

# **Real Estate's Contribution to Portfolio Risk and Return in the New World Financial (Dis)Order**

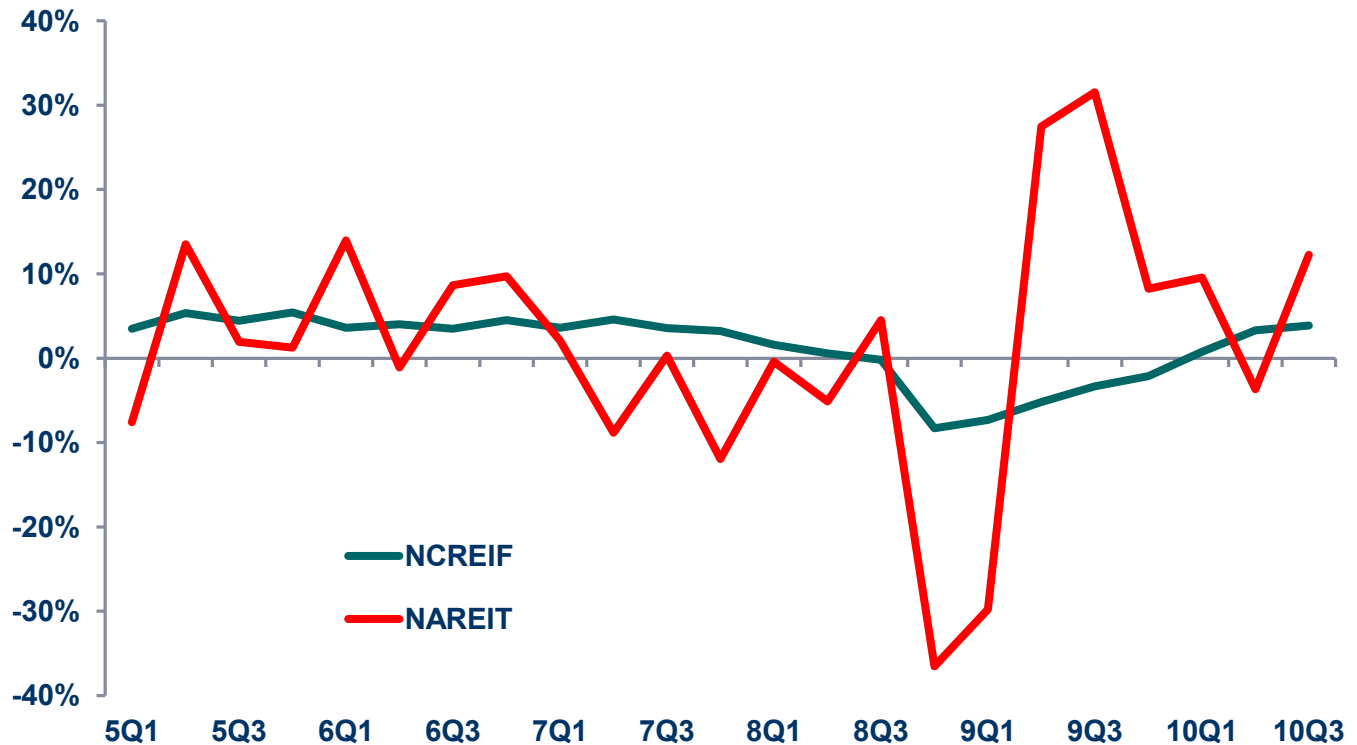


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**September 29, 2011**

# Real Estate – Separate But Equal

- Private
  - Appraisal-based pricing – illiquid and less volatile
  - Lumpy ownership – you cannot buy 150 s.f. of office to rebalance
  - Nonstandard documentation
  - Acting on insider trading legal
  - Unknown risk and return metrics
  - Allocations and decisions done the old fashioned way
- Public
  - Auction-based pricing – liquid & more volatile
  - Share-based ownership – observable pricing
  - Acting on Insider information illegal
  - Known risk and return metrics
  - Portfolio managers can manage risk

# Public Versus Private Real Estate Returns



# What Happened During Bubble?

- Both public and private real estate enjoyed “favored” nation status.
  - Pricing out of line with intrinsic demand
  - Appraisers accepted irrational buyers with inexpensive capital as a basis for “clearing” price
    - Cap rates (eg spreads over risk free rate) fell to record lows – driving up prices
    - However, today on the opposite side of the cycle they are not willing to accept asymmetrical pricing, especially in U.S.
  - Luckily cycle was more a capital, not a supply-driven, cycle in many global markets unlike past cycles

# So Along Comes August 2007 and the Bubble Bursts.....

- REITs and REOCs were also caught up in the stampede:
  - Volatility for all asset classes increased
  - Correlation between all asset classes also increased during the Great Recession
- In some real way public real estate probably overreacted as much as private real estate under reacted
  - Perhaps you should just split the difference and call it a day

## But That's Only Part of the Story

- Let's assume that listed property returns are comprised of two simple components plus an error term (noise):

$$\text{Listed Returns} = \text{Unobservable Real Estate Returns} + \text{Stock Market Influence} + \text{Error Term}$$

- The two independent variables are not orthogonal - linkages through the real economy:
  - Credit market
  - Feedback of household income, employment, etc.
- Private real estate valuation just quarantines itself: listed companies do not have that luxury.
- But what if you could isolate the latter effect via REIT's correlation with the larger market (S&P500)?

## “Stripped” REIT Series

- Turn previous equation around, and estimate “unobservable” real estate
- Such that:

$$S = R - (\text{CORR}(R, M) * \frac{\sigma_R}{\sigma_M}) * M$$

S	= Stripped REIT(“Unobservable”) Returns
R	= REIT Listed Returns
(CORR(R,M) * ...)	= Estimated Beta
M	= Market Returns (S&P500)

- Estimate Beta over some appropriate time period, average over a number of time periods, or provide direct estimates of correlation and standard deviations which you can get directly from the Northfield risk models

# Goal

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**Calculate correlation and risk of “true unobservable” real estate returns relative to the general market using *ex ante* estimates**



## Steps

- Estimate series of rolling two year weekly betas starting in 1995 for REITs against the S&P
- Calculate “stripped” series using regression betas for 2007:7 to 10/29/2010 as well and the rolling two year forward periods such that:

$$S = R - (\text{CORR}(R, M) * \frac{\sigma_R}{\sigma_M}) * M$$

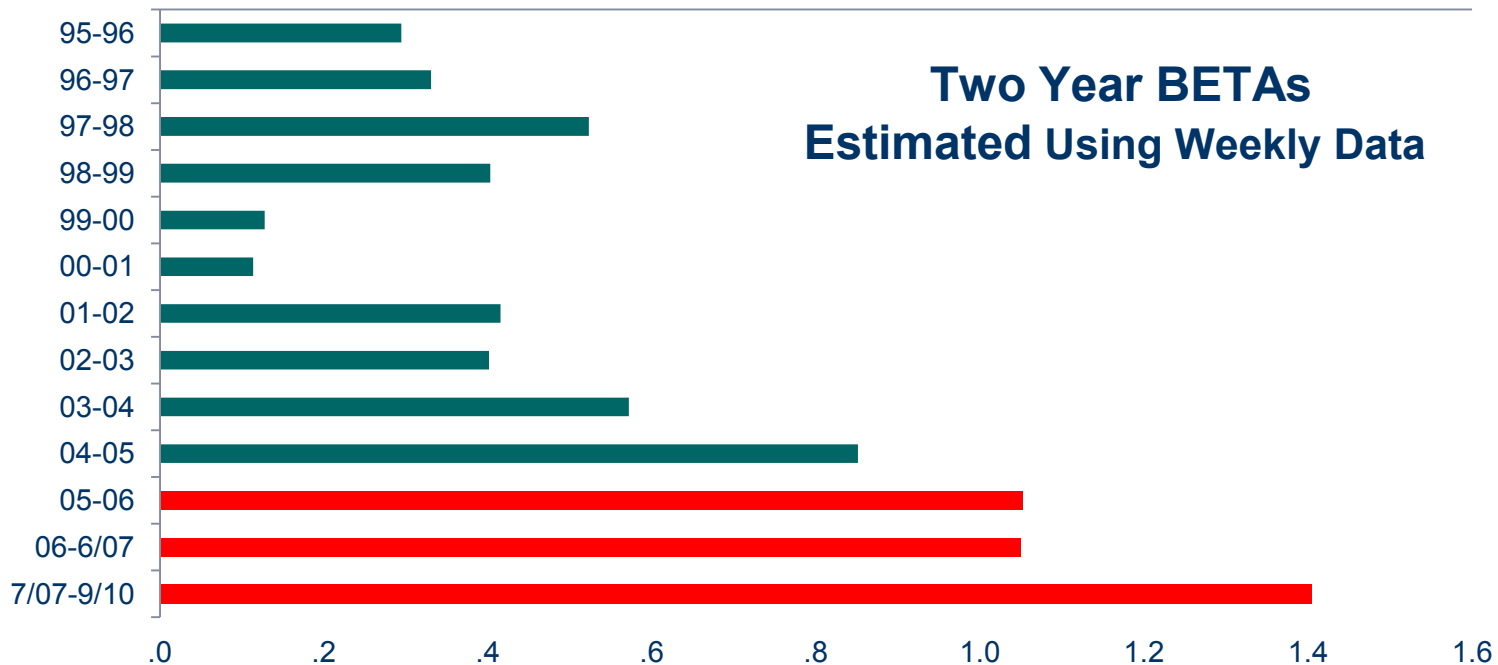
## Steps (con't)

- Total of 11 weekly regressions starting in 95:
  - 95-96
  - 96-97
  - Last one 08-June 09
- With stripped series in hand calculate and compare:
  - $\text{Corr}(s,m)$  to  $\text{Corr}(r,m)$
  - Standard deviation of the Stripped Returns to Reits

# Empirical Results

- REIT's relationship with the general market has not held steady over the past 15 years
- During the "Great Recession" and its associated de-gearing, correlation between REITs and the market increased
  - As expected – Fewer, if any, lifeboats on this Titanic
  - Correlations consistently lower for stripped series
  - Lowest during recent "crisis" period
- Standard deviations also behaved similarly with one exception 97-98
  - High-tech bubble?

# REIT's Relationship with Market Changed During the Financial Crisis



# Correlations Reduced:

WEEKLY	STRIPPED CORRELATIONS			
	JULY 2007 - OCT 2010		TWO YEAR FORECAST	
	NAREIT	S&P	NAREIT	S&P
95-96	.99	.72	.95	.58
96-97	.99	.71	.93	.47
97-98	.97	.64	.70	-.55
98-99	.99	.68	.78	.46
99-00	1.00	.77	.99	.45
00-01	1.00	.77	.84	-.01
01-02	.98	.68	.93	.16
02-03	.99	.69	.97	.32
03-04	.97	.62	.94	.36
04-05	.90	.46	.87	.15
05-06	.82	.31	.79	.26
06-6/07	.83	.32	.80	.29
Avg	.95	<b>.61</b>	.87	<b>.24</b>

# Standard Deviations Reduced

HISTORIC 2-YEAR			JULY 2007 - OCT 2010			ROLLING TWO YEAR FORECASTS		
STANDARD DEVIATIONS			STANDARD DEVIATIONS			STANDARD DEVIATIONS		
WEEKLY DATA	ACTUAL NAREIT	FITTED STRIPPED	WEEKLY DATA	ACTUAL NAREIT	FITTED STRIPPED	WEEKLY DATA	ACTUAL NAREIT	STRIPPED FORECAST
95-96	0.97	0.88	95-96	6.28	5.48	95-96/97-98	2.12	1.81
96-97	1.24	1.06	96-97	6.28	5.39	96-97/98-99	2.23	1.98
97-98	2.12	1.73	97-98	6.28	4.93	97-98/99-00	1.77	2.07
98-99	2.23	1.94	98-99	6.28	5.21	98-99/00-01	1.96	1.77
99-00	1.77	1.73	99-00	6.28	5.92	99-00/01-02	2.09	1.89
00-01	1.96	1.95	00-01	6.28	5.96	00-01/02-03	1.88	1.58
01-02	2.09	1.69	01-02	6.28	5.18	01-02/03-04	2.05	1.79
02-03	1.88	1.58	02-03	6.28	5.21	02-03/04-05	2.24	1.99
03-04	2.05	1.77	03-04	6.28	4.83	03-04/05-06	2.20	1.79
04-05	2.24	1.90	04-05	6.28	4.29	04-05/06-07	2.45	1.95
05-06	2.20	1.67	05-06	6.28	4.01	05-06/07-08	5.91	3.72
06-6/07	2.45	1.66	06-6/07	6.28	4.01	06-7/07 TO 7/07-12/08	6.65	3.72
Avg	1.93	1.63	Avg	6.28	5.03	Avg	2.79	2.17

# Results Reinforced By Northfield's Risk Model

- Ran a risk decomposition report over six time periods using Northfield's Fundamental Model
  - Comparison between portfolio of market cap-weighted U.S. REITs versus every stock in the Fundamental Model minus REITs
  - Calculate correlation between REITs and stocks ex-REITs over selected time periods

Date	R-Squared	Corr(R,M)
July 31, 1997	.41	.64
July 31, 1998	.33	.57
July 31, 2000	.30	.54
July 31, 2003	.55	.74
July 31, 2008	.67	.82
September 30, 2010	.87	.93

*Lower correlations likely due to the presence of smaller firms that are less closely tied to the economy than larger cap firms in the S&P or REITs*

# Practical Applications

- Investors with REITs and private equity real estate:
  - To protect their bricks and mortar position short REITs as crisis begins - no practical way to sell physical properties in the short-run
  - The amount of the short depends on:
    - The “risk” to the bricks and mortar portfolio (cash flow, refinancing, etc.) in conjunction with your “estimate” of stripped returns and correlation going forward
    - This needs to be in addition to whatever rebalancing that you do with your existing REIT portfolio
    - The opposite is true in a bull market
- REIT-only investors can gain better exposure to pure real estate returns by shorting the S&P against their REIT position effectively getting rid of non-real estate effects:



# Pure REIT Hedge

$\hat{\rho}$  = Expected Corr(REITS, Market)

$\hat{\gamma}$  = Expected  $\frac{\sigma(\text{REITS})}{\sigma(\text{Market})}$

Hedge =  $\hat{\rho} * \hat{\gamma}$

## What about Brazil?

- Created monthly Brazilian REIT and Equity Indices:
  - October 2005 to July 2011
  - Market cap-weighted
  - Benchmark: All Brazilian securities in Northfield's Global Model
  - Portfolio: All Publically Traded REITs in Brazil for which Northfield had coverage

## Data Limited Analysis

- Instead of 60 month betas – 24 month betas:

October 2005 to September 2007

April 2006 to March 2008

October 2006 to September 2008

April 2007 to March 2009

October 2007 to September 2009

April 2008 to March 2010

- Forecast: April 2010 to July 2011

# Investible Universe



## Benchmark

- October 2005:
  - 430 Securities - Market Capitalization: \$B 409.3
- July 2011
  - 530 Securities - Market Capitalization: \$B 2,457.8

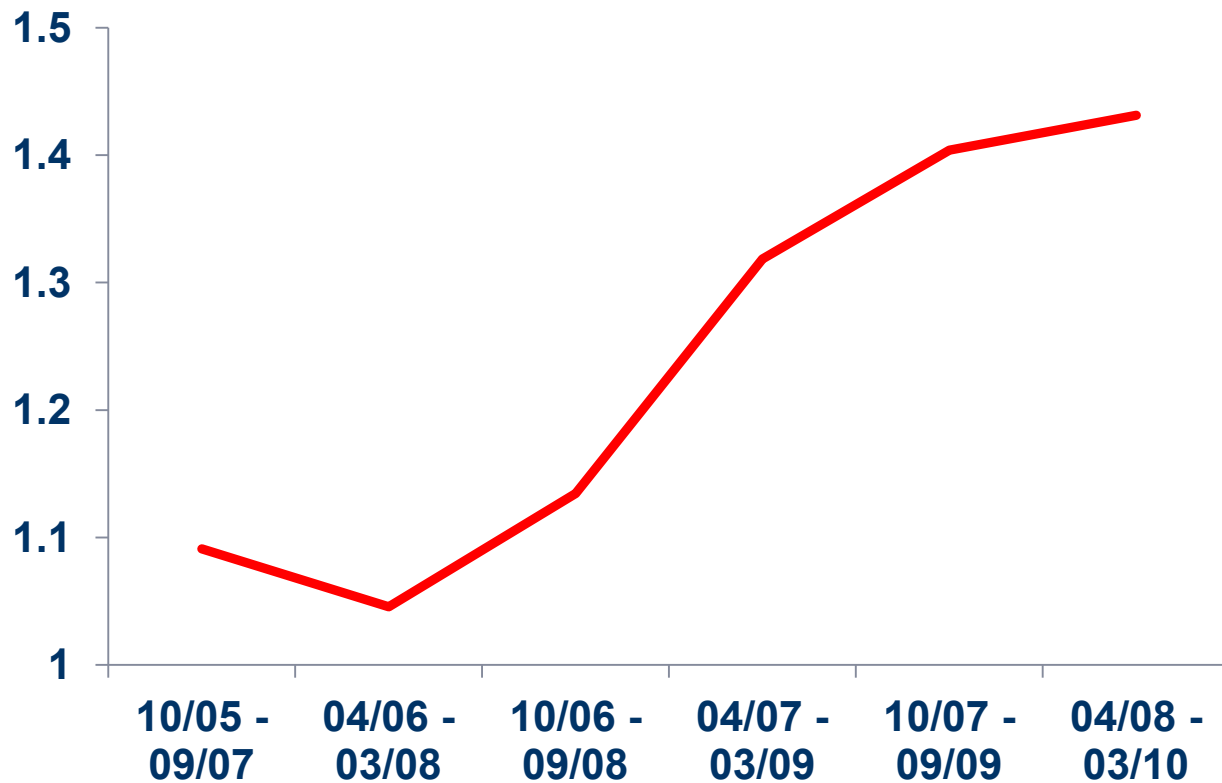


## REITS

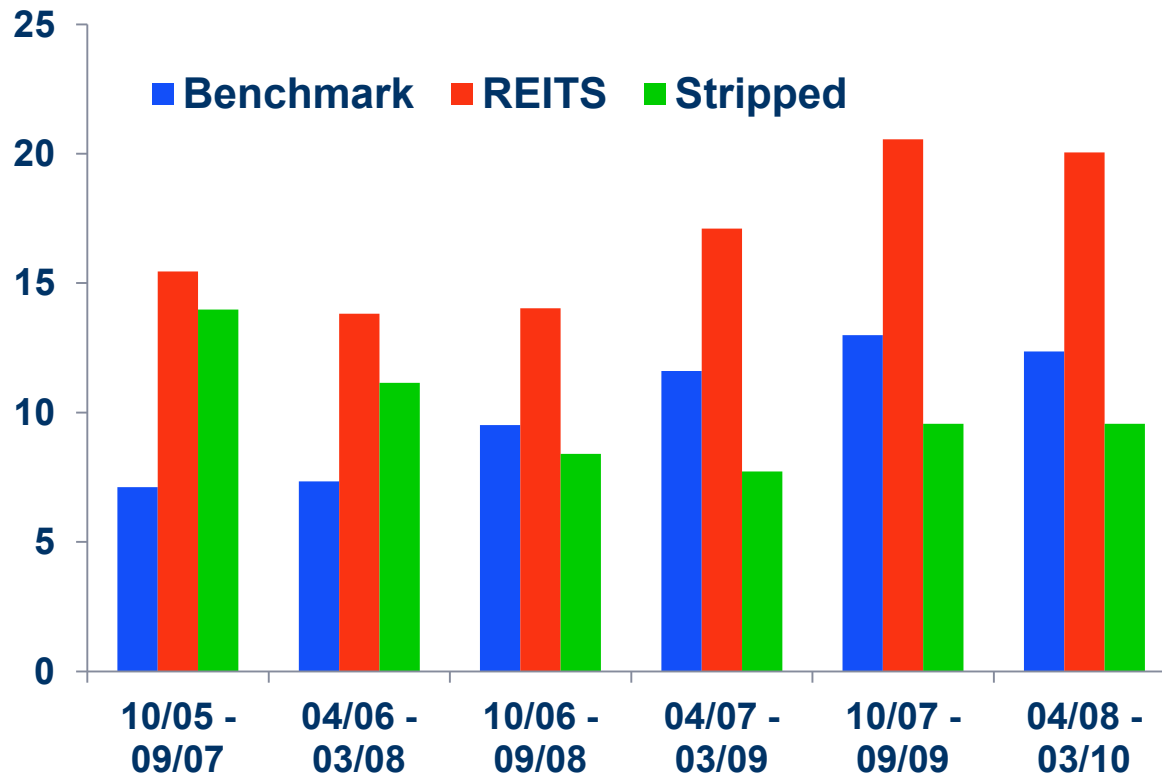
- October 2005\*:
  - 1 Security - Market Capitalization: \$B 1.2
- July 2011
  - 20 Securities - Market Capitalization: \$B 39.1

**\*CYRELA BRAZIL REAL COM NPV**

# Upwardly Trending Betas



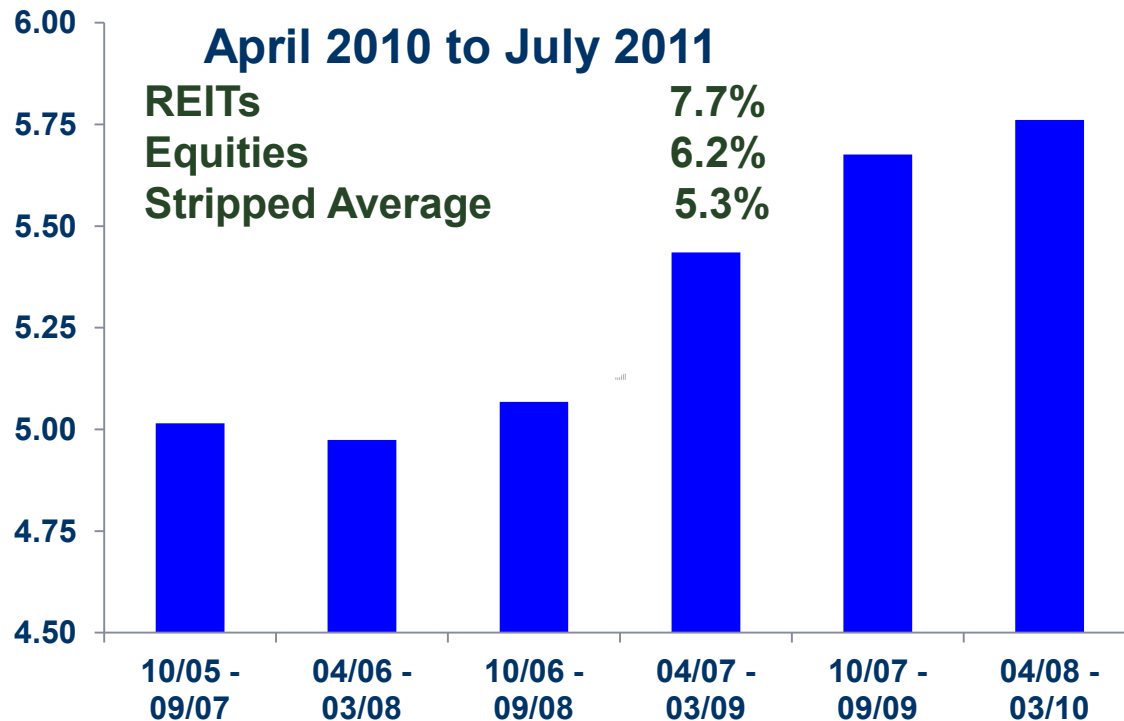
# “Stripped” Standard Deviations Reduced



# Forecasted Correlations Reduced

<b>STRIPPED CORRELATIONS</b>		
<b>April 2010 to July 2011</b>		
	<b>Stripped/Equities</b>	<b>Stripped/REITS</b>
<b>10/05 - 09/07</b>	<b>-0.17</b>	<b>0.50</b>
<b>04/06 - 03/08</b>	<b>-0.12</b>	<b>0.55</b>
<b>10/06 - 09/08</b>	<b>-0.22</b>	<b>0.46</b>
<b>04/07 - 03/09</b>	<b>-0.42</b>	<b>0.27</b>
<b>10/07 - 09/09</b>	<b>-0.49</b>	<b>0.18</b>
<b>04/08 - 03/10</b>	<b>-0.51</b>	<b>0.16</b>
<b>AVERAGE</b>	<b>-0.32</b>	<b>0.35</b>
<b>CORR(REITS,Equities) = .77</b>		

# “Stripped” Forecasted Std Devs Less Than REITs or Benchmark





## Brazilian Results

- Results for Brazil similar to that of the U.S.
- “Stripped” REITs consistently exhibit lower volatility and correlations than their “unstripped” counterparts:
  - Both *ex post* and *ex ante*
- Data restrictions constrain analysis
  - Limited sample size and limited duration
- Still some insights helpful for investors in today’s market

## Next Steps

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- Investigate importance of leverage
  - Introduced bond and interest rate series but no significance in initial findings
- Extend research to additional non-U.S. REIT markets using Northfield's Global REIT and risk models
  - Approach also should be fungible across other assets classes

## References

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- Giliberto, S. Michael. "Measuring Real Estate Returns: The Hedged REIT Index," Journal of Portfolio Management, 1993, v19(3), 94-98.
- Liang, Youguo and James R. Webb. "The Hedged REIT Index And Mixed-Asset Portfolios," Journal of Real Estate Portfolio Management, 1996, v2(1), 55-61

# Conclusions

- REIT returns consist can be divided into two components:
  - “Unobservable” or true real estate returns
  - Market-influenced returns
- Effects are not orthogonal and have links to the real economy
  - Bifurcated returns influence optimal allocations:
    - Across asset classes
    - Within real estate
- Possible to profile these “stripped” returns and gain a sense of how they behave across time and over the cycle
  - From this comes several potential portfolio allocation strategies
- Evidence suggests that “stripped” returns are less volatile and less correlated than REIT benchmark and provide a helpful hedging tool for both private and public real estate investors