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

Richard B. Gold
June 3, 2011

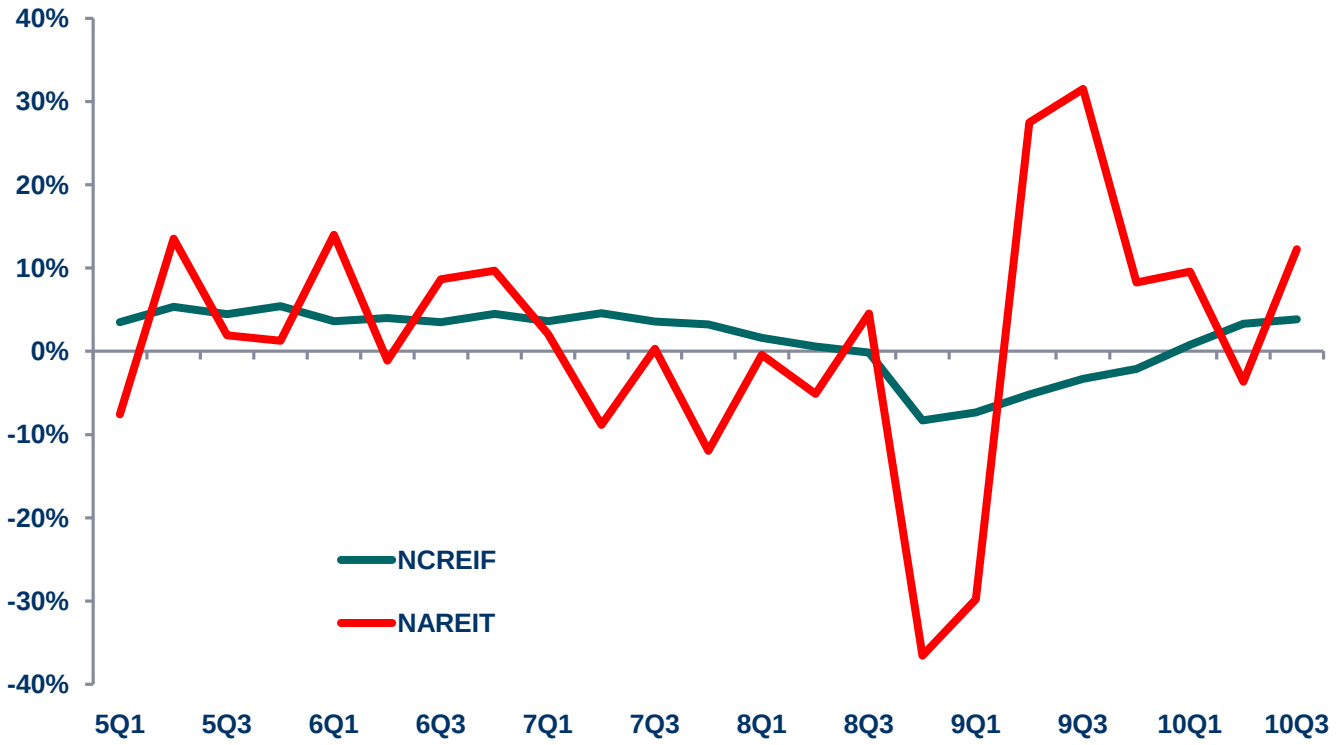
Northfield
INFORMATION SERVICES, INC.

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
  - Acting on Insider information illegal
  - Known risk and return metrics
  - Portfolio managers can manage risk

Northfield
INFORMATION SERVICES, INC.

Public Versus Private Real Estate Returns



Northfield
INFORMATION SERVICES, INC.

What Happened During Bubble?

- Both public and private real estate enjoyed "favored" nation status.
  - Pricing was 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 this was more a capital, not a supply-driven, cycle in many global markets unlike past cycles

Northfield
INFORMATION SERVICES, INC.

So Along Comes August 2007 and the Bubble Bursts……

- REITs and REOCs were caught up in the stampede:
  - Volatility for all asset classes increased
  - Correlation between asset classes also increased during the Great Recession and its aftermath
- 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

Northfield
INFORMATION SERVICES, INC.

But That's Only Part of the Story

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

  Listed Returns = Unobservable Real Estate Returns + Stock Market Influence + Error Term

- The two independent variables are not orthogonal because of 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

- Turning the previous equation around, we estimate "unobservable" real estate returns as REIT returns less the product of Beta times Market Returns
- Such that:

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

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

- You can estimate Beta using 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

Northfield
INFORMATION SERVICES, INC.

Goal

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

Northfield
INFORMATION SERVICES, INC.

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:

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

Steps (con't)

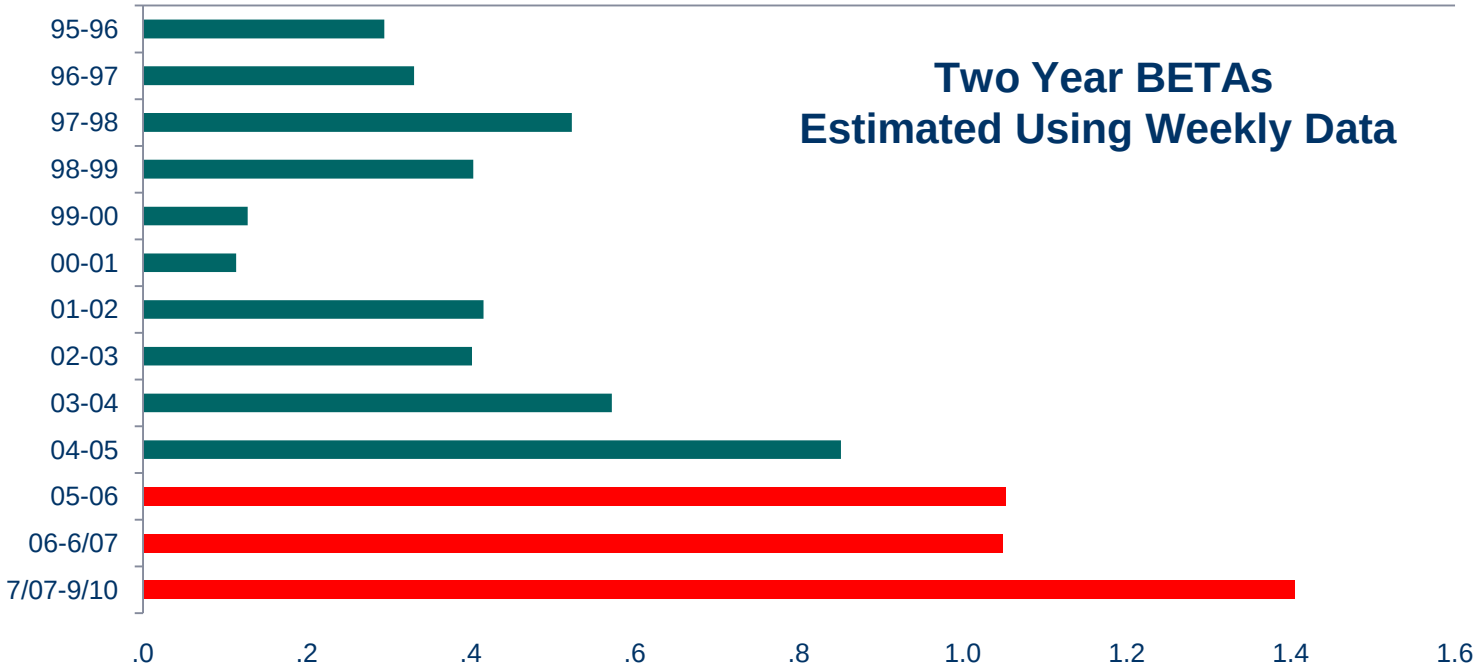
- Total of 11 weekly regressions starting in 95:
  - 95-96
  - 96-97
  - Last one 08-June 09
- With stripped series in hand calculate and compare:
  - Corr(s,m) to Corr(r,m)
  - Standard deviation of the Stripped Returns to Reits

Empirical Results

- REITs 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 – There were even fewer, if any, lifeboats on this voyage of the 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?

Northfield
INFORMATION SERVICES, INC.

REIT's Relationship with Market Has Changed During This Cycle



Northfield
INFORMATION SERVICES, INC.

Correlations Reduced:

	CORRELATIONS			
	JULY 2007 - OCT 2010		TWO YEAR FORWARD	
WEEKLY	NAREIT/S&P	FITTED STRIPPED S&P	NAREIT/S&P	FITTED STRIPPED 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*	*.61*	*.87*	*.24*

Northfield
INFORMATION SERVICES, INC.

Standard Deviations Reduced

HISTORIC 2-YEAR STANDARD DEVIATION				JULY 2007 - OCT 2010 STANDARD DEVIATION				ROLLING TWO YEAR FORECASTS STANDARD DEVIATION		
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*

Northfield
INFORMATION SERVICES, INC.

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 you would short REITs as the 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:

Northfield
INFORMATION SERVICES, INC.

Pure REIT Hedge

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

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

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

Next Steps

- Investigate importance of leverage
  - Introduced bond series but no significance in initial findings
- Extend research to non-U.S. REIT markets using Northfield's Global REIT model and risk models
  - Approach should be fungible
  - Initial test for Canada reinforces U.S. results

Northfield
INFORMATION SERVICES, INC.

References

- Chatrath, Arjun. "Can We Hedge REIT Returns?," Real Estate Finance, 1999, v15(4,Winter), 78-85.
- 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

Northfield
INFORMATION SERVICES, INC.

Conclusions

- REIT returns consist of a true “unobservable” real estate component and a market-influenced component
  - Effects are not orthogonal because they are both impacted and linked to the real economy
  - Bifurcated returns influence optimal allocation:
    - 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