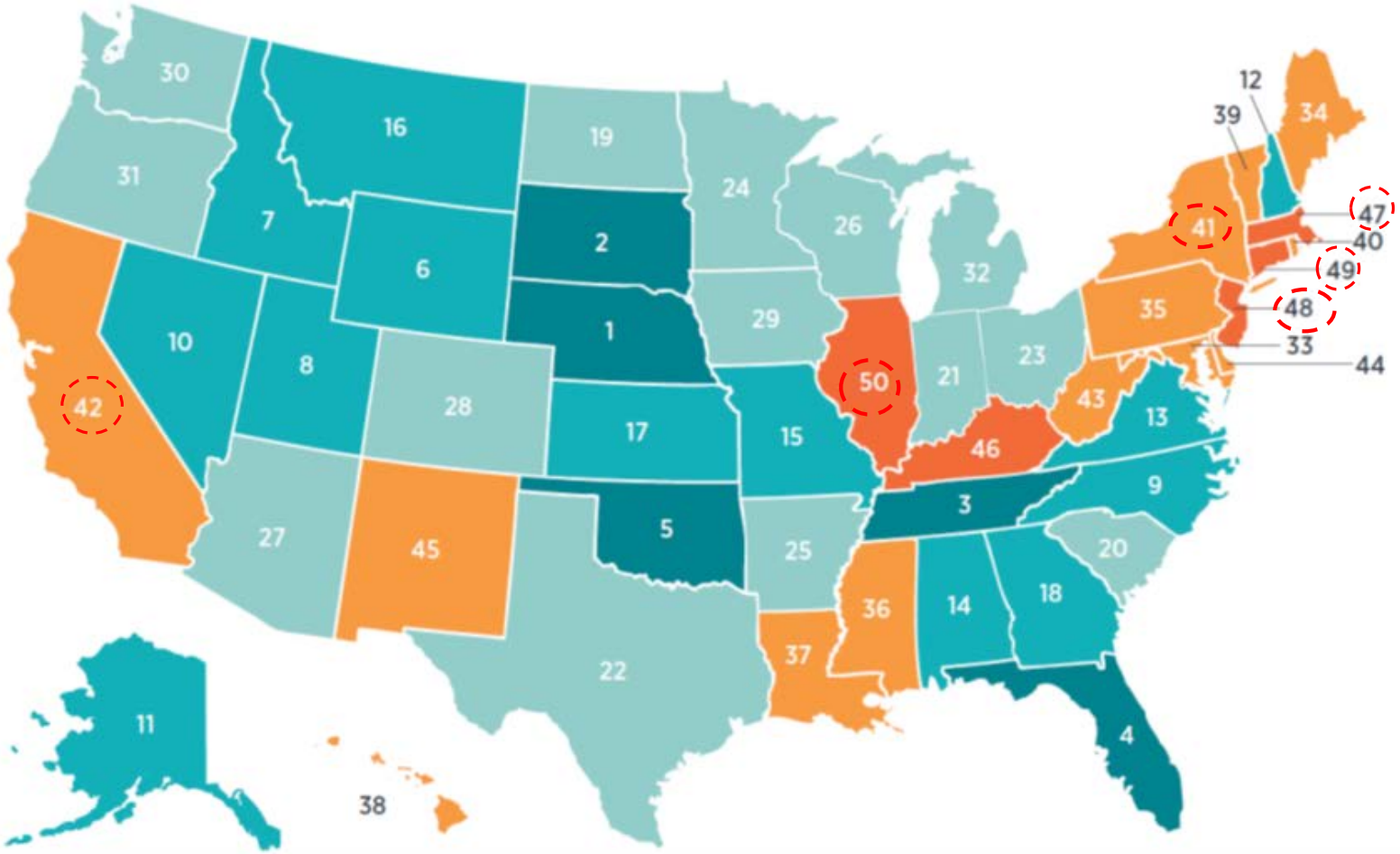


Sources: Real Capital Analytics and instructor's calculations.

The Financial Strain on State & Local Budgets

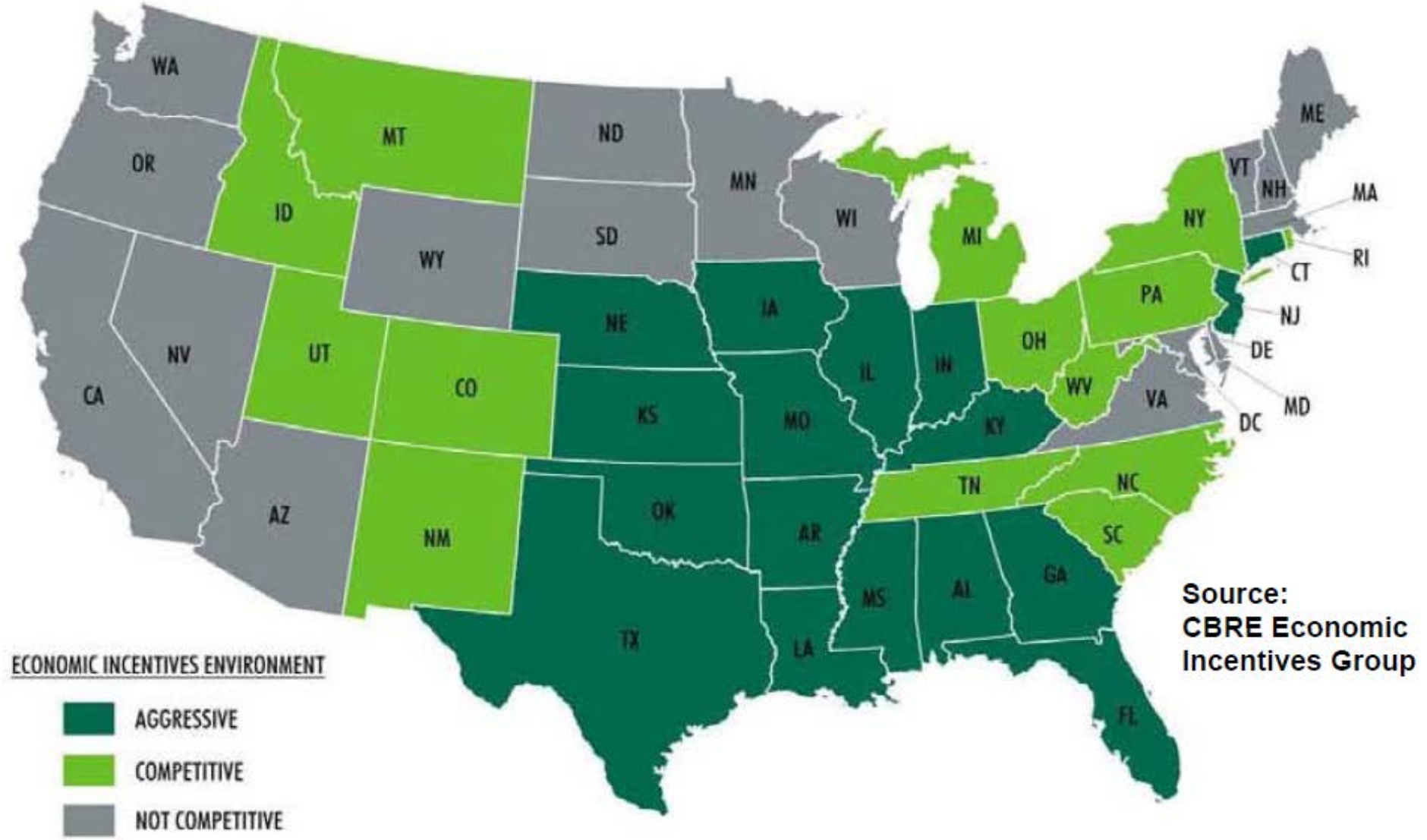
- It is no surprise that many state & local budgets are under enormous financial strain. Consider:

Note: Six of the nine worst-ranked states: Illinois, Connecticut, New Jersey, Massachusetts, California and New York.



Source: Norcross and Gonzalez, "Ranking the States by Fiscal Condition, 2018 Edition," Mercatus Center at George Mason University

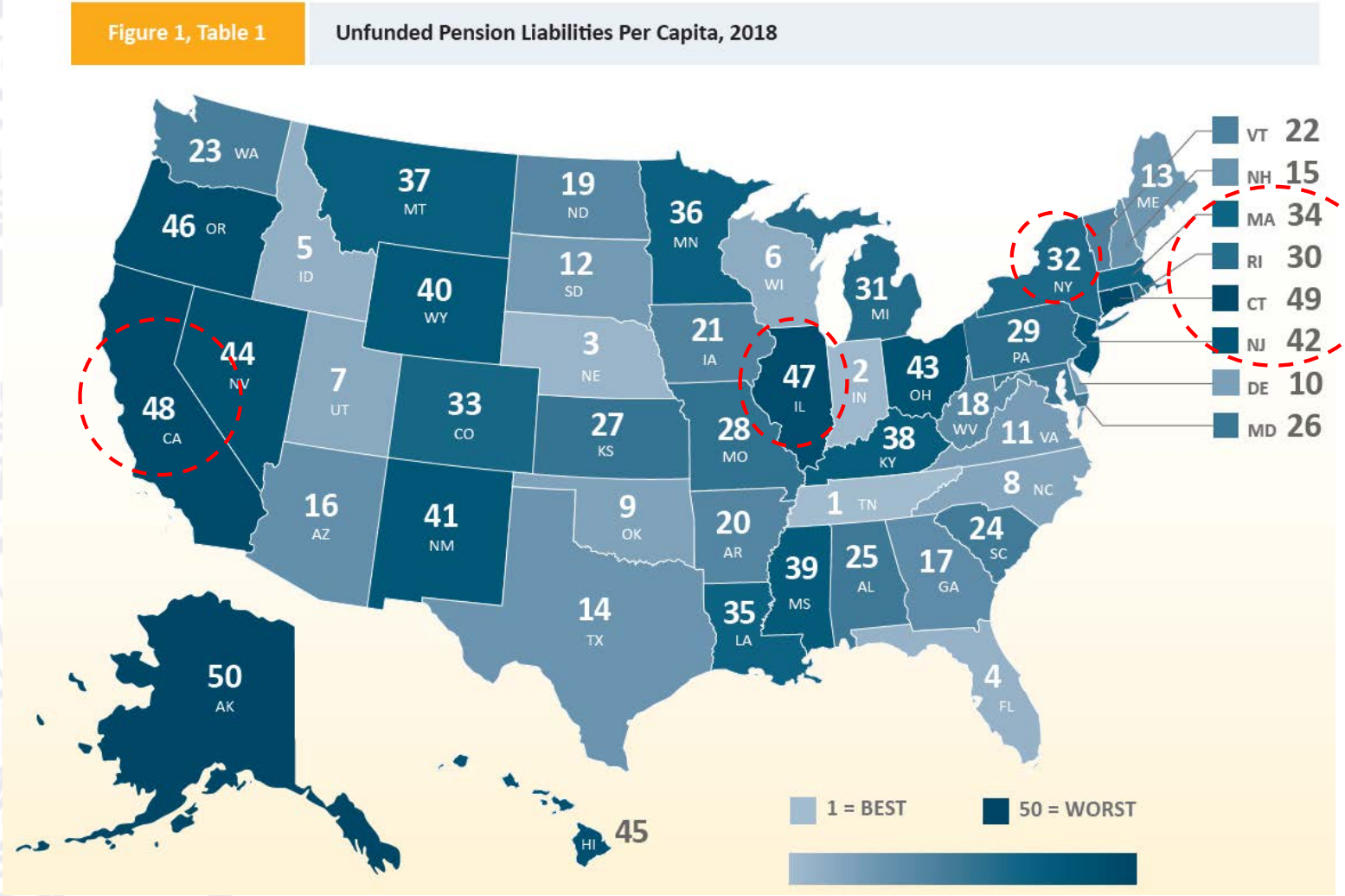
Will Aggressiveness Change with State Fortunes?



Source: Jim Costello and Mark Seely, "Industrial, Economic & Workforce Trends," CBRE Client Conference, October 28, 2010.

The Financial Strain = *f*(Unfunded Pension Liabilities)

- It is also no surprise that many state & local budgets are under enormous financial strain due to unfunded pension liabilities. Consider:

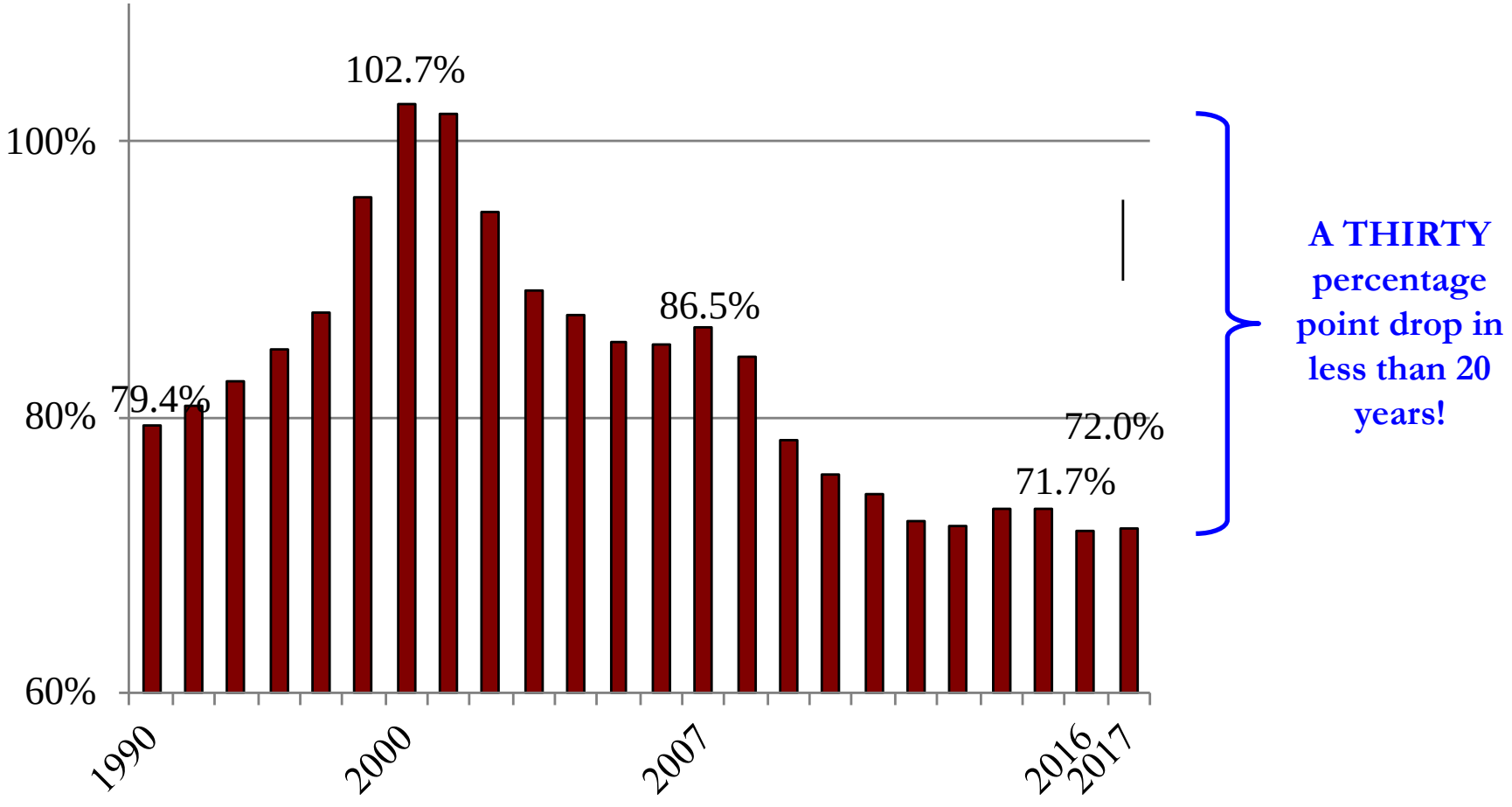


Source: "Unaccountable and Unaffordable," American Legislative Exchange Council, 2018.

Worsening Funding Ratios

- **Unfunded pension liabilities generally growing for the last ≈20 years:**

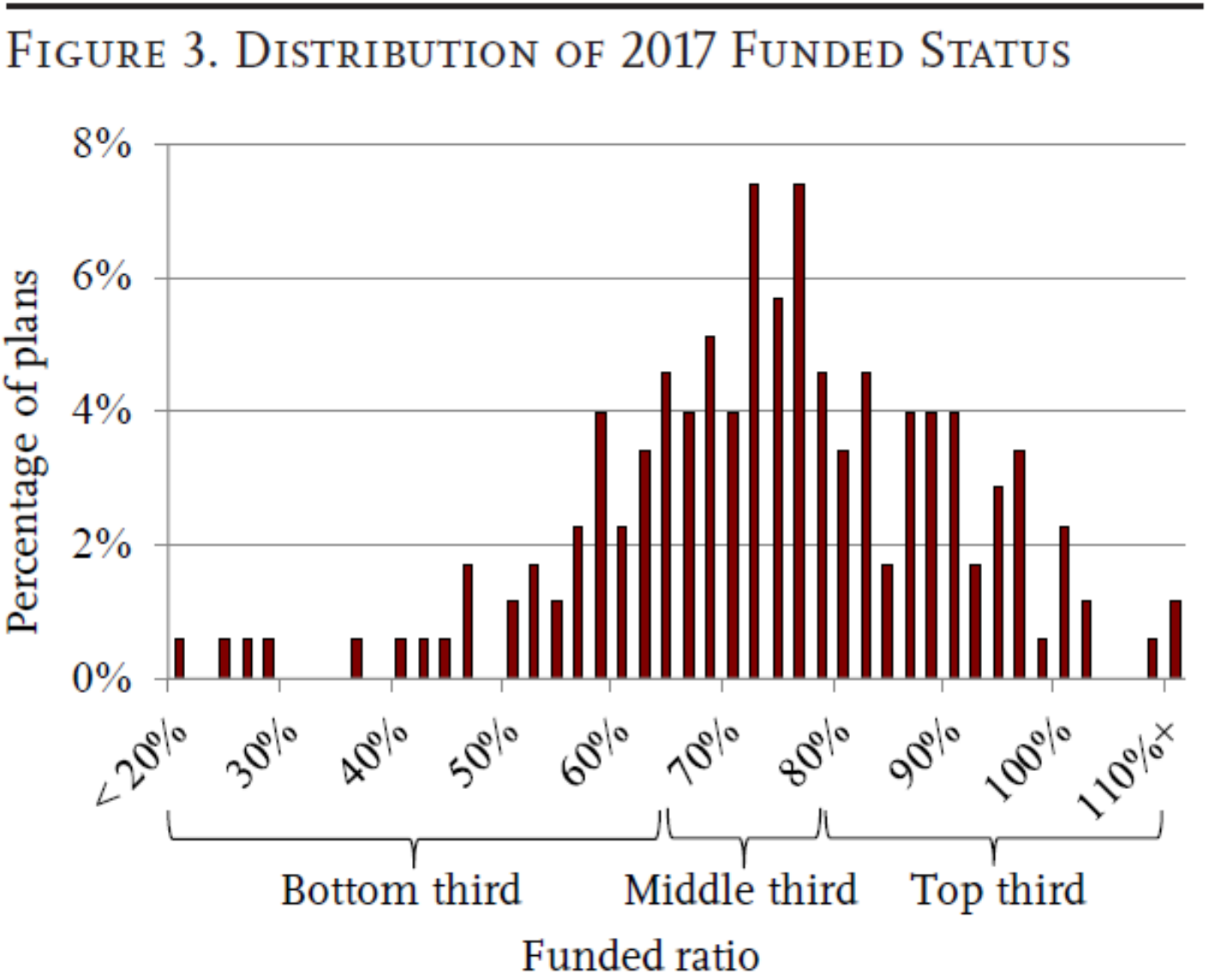
Figure 1. *State and Local Pension Funded Ratios, FY 1990-2017*



Source: Center for Retirement Research at Boston College, October 2018.

The Distribution of Worsening Funding Ratios

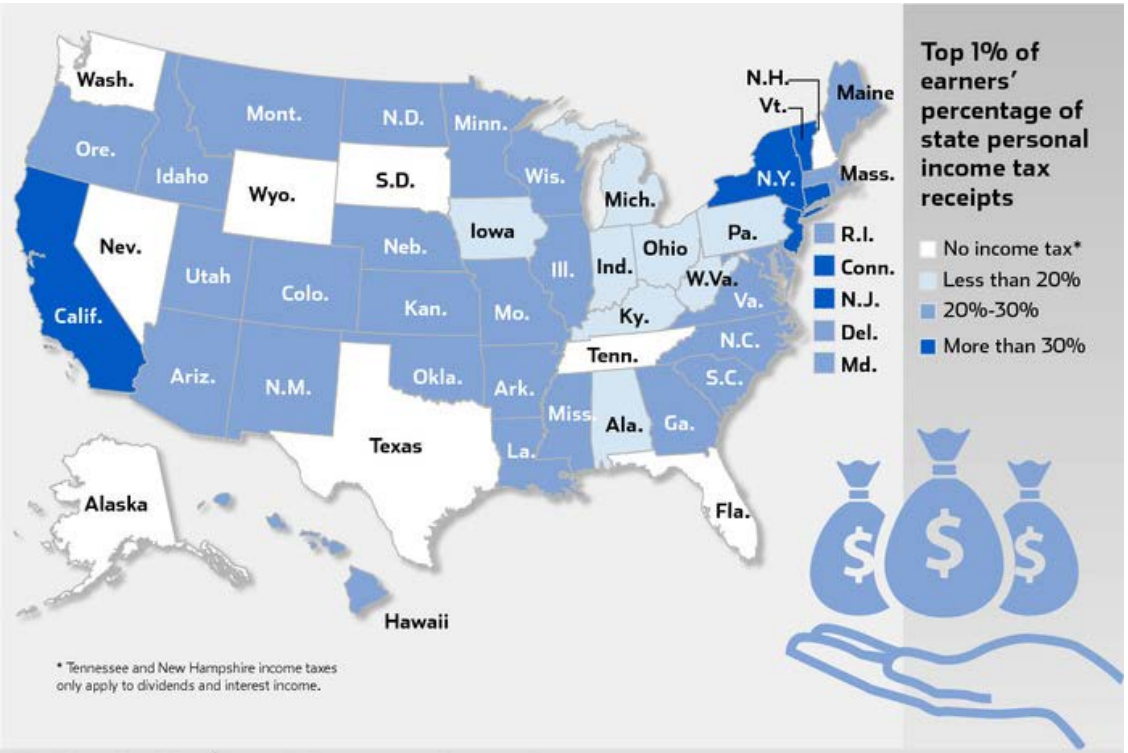
- Even more worrisome:



More investigation into the entities falling well below median

Source: Center for Retirement Research at Boston College, October 2018.

Increasing Realization: Taxing the Rich Doesn't Work



Taxing the Top | How high-earners fare in selected states

STATE	PERCENTAGE OF STATE REVENUE MADE UP BY INCOME TAXES	HIGHEST INCOME TAX RATE	INCOME LEVEL WHERE IT KICKS IN	PERCENTAGE OF INCOME TAX RECEIPTS PAID BY TOP 1%
California	43.9%	10.3%	$1 million	45%
Connecticut	49.3	6.5	500,001	40
Hawaii	28.4	11.0	200,001	20
Illinois	31.4	5.0	All income	25
Maryland	42.8	5.5	500,001	25
New Jersey	39.2	8.97	500,000	41
New York	56.7	8.97	500,001	41
Vermont	21.3	8.95	373,651	34

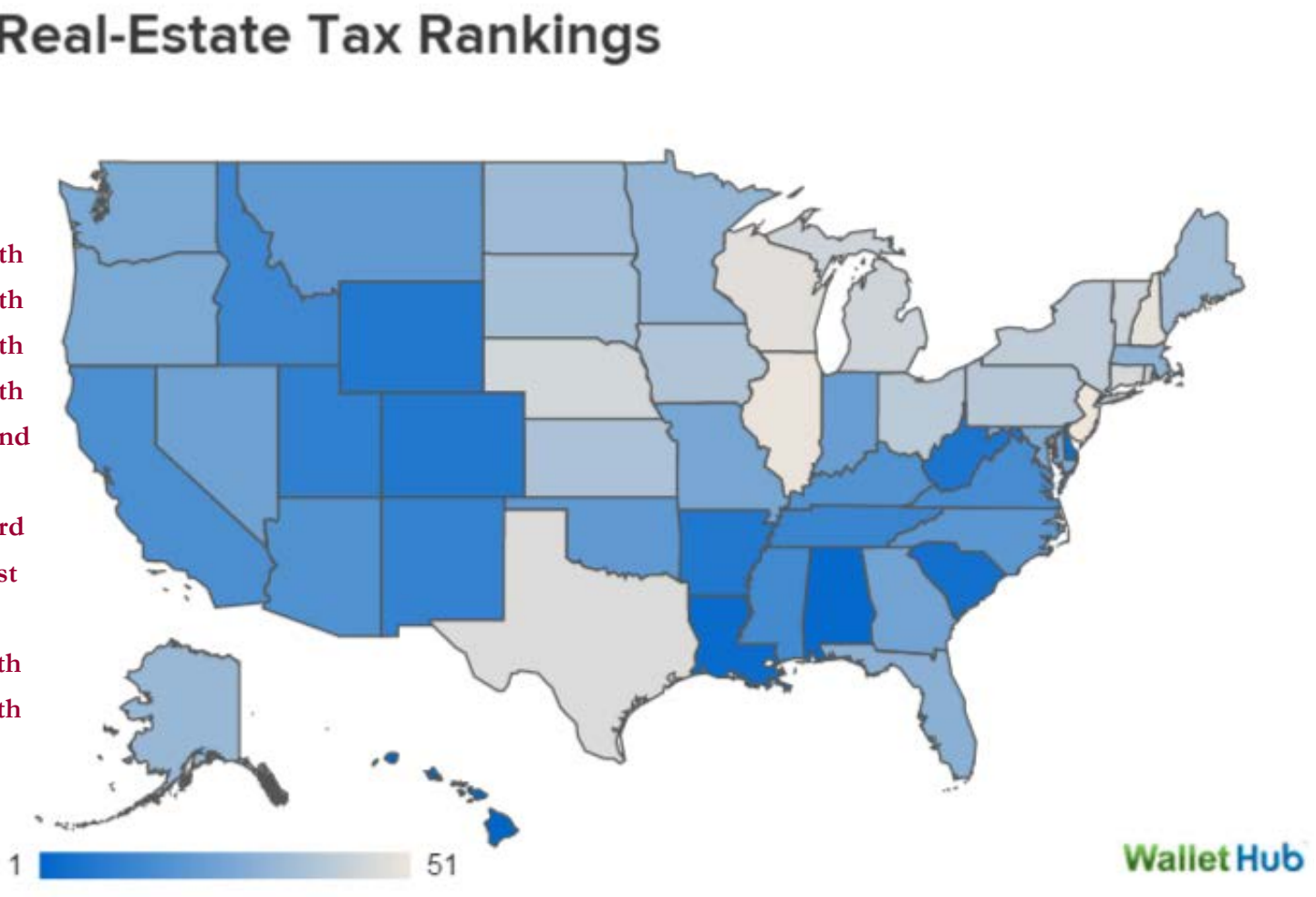
Sources: Institute on Taxation and Economic Policy; Federation of Tax Administrators; Tax Policy Center, Urban Institute and Brookings Institution

- At the state & local levels, "tax the rich" policies are increasingly problematic:
  - the income of the rich is more variable than lower brackets (27% drop in state-level personal income taxes after GFC), and
  - the rich move to other states (*e.g.*, Florida and Texas) with lower income taxes.
- Calls for "broadening the (income) tax base" will be met with political resistance.
- In order to cope, state & local authorities considering a range of service cuts &/or increasing other forms of taxation (*e.g.*, property and transfer taxes):
  - both the service cuts and the tax increases adversely affect real estate values!

- Source: Robert Frank, "The Price of Taxing the Rich," *The Wall Street Journal,* March 26, 2011

CHICAGO BOOTH

What About Property Taxes? ← Similar Story



Selected Rankings:

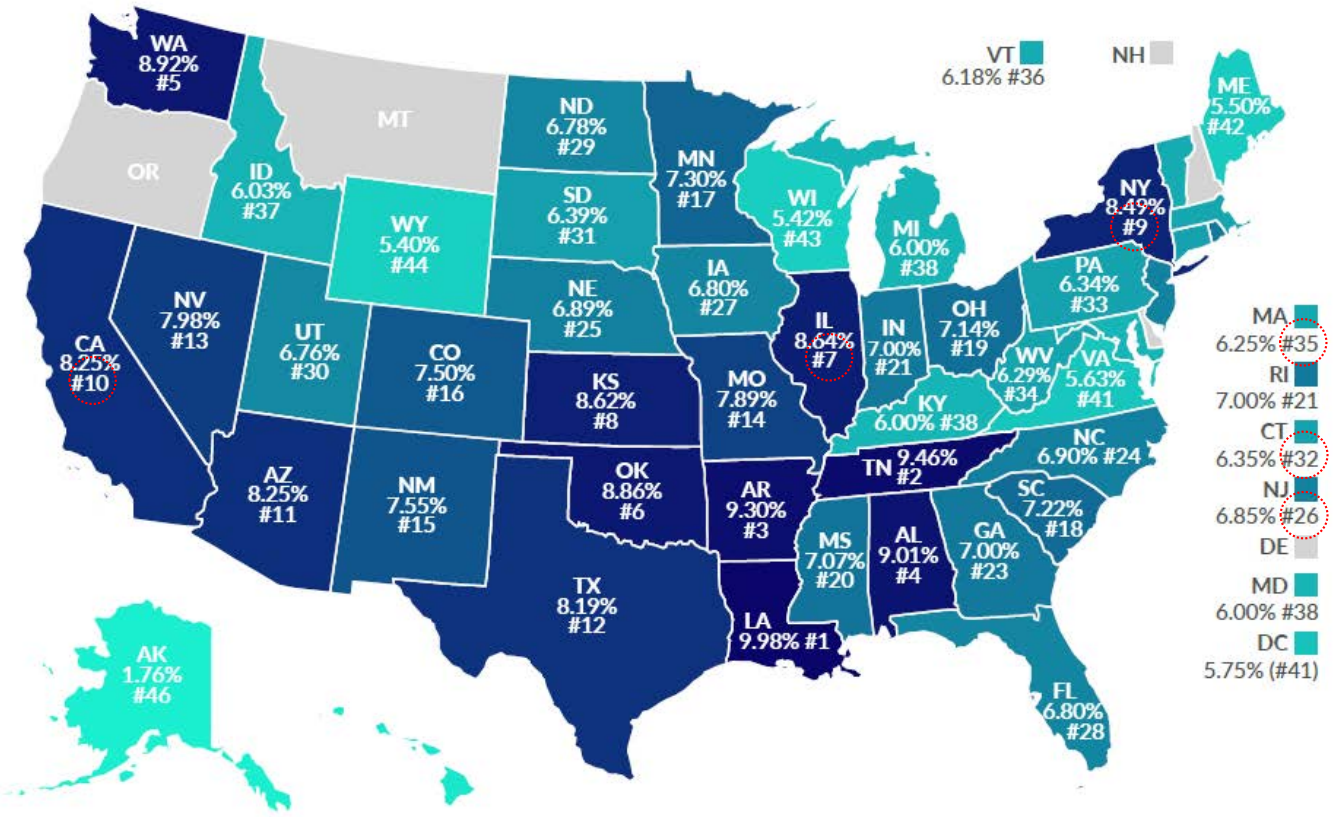
New Jersey	50th
Illinois	49th
Connecticut	47th
Texas	44th
New York	42nd
…	
Massachusetts	33rd
Maryland	31st
…	
Virginia	18th
California*	16th

*** While California ranks lowly on this list, it has its own challenges with regard to Prop 13 and other regulations.**

Combing State & Local Taxes ← Similar Story

Seems unlikely that states with challenging fiscal conditions can tax their way out of their problems.

Combined State & Average Local Sales Tax Rates, Jan. 1 2017



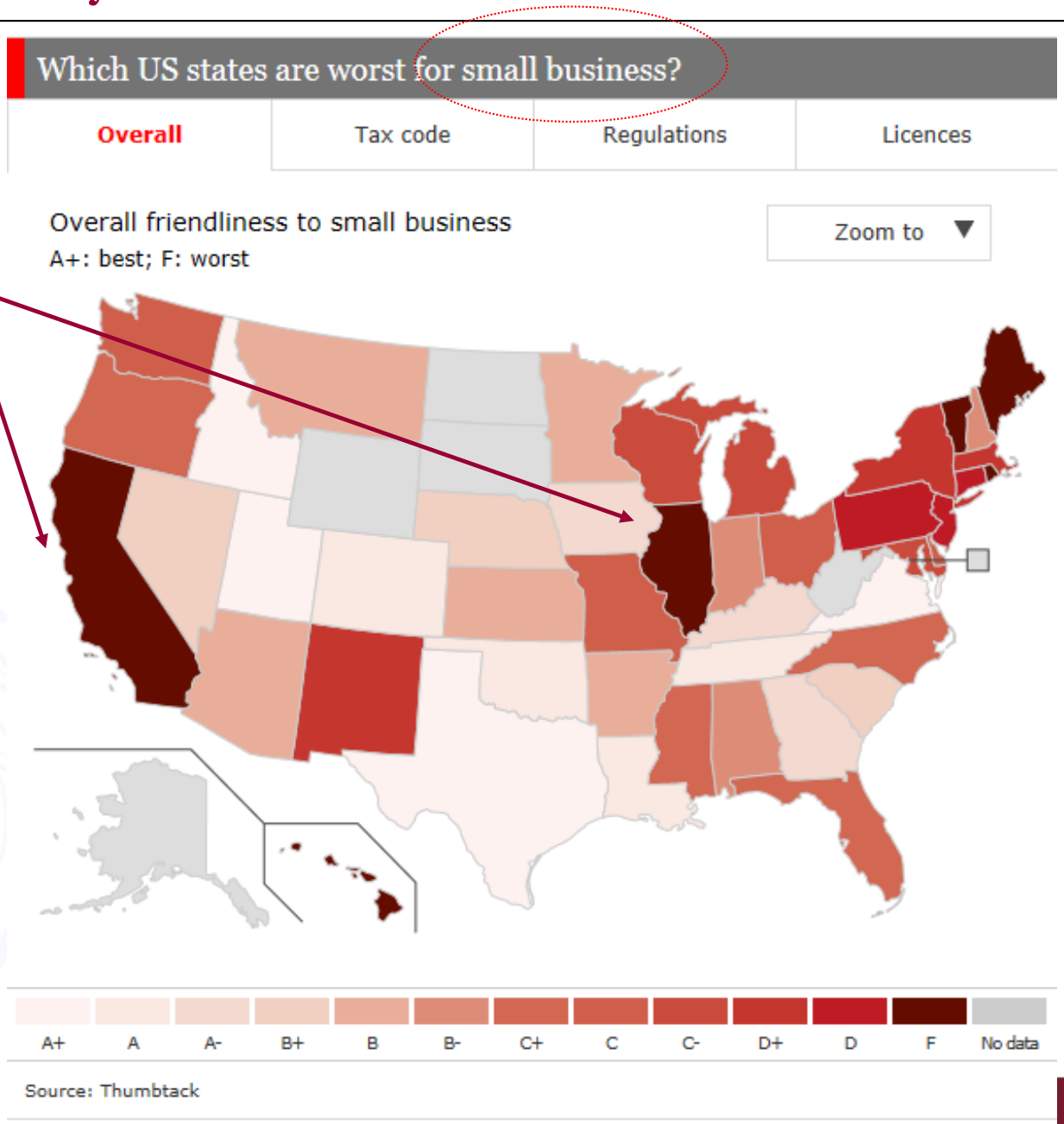
Note: City, county and municipal rates vary. These rates are weighted by population to compute an average local tax rate. Three states levy mandatory, statewide, local add-on sales taxes at the state level: California (1%), Utah (1.25%), Virginia (1%), we include these in their state sales tax. The sales taxes in Hawaii, New Mexico and South Dakota have broad bases that include many services. Due to data limitations, table does not include sales taxes in local resort areas in Montana. Salem County is not subject to the statewide sales tax rate and collects a local rate of 3.4375%. New Jersey's average local score is represented as a negative.

Source: Sales Tax Clearinghouse, Tax Foundation calculations, State Revenue Department Websites

BOOTH

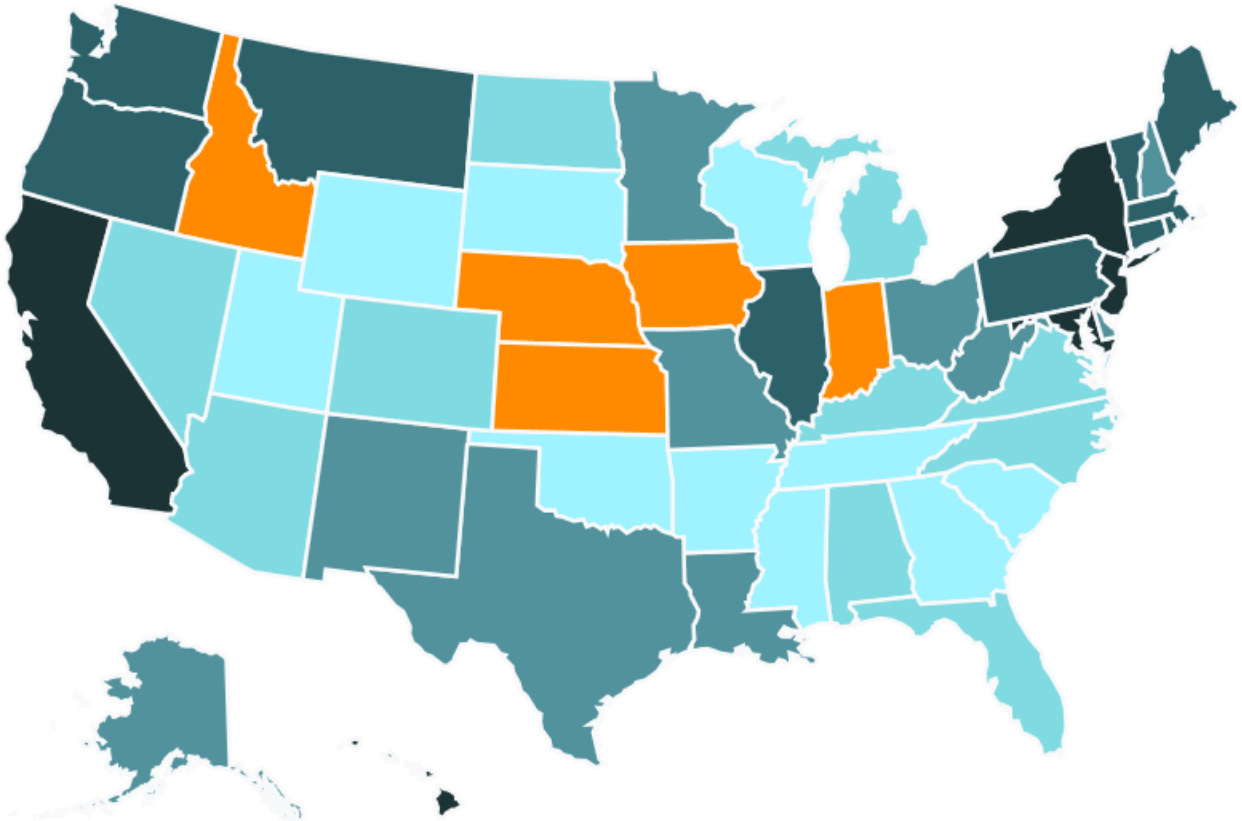
It Seems Regulatory Burden Are Associated with Finances

Not exactly the conditions that facilitate future growth!



Overall Regulatory Burden Tells a Similar Story

- As an each state's regulatory climate (liability system, property rights, health insurance, labor market, *etc.*):



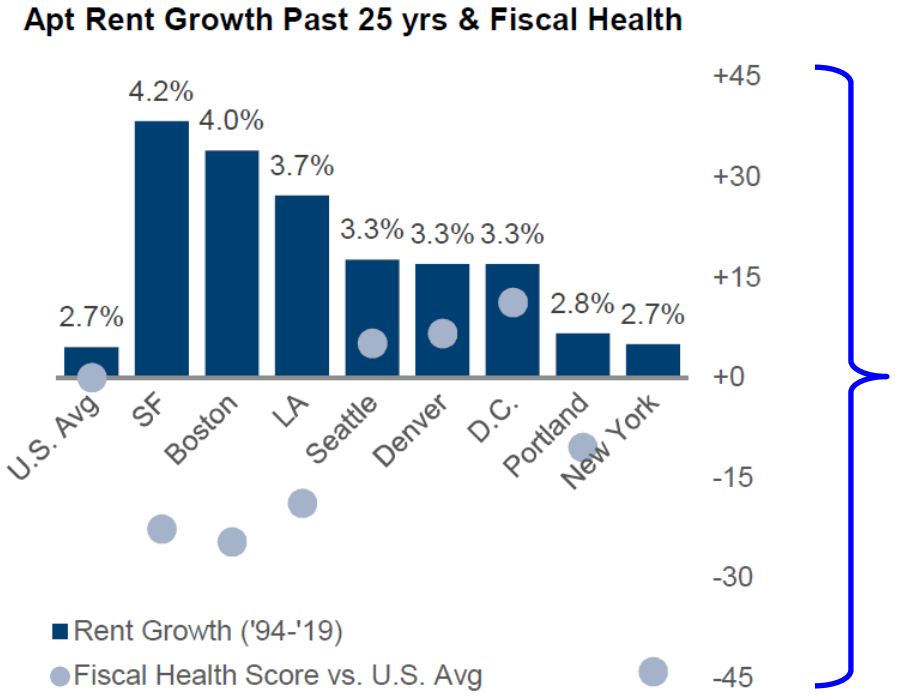
Selected Rankings:

New York	50th
New Jersey	49th
California	48th
Maryland	47th
…	
Connecticut	41st
Massachusetts	40th
…	
Illinois	38th
…	
Virginia	20th
…	

Source: Ruger and Sorens, "Freedom in the Fifty States," 5th Edition (the regulatory dimension), Cato Institute, 2018

More Regulatory Burden on the Horizon?

- Quickly growing rents in a number of "blue" cities/states has led to many of these locals to consider new/further rent-control initiatives:



Strong rent growth = *f*(strong demand, restrictive zoning/building code, challenging topography, *etc.*)

Rather than loosen zoning/building code (and creating concerns about negative externalities (*e.g.*, more congestion)), the political answer is often rent control.

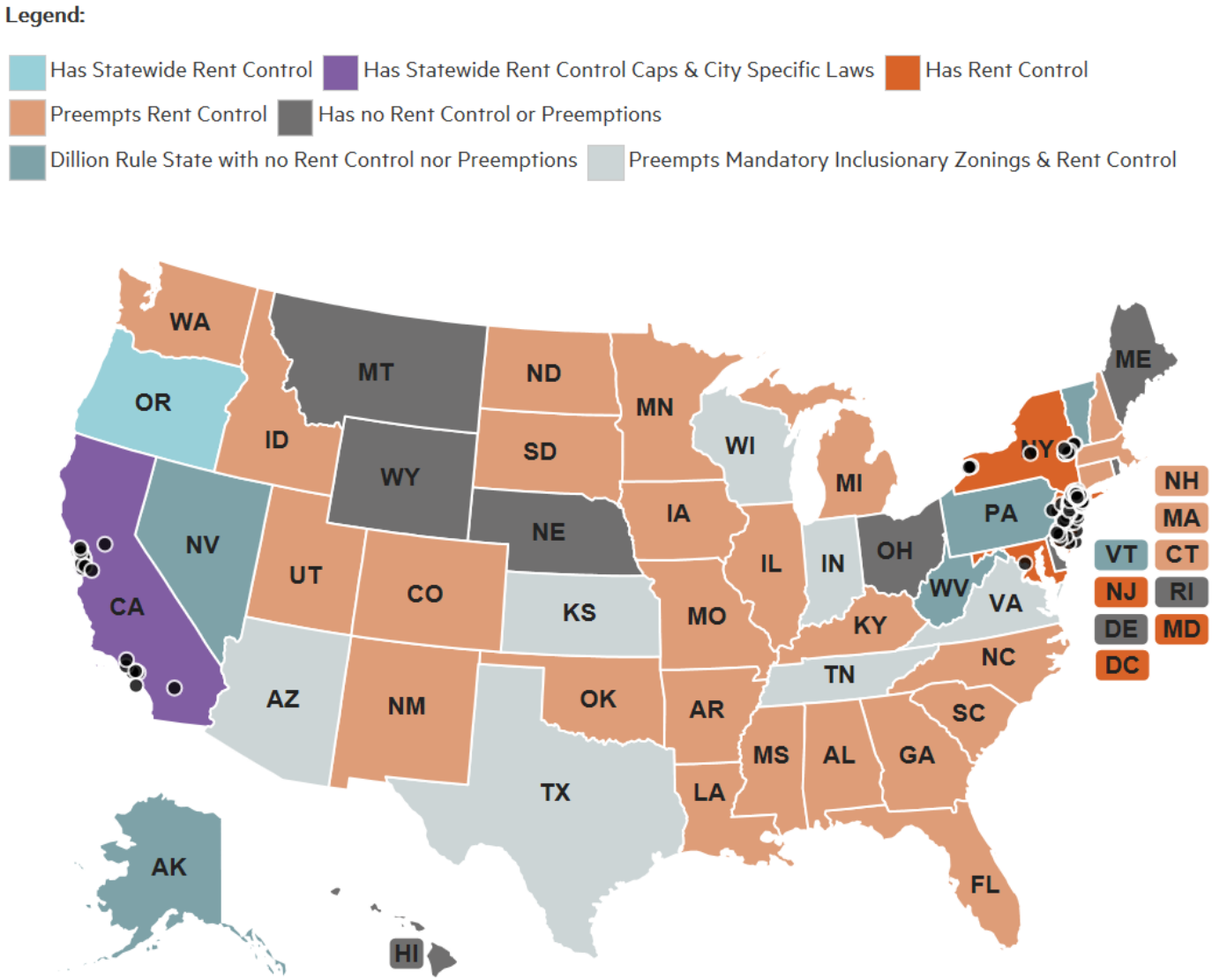
Source: "Big City Blues," Green Street Advisors, May 9, 2019.

- NYC: A Precursor of things to come?
  - Revised (2019) rent control law (applies to ≈ 50% of the units or ≈ 1 million units) provides, among other matters, no increase in rents due to capital improvements.
  - Climate Mobilization Act (2019) penalizes office buildings with greenhouse gas emissions > 8.5 kg CO_2e/s.f. by 2024 and > 4.5 kg CO_2e/s.f. by 2030.

Blackstone's moratorium on cap ex at Stuy Town

A Particular Regulatory Burden: Rent Control

State & Local Rent-Control Positions



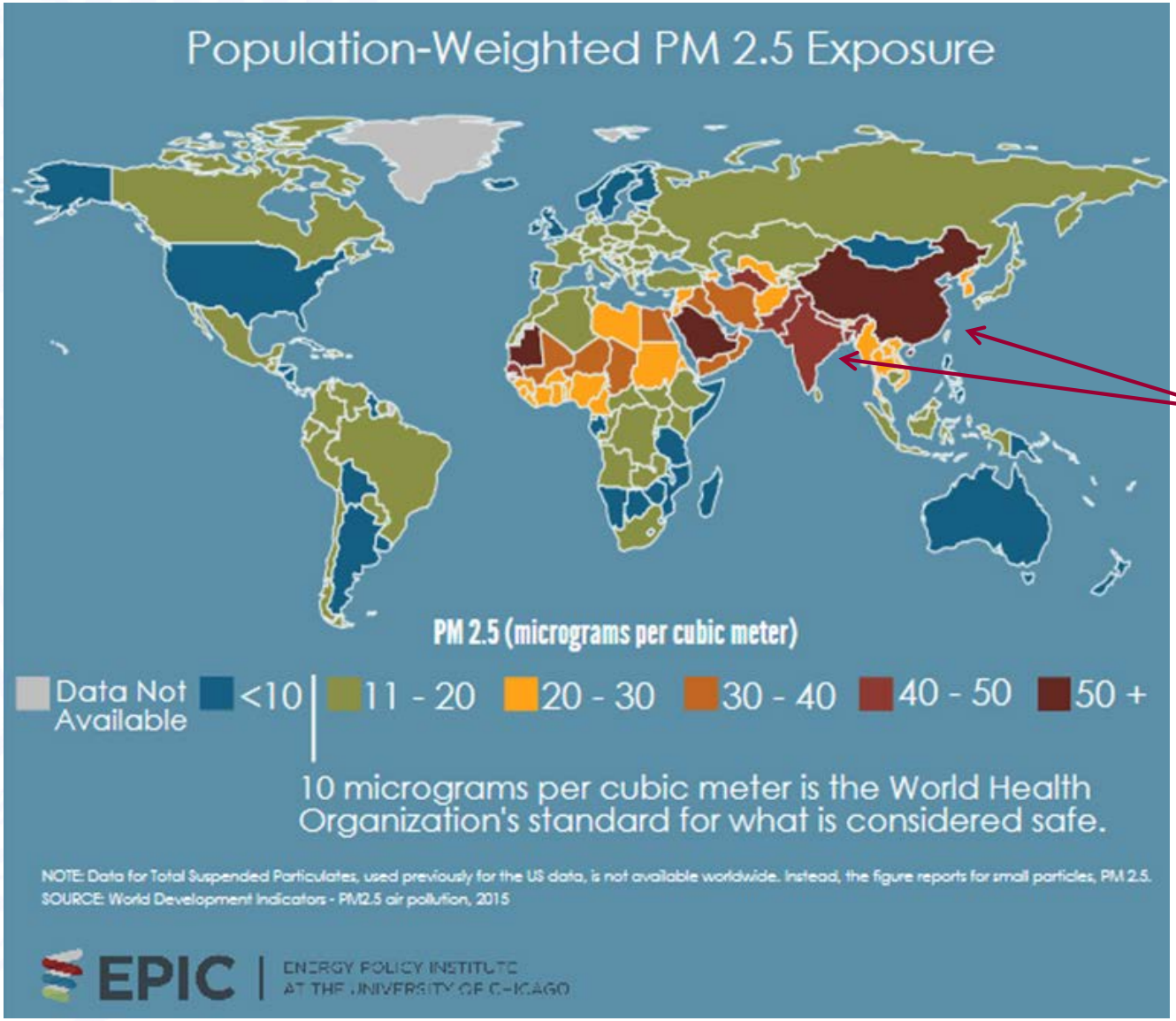
Rent Control:	
Boston	No
New York	Yes
Washington, D.C.	Yes
Chicago	No
Los Angeles	Yes
San Francisco	No*
…	
Portland (OR)	Yes
San Jose	Yes
Seattle	No
…	

* Subject to statewide cap of CPI + 5% (with max of 10%)

Source: National Multifamily Housing Council, "Rent Control by State," September 20, 2019.

Climate Change: Looking Beyond the U.S.

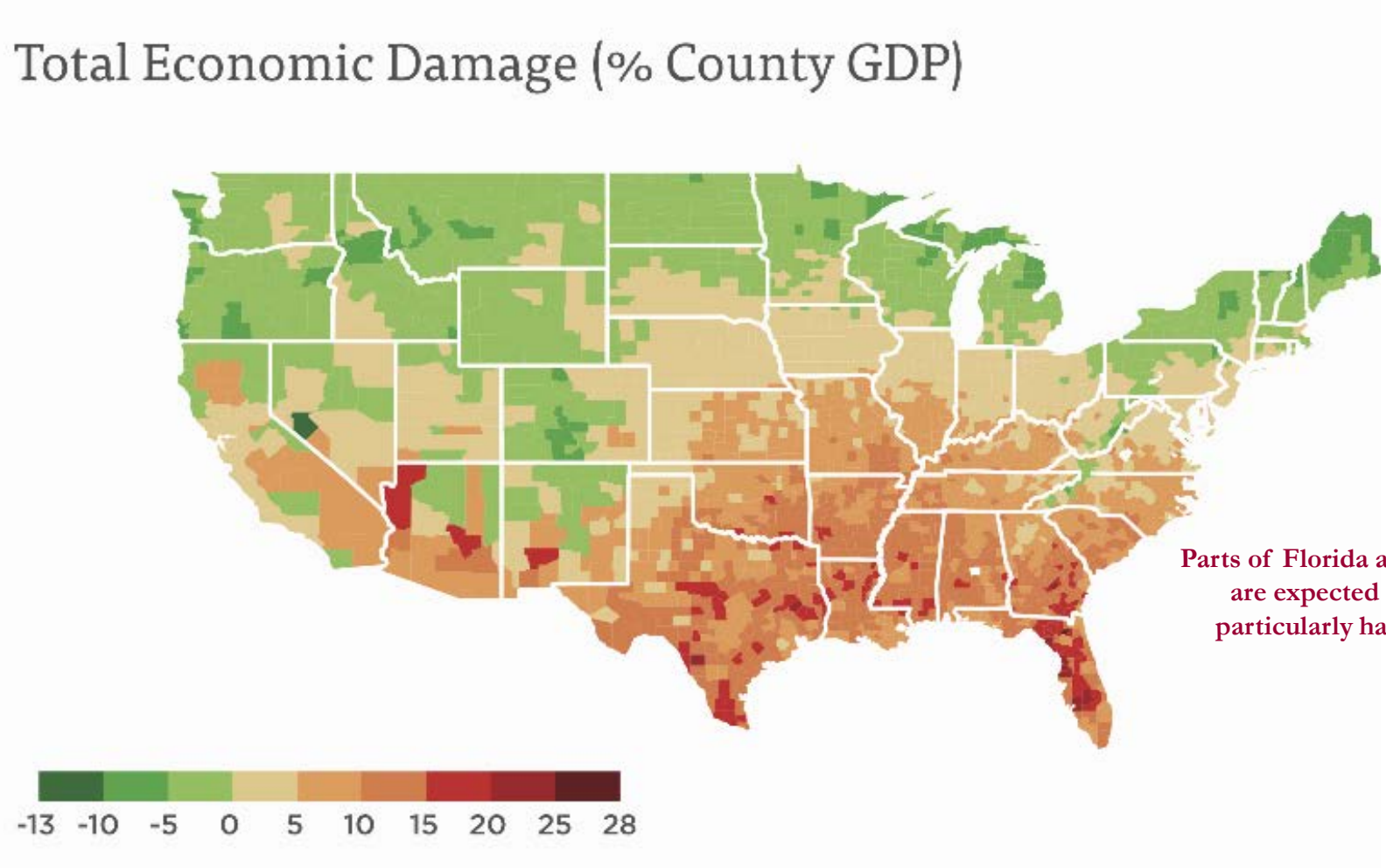
- However you handicap the likelihood of the U.S. adopting (some variation of) the "new green deal," India and China hold the key *wrt* global pollution:



The most-populous countries (> 50% of the global population) also have among the highest pollution per capita!

Climate Change: Looking within the U.S. → Varying Impacts

- **Consider the differences in estimated economic impacts: south *v.* north, coastal *v.* non-coastal, *etc.*:**



Parts of Florida and Texas are expected to be particularly hard hit!

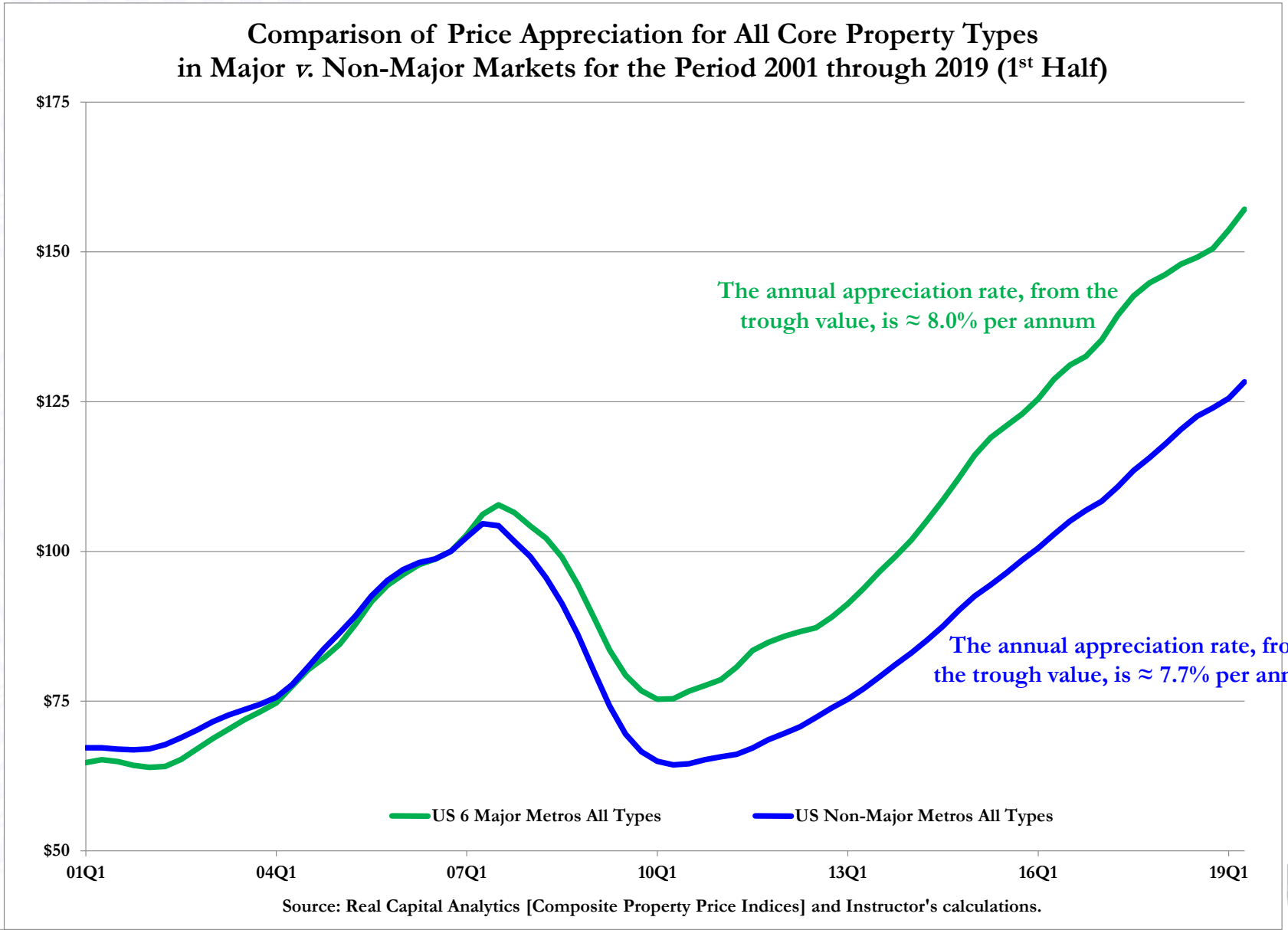
Source: Solomon Hsiang *et al*, "Estimating Economic Damage from Climate Change in the United States, ***Science***, pp. 1362-1369, June 30, 2017.

A Mispriced Risk: State & Local Finances?

- What Does Theory Suggest?:
  - The equilibrium condition
  - The search for "alpha"
  - Consider some examples
- A Closer Look at Theory:
  - Equivalent Sharpe ratios
  - Returns $=f(CF_0/P_0, g, \ldots)$
  - Indifference Curve
- Risk Factors & (Mis)Pricing?:
  - Pricing
  - Fiscal Solvency
  - Business Climate
  - Climate Change
- Trends ← Gateway *v.* Non-Gateway: Cap Rates & Appreciation:
  - Growth in Asset Values
  - Changes in Cap Rates

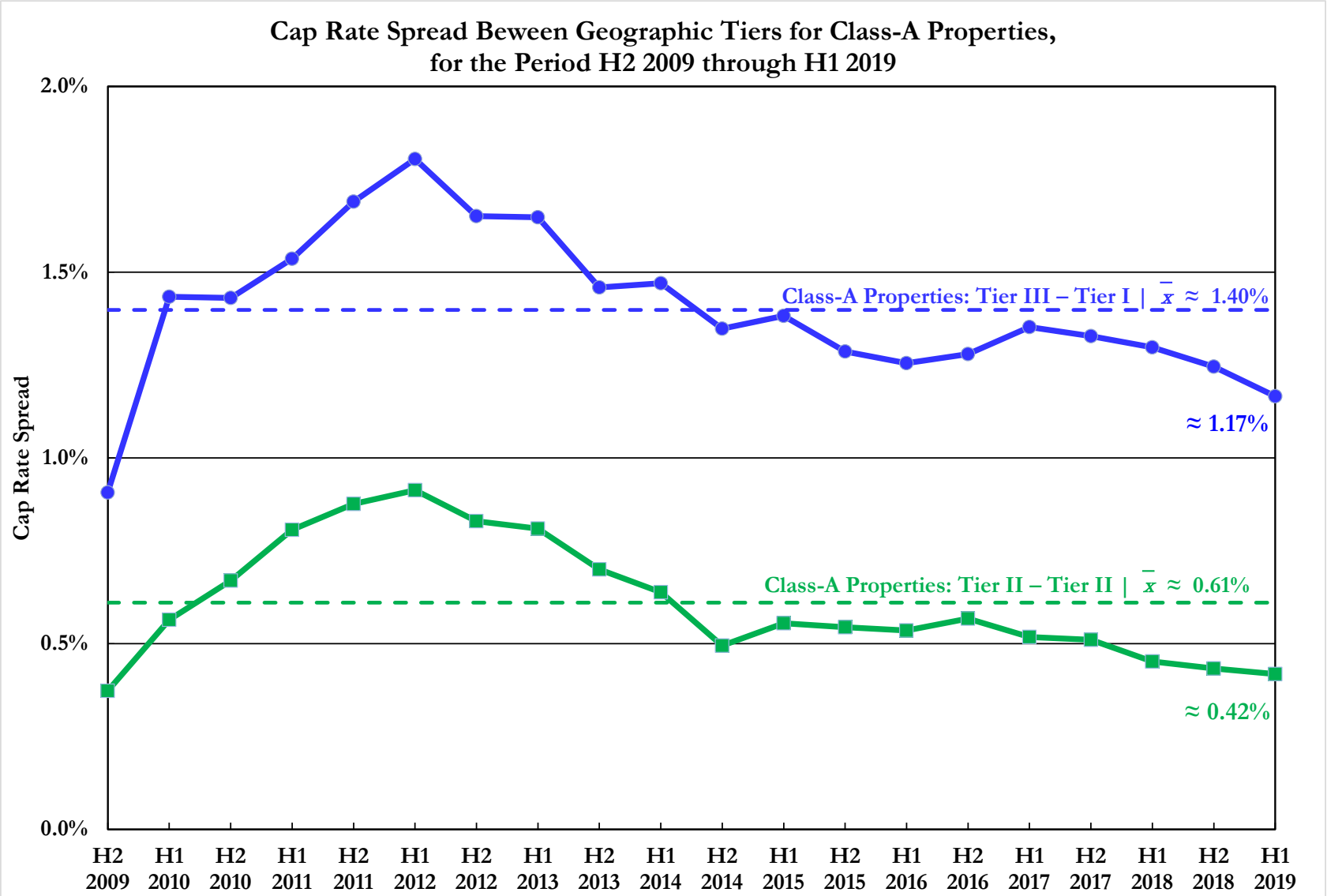
Price Changes by Gateway *v.* Non-Gateway

- Since-trough appreciation returns are roughly identical:



Cap Rate Trends: Class-A Properties

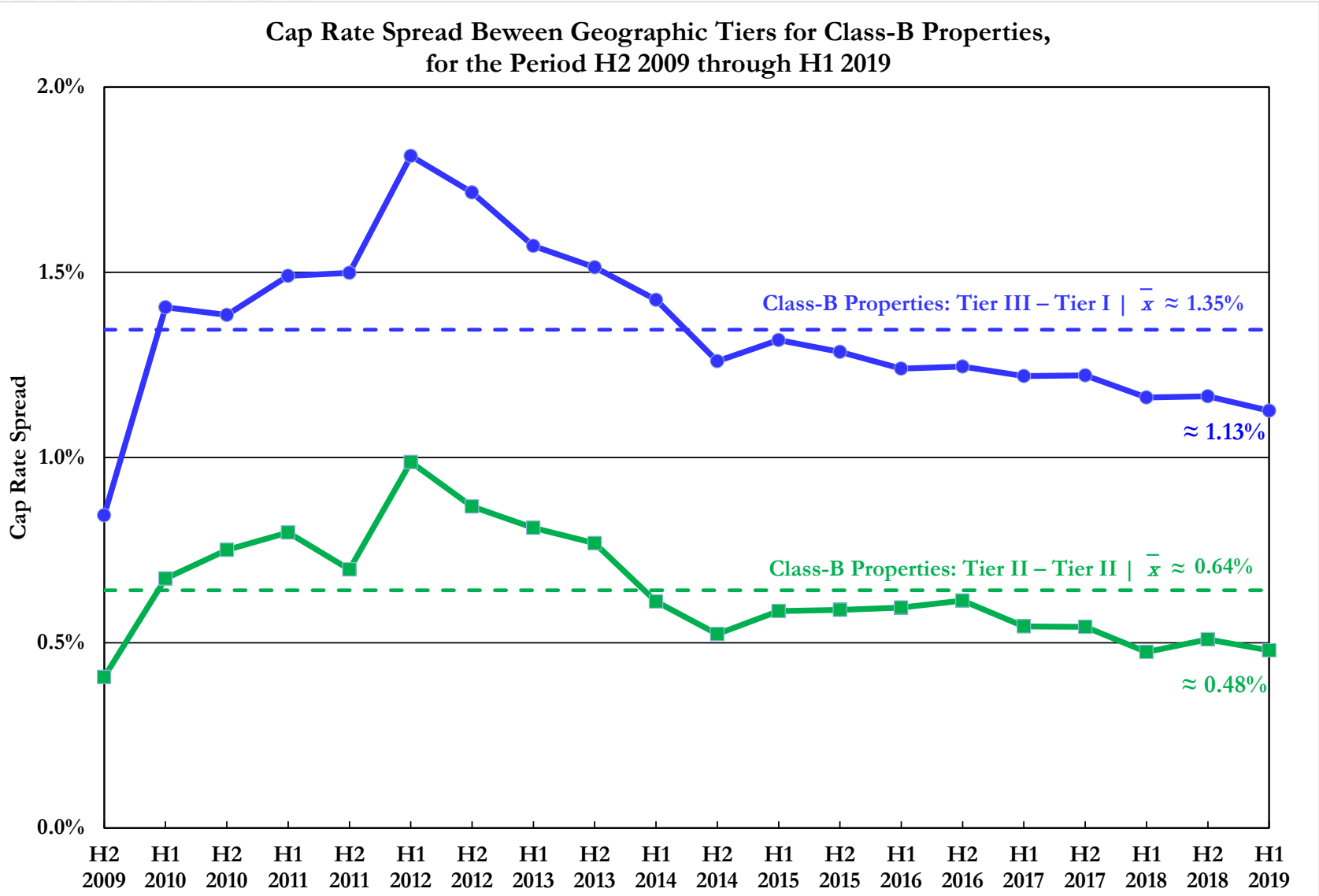
- Cap-rate spreads, by geographic tiers, seem to be narrowing:



Sources: CBRE North American Cap Rate Survery | First Half of 2019 and Instructor's calculations.

Cap Rate Trends: Class-B Properties

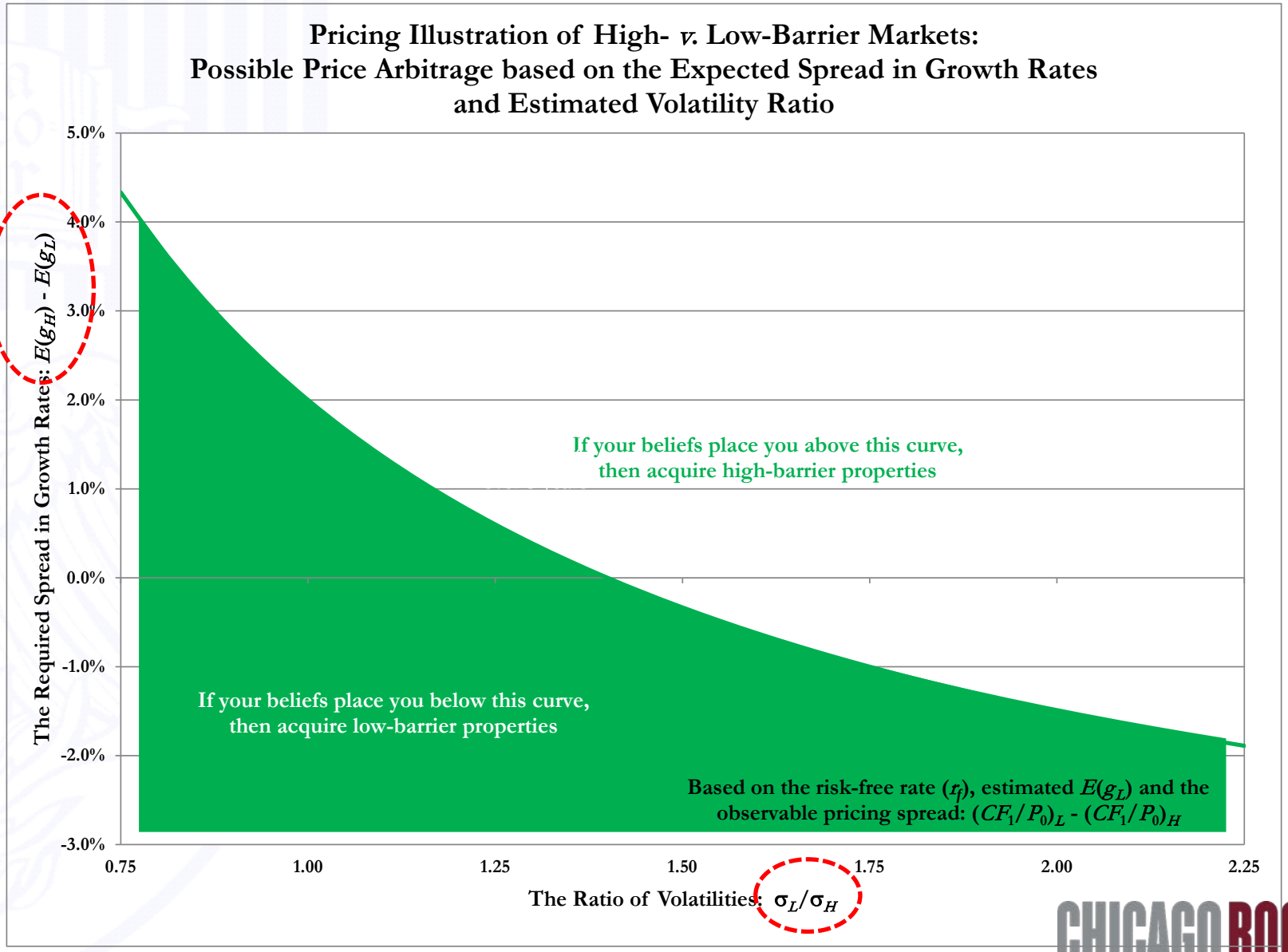
- Cap-rate spreads, by geographic tiers, also seem to be narrowing:



Sources: CBRE North American Cap Rate Survery | First Half of 2019 and Instructor's calculations.

Redux: Identifying the Indifference Curve

- Given "observables," we can identify the key unobservable factors:



CHICAGO BOOTH