Chapter 27:
Real Estate Investment Management Part II:
Performance Attribution & Evaluation

Chapter 27 Learning Objectives

- What is meant by investment "performance attribution" at both the "macro-property level" and the portfolio level;
- How to quantify segment "allocation" versus asset "selection" effects in a portfolio's differential performance relative to an appropriate benchmark;
- What is meant by formal, quantitative investment performance evaluation, and the role of this function in the relationship between investment managers and their investor clients;
- The nature of manager "custom benchmarking" in the private real estate asset class, and how this differs from corresponding practices in the public securities investment industry.

Chapter 27 Outline:

Introduction

27.1 Macro-level Investment Performance Attribution

- 27.1.1 Macro property level performance attribution
- 27.1.2 Portfolio level performance attribution
- 27.1.3 The use of a *benchmark* in performance attrib.
- 27.1.4 The case for using mgr alloc wts in the bnchmk

27.2 Investment Performance Evaluation & Benchmarking

- 27.2.1 The basic idea...
- 27.2.2 Benchmarks in the private R.E. asset class
- 27.2.3 Matching evaluation, responsibility, & auth.
- 27.2.4 The problem of statistical significance
- 27.2.5 Implications of the lack of stat. significance
- 27.2.6 Adjusting for risk

27.3 Conclusions

Macro-Level Investment Policy Analysis:

- ***Strategic*** **Investment Decision Making:**
  - **Long-run objectives & plan:**
  - **Chapter 21 (Portf Theory) ⇐** ***Basic methodology.***
  - **Chapter 22 (Equilibr Models) ⇐** ***Rational expectations to apply MPT.***

- ***Tactical*** **Investment Policy:**
  - **Short/medium term actions (opportunistic):**
  - **Chapter 22 (Equilibr Models) ⇐** ***Find mis-priced assets.***

- ***Policy Implementation:***
  - **Investment management:**
  - **Chapters 26 & 27 (Perf. Attrib., Benchmarking).**
  - **Chapter 22 (Equilibr Models) ⇐** ***Risk-adjustment for perf. Attrib.***
  - **Most relevent for private direct investment**
  - **Also relevant for REIT mgt to consider, as REITs can be viewed as mgrs of direct priv R.E. investments on behalf of stockholders.**

What is "*Benchmarking*" ?

DEFINITION:
The formal (quantitative) *comparison* of a given investment agent's (or portfolio's) investment performance with that of a suitably defined index or peer group, over a specified time period.

EXAMPLE:
- **A large-cap stock manager is "benchmarked against the S&P500"…**
- **Manager averages a 10% return over a 3-yr mgt contract period…**
- **S&P500 averages 12% over the same period…**
- **Manager has some "*explaining*" to do.**

What is
"*Performance Attribution*" ?

DEFINITION:
The *decomposition* of the total investment performance into additive components so as to "attribute" the total performance to sources that may reflect various investment management *functions*.

EXAMPLE:
- **Manager 10% vs NCREIF 12%, but…**
- **If mgr had allocated among different property types in same proportion as NCREIF Index, then mgr would have earned 13%:**

➔ Mgr relative good at individual asset *"selection"*;
➔ Source of poor relative performance must be *"allocation"* across property type market segments.

Some historical Perspective…

- **MPT (1950s & 60s)**
- **CAPM (1960s & 70s)**
  - **➔Invstmt Mgt Perf.Eval: *"Risk-adjusted returns"*:**
    "Jensen's Alpha", "Sharpe Ratio", "Treynor Ratio".
- **Disillusionment with CAPM (1980s & 90s):**
  Going beyond "beta" to explain expected returns: *Size, B/M Ratio,…*
- **"*Style*" oriented invstmt strategy (1980s & 90s):**
  ➔Style-based benchmarking as an invstmt mgt tool, consistent with style-based portfolio strategy.
- **Property "Crash" of early 1990s:**
  ➔Benchmarking expands from equities to R.E. (1990s).

Lecture Outline:

- **27.1. Performance Attribution**
- **27.2. Basics of Benchmarking**
- **27.2 (cont.). Issues in Benchmarking Private Real Estate**

27.1. Performance Attribution

- Definition & Overview.
- 27.1.2. Portfolio-Level Performance Attribution.
- 27.1.1 Property-Level Performance Attribution.

Performance Attribution Overview . . .

DEFINITION:
The *decomposition* (or "breaking down", or "parsing") of the total investment return of a subject property or portfolio of properties (or an investment manager).

PURPOSE:
To assist with the *diagnosis* and understanding of what caused the given investment performance.

USAGE:
By investment managers (agents) and their clients (principals).
REIT managers also could use.

Performance Attribution Overview . . .

Two levels

at which performance attribution is performed:

- **Portfolio level**

  Pertains to dynamic portfolios or investment manager (or fund) level.

- **Property level**

  Pertains to individual properties or static portfolios of multiple properties.

Performance Attribution Overview . . .

Major *attributes* (return components):

At the PORTFOLIO LEVEL:

Allocation
Selection
Interaction

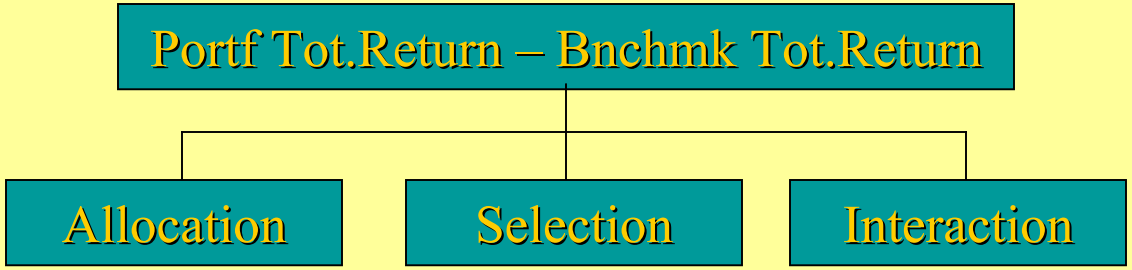
At the PROPERTY LEVEL:

Initial Cash Yield
Cash Flow Change
Yield Change

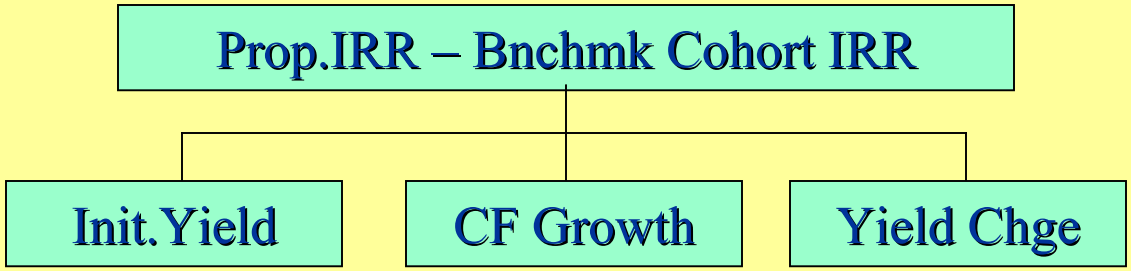
Performance Attribution Overview . . .

- **At both levels, *diagnostic* purpose is facilitated by comparison between *subject* portfolio or mgr with an appropriate *benchmark*.**
- ***Relative* (or *differential*) performance betw subj vs benchmrk is quantified, in total & w/in components.**

Portfolio Level:



Property Level:

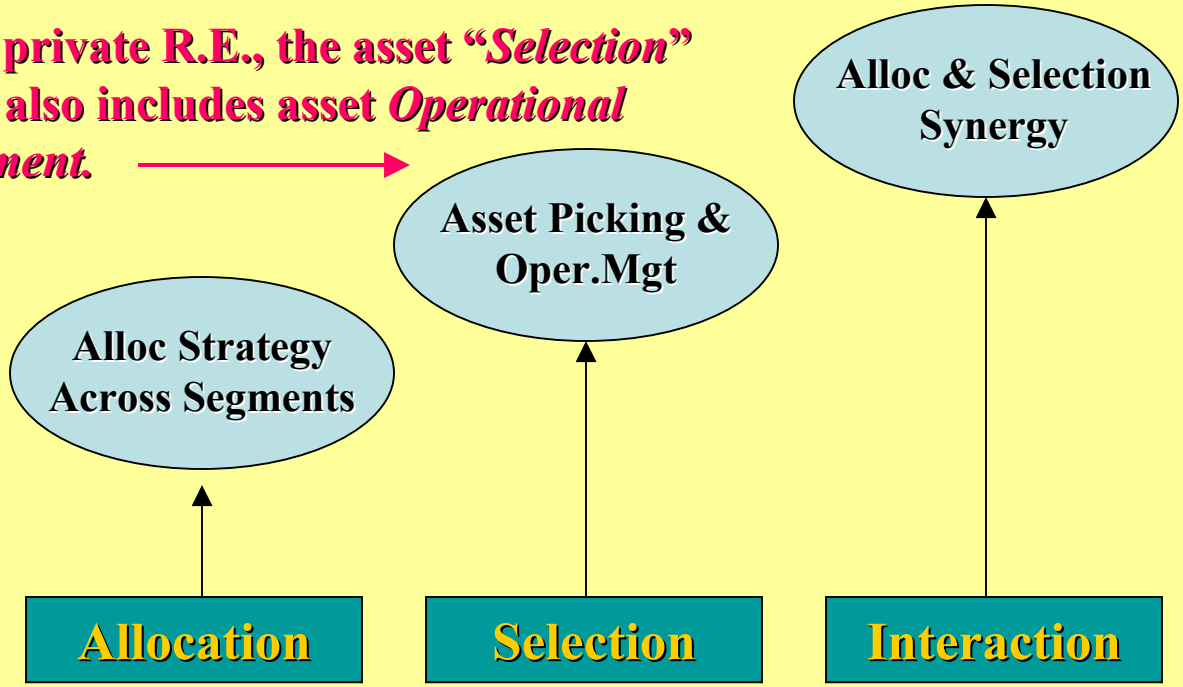


Performance Attribution Overview . . .

Basic idea is that components of the performance differential between the subject & the benchmark reflect performance of various distinct *functions* of investment management.

For example, at the portfolio level…

Note: In private R.E., the asset "*Selection*" function also includes asset *Operational Management*.



Performance Attribution Overview . . .

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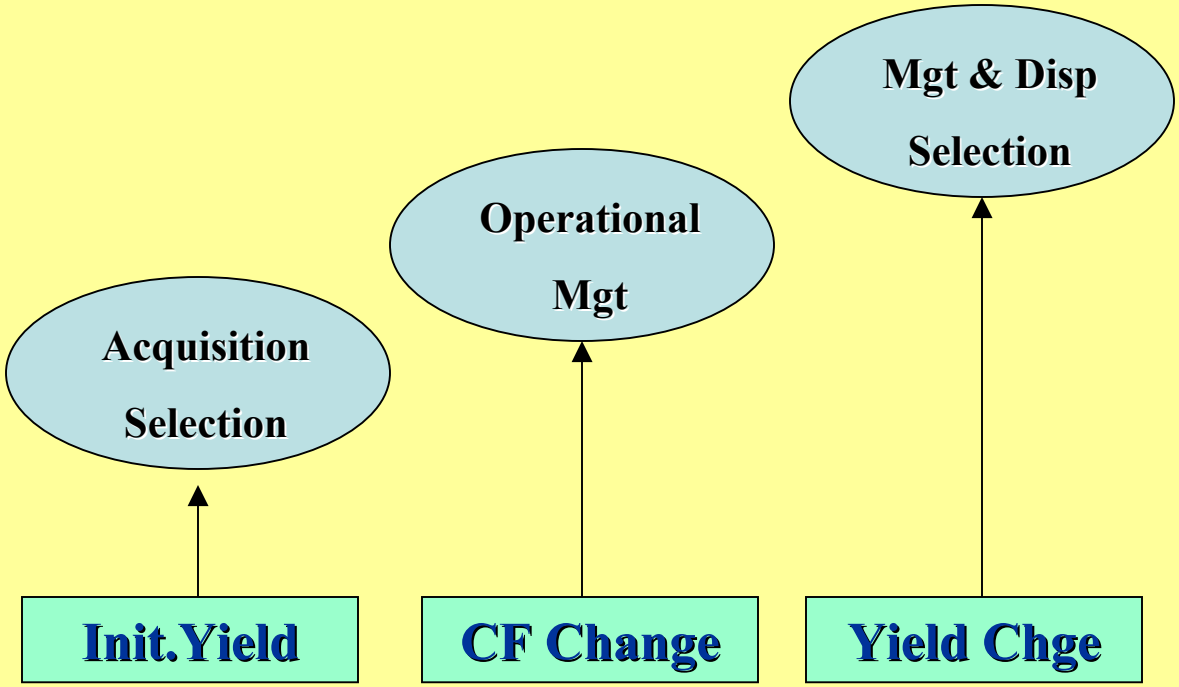
For example, at the property level…



A basic problem with all performance attribution analyses:

It is generally impossible to define unique, unambiguous break-downs or components of the total return that correspond to clear causal determinants or investment management functions.

Nevertheless,

Some useful insights can be obtained from performance attribution, provided results are used carefully.

Multi-period Attribution

- **Performance attribution lacks significance for any one short holding period (e.g., quarter or year).**
- **When aggregating across periods:**
  - **At the portfolio level (i.e., for *allocation* and *selection* attribution), it is generally best to use the arithmetic TWRR of the attribution components (for component additivity).**
  - **At the property level (i.e., for *initial yield*, *cash flow change*, and *yield change* attribution), it is probably more appropriate to use the IRR, because capital flow timing is controlled by the property (investment) manager at the property level.**

27.1.2 Portfolio-Level Performance Attribution . . .

Simple Numerical Example:

- **Bob & Sue are competing property investment managers specializing in office and industrial property.**
- **Over the same time period they made the following segment allocations and achieved the following returns…**

Exhibit 27-2: Bob & Sue's returns realized for clients:

Weights:	**Bob:**	**Sue:**
Industr	90%	10%
Office	10%	90%
Returns:	**Bob:**	**Sue:**
Total Portfolio	9.20%	9.70%
Industrial Properties	9.00%	7.00%
Office Properties	11.00%	10.00%

- **Sue beat Bob by 50 basis points, 9.70% to 9.20%, in total portfolio performance, which is what counts.**
- **But how can we *attribute* this total performance differential between the two major functions an investment manager performs @ portf level: segment allocation, and asset selection?…**

27.1.3. Use of a Benchmark in Performance Attribution . . .

The most logical way to perform this type of comparative attribution analysis is to define a common *benchmark* that is an appropriate reference point for both Bob's and Sue's performance.

Suppose (to simplify the illustration) that Bob's performance is identical to whatever benchmark index would be an appropriate reference for Sue's performance. Then we can attribute Sue's differential performance, with respect to her benchmark, to allocation (A_S–A_B) and selection (S_S–S_B) as follows:

$$A_S - A_B = r_{BI}(w_{SI} - w_{BI}) + r_{BO}(w_{SO} - w_{BO})$$

$$= 9\%(0.1-0.9) + 11\%(0.9-0.1)$$

$$= -7.2\% + 8.8\% = +1.6\%$$

$$S_S - S_B = w_{BI}(r_{SI} - r_{BI}) + w_{BO}(r_{SO} - r_{BO})$$

$$= 0.9(7\%-9\%) + 0.1(10\%-11\%)$$

$$= -1.8\% - 0.1\% = -1.9\%$$

Portfolio-Level Performance Attribution . . .

Sue's returns vs her benchmark:		
Weights:	**Benchmark**	**Sue:**
Industr	90%	10%
Office	10%	90%
Returns:	**Benchmark:**	**Sue:**
Total Portfolio	9.20%	9.70%
Industrial Properties	9.00%	7.00%
Office Properties	11.00%	10.00%

Clearly, Sue outperformed her benchmark (9.70% vs 9.20%, a +50 bp differential) because of her superior allocation (90% to the office segment that did better than industrial property), not because of her selection (which actually hurt her performance, as her properties did worse than the benchmarks within each segment).

The *pure* effect of her differential performance in the selection and allocation functions is quantified as follows…

Portfolio-Level Performance Attribution . . .

The pure effect of Sue's asset selection, relative to her benchmark, is quantified as the sum across all segments of the difference between Sue's within-segment return and the benchmark's within-segment return, weighted by the *benchmark's* allocation to each segment.

$$S_S – S_B = w_{BI}(r_{SI} – r_{BI}) + w_{BO}(r_{SO} – r_{BO})$$

The pure effect of Sue's allocation choices, relative to her benchmark, is quantified as the sum across all segments, of the difference between Sue's allocation and the benchmark's allocation multiplied by the *benchmark's* return in each segment.

$$A_S – A_B = r_{BI}(w_{SI} – w_{BI}) + r_{BO}(w_{SO} – w_{BO})$$

Portfolio-Level Performance Attribution . . .

Thus, the pure effect of Sue's selection performance relative to her benchmark was:

$$S_S – S_B = w_{BI}(r_{SI} – r_{BI}) + w_{BO}(r_{SO} – r_{BO})$$

$$= 0.9(7\%-9\%) + 0.1(10\%-11\%)$$

$$= -1.8\% - 0.1\% = -1.9\%$$

She lost 1.9% relative to her benchmark because her industrial properties did 2% worse than the benchmark's industrial properties and her office properties did 1% worse than the benchmark's office properties, and her benchmark allocation was 90% to industrial.

Note that in order to avoid mixing the effect of Sue's allocation in with the effect of her selection, we quantify her selection effect using the *benchmark's* allocation.

Portfolio-Level Performance Attribution . . .

Similarly, the pure effect of Sue's allocation performance relative to her benchmark was:

$$A_S - A_B = r_{BI}(w_{SI} - w_{BI}) + r_{BO}(w_{SO} - w_{BO})$$

$$= 9\%(0.1-0.9) + 11\%(0.9-0.1)$$

$$= -7.2\% + 8.8\% = +1.6\%$$

She gained 1.6% relative to her benchmark because she put 80% more weight than her benchmark into office properties, and office properties performed 2% better than industrial properties within the benchmark.

Note that in order to avoid mixing the effect of Sue's selection performance in with the effect of her allocation, we quantify her allocation effect using the *benchmark's* selection performance.

Portfolio-Level Performance Attribution . . .

The sum of these two pure effects of Sue's selection and allocation performance does not equal her total return performance differential with respect to her benchmark.

The remaining performance differential is due to the *combined effect* of Sue's selection and allocation performances *interacting* together. (There is no meaningful way to disentangle this interaction effect and allocate it to either one of the two pure effects.)

Sue vs her benchmark:	
Attribute:	
Allocation	1.60%
Selection	-1.90%
Interaction	0.80%
Total differential	0.50%

Portfolio-Level Performance Attribution . . .

Sue's returns vs her benchmark:		
Weights:	**Benchmark**	**Sue:**
Industr	90%	10%
Office	10%	90%
Returns:	**Benchmark:**	**Sue:**
Total Portfolio	9.20%	9.70%
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Sue vs her benchmark:	
Attribute:	
Allocation	1.60%
Selection	-1.90%
Interaction	0.80%
Total differential	0.50%

The interaction effect is sometimes called the "cross-product".

Some analysts suggest that it reflects the investment manager's "specialization" ability, her degree of success in over-weighting segments in which the manager has relatively better (or less bad) selection skills even though her overall selection ability may be weak and such segments may not be strategically superior from an overall allocation perspective.

e.g., Sue over-weighted office, where her selection was "less bad" than in industrial, so she achieved a positive interaction (specialization) effect.

27.1.4. Mgr Allocation Weights in the Benchmark?...

Some analysts use the manager's weights to compute the "selection" effect:

$$S_S - S_B = w_{SI}(r_{SI} - r_{BI}) + w_{SO}(r_{SO} - r_{BO})$$

$$= 0.1(7\%-9\%) + 0.9(10\%-11\%)$$

$$= -0.2\% - 0.9\% = -1.1\%$$

This allocates the entire performance differential to just selection and allocation, eliminating the interaction effect:

Alloc (Sue – Bnchmrk) =	+1.6%
+ Select(Sue-Bnchmrk) =	- 1.1%

Total	+0.5%

But it is misleading to define the selection effect this way and think of it as a pure selection effect. It would be more meaningful to explicitly combine the interaction effect with selection and call it "Selection&Allocation".

Portfolio-Level Performance Attribution . . .

The *meaning* of portfolio-level attribution in private real estate investment (as distinct from public securities investment)…

- **The *allocation* component has a very similar meaning in private real estate as compared to public securities (corresponding to the segment weight allocation decision at the portfolio level), but…**

- **The *selection* component in private real estate encompasses both the traditional "asset picking" function of securities investment management (picking good individual assets), and also (unlike with public securities) the *acquisition* and *operational management* function associated with negotiating private asset deals and long-term holding of a real property asset that must be managed by its investor/owner. (i.e., purely "*passive*" investment is not possible in the private real estate investment industry.)**

Portfolio-Level Performance Attribution . . .

It is very difficult to break down the overall *selection* performance between the contributions provided by the "traditional selection" (asset picking) function and that provided by the acquisition and operational management functions.

Some insight may be obtained by analysis of *property-level* performance attribution. In particular:

- ***Initial yield*** **relates to the *traditional selection* & *acquisition* functions;**
- ***Cash flow change*** **relates largely to the *operational management* function (but not purely or necessarily, e.g., it may reflect expiration of vintage leases);**
- ***Yield change*** **may reflect either a *traditional selection* (asset picking) effect or an *operational management* effect, or both.**

27.1.1 Property-Level Performance Attribution . . .

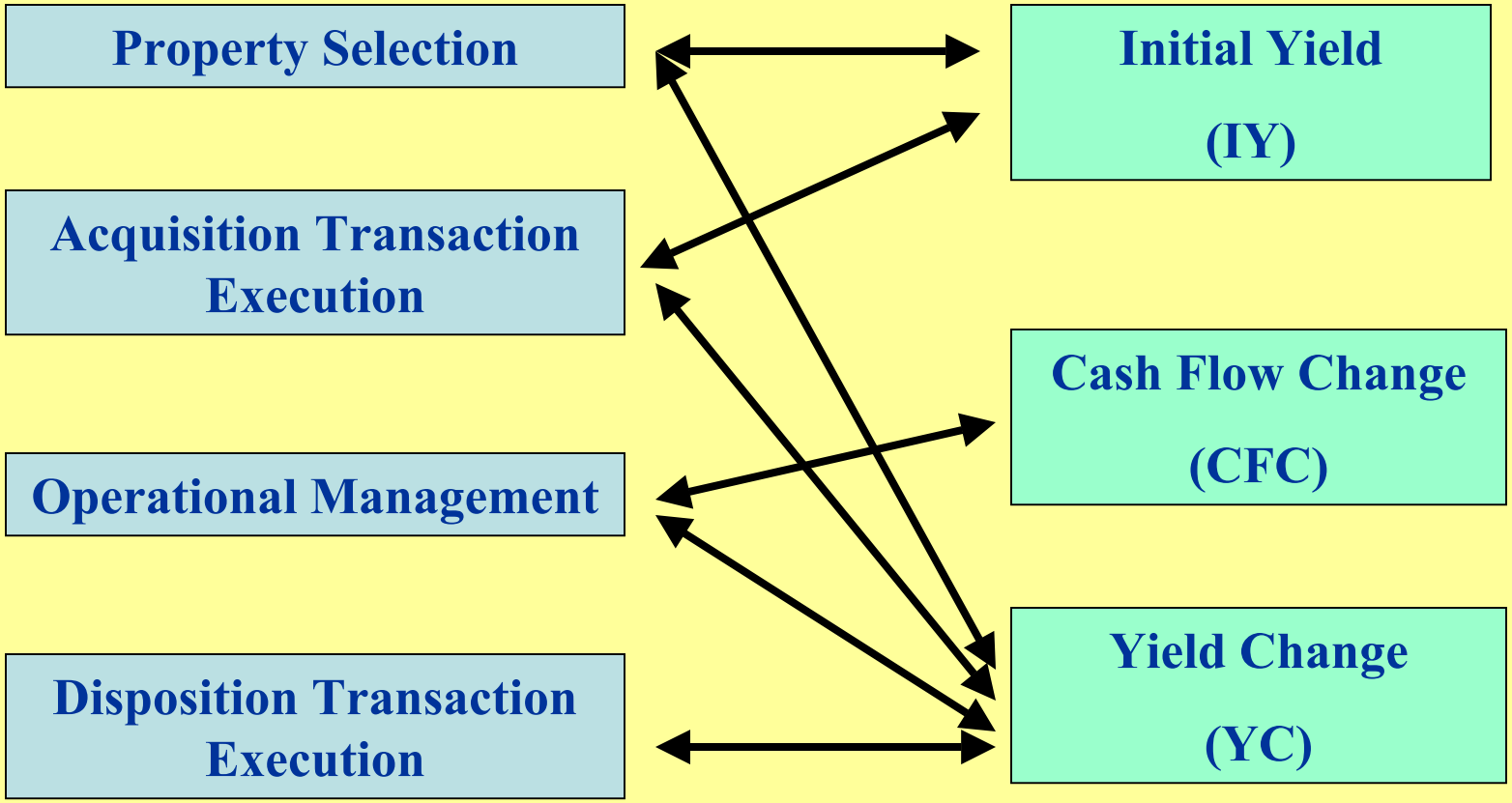
Property level performance attribution focuses on "*property level*" investment performance, i.e., the total return achieved within a given property or a static (fixed) portfolio of properties (that is, apart from the effect of investment allocation decisions, as if holding allocation among categories constant).

Property level attribution should be designed to break out the property level total return performance in a manner useful for shedding light on the four major property level investment management functions:

- **Property selection (picking "good" properties as found);**
- **Acquisition transaction execution;**
- **Operational management during the holding period (e.g., marketing, leasing, expense mgt, capital expenditure mgt);**
- **Disposition transaction execution.**

Property-Level Performance Attribution . . .

These property-level management functions are related generally to three attributes (components) of the property-level since-acquisition IRR, essentially as indicated below…



Property-Level Performance Attribution . . .

Conventional property level performance attribution is based on periodic returns, or on time-weighted multi-period returns (TWRRs).

But IRR-based performance attribution is arguably more useful for property level management diagnostic purposes, because:

- **At the property level, the investment manager is typically responsible for the major cash flow *timing* decisions that can significantly effect property level (static portfolio) returns, e.g., leasing decisions, capital expenditure decisions.**
- **The IRR is sensitive to the effect of cash flow timing, the TWRR is not.**
- **The IRR is cash flow based (net of capital improvement expenditures), therefore, more accurately reflecting the investment return effect of capital improvement decisions.**

Property-Level Performance Attribution . . .

Useful IRR-Based property level performance attribution benchmarking requires the use of:

Since-acquisition IRR

- **IRR is computed since acquisition of property (or portfolio):**
  - **In order to reflect investment operational performance during entire holding period since acquisition;**
  - **Property investment holding periods are typically multi-year (single period or periodic returns do not reflect effective investment management holding period).**
- **IRR is computed for appropriate benchmark cohort, defined as universe of similar investments by competing managers, measured from same inception date (equal to property acquisition date).**

Recall Ch.10 Appendix:

Property-Level Performance Attribution . . .

Simple Numerical Example:

- **Property (or static portfolio) bought at initial cash yield of 9%.**
- **Net cash flow grew at 2% per year.**
- **Property (or properties) sold (or appraised) after 10 years at a terminal yield of 10%, based on yr.11 projected cash flow (also 2% more than yr.10).**
- **IRR is 10.30%.**
- **How much of this IRR is due to 3 components: Initial Yield (IY), Cash Flow Change (CFC), and Yield Change (YC)?…**

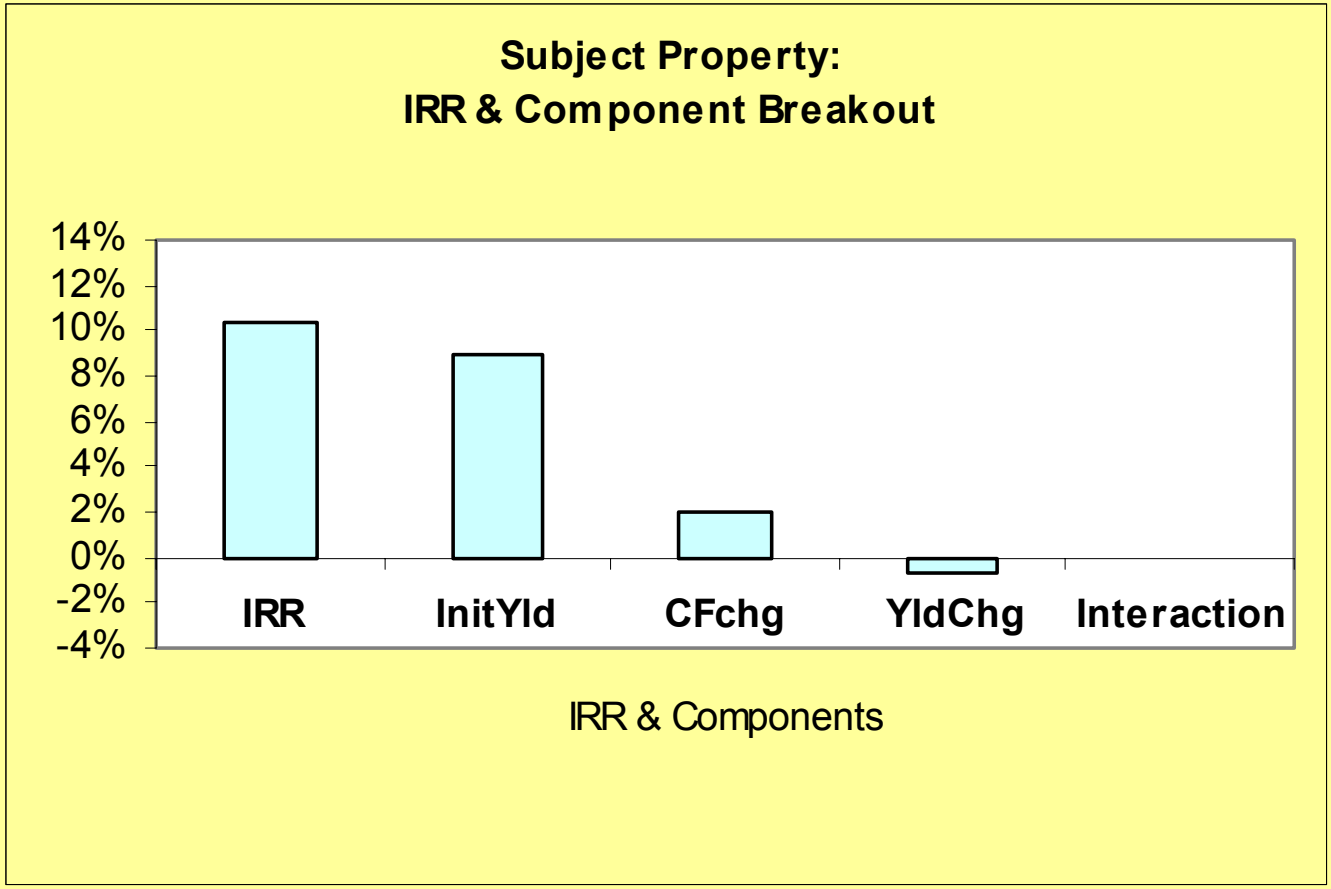
There are several ways one might answer this question. The approach that seems most intuitively related to the 4 basic mgt fcns is presented here…

Yr	*IRRs:*	0	1	2	3	4	5	6	7	8	9	10	11
(1) Actual Oper.CF			1.0000	1.0200	1.0404	1.0612	1.0824	1.1041	1.1262	1.1487	1.1717	1.1951	1.2190
(2) Actual Capital CF		-11.1111										12.1899	
(3) Actual Total CF (=1+2)	**10.30%**	**-11.1111**	**1.0000**	**1.0200**	**1.0404**	**1.0612**	**1.0824**	**1.1041**	**1.1262**	**1.1487**	**1.1717**	**13.3850**	
(4) Init.Oper.CF constant			1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
(5) Capital CF @ Init.Yld.on(4)		-11.1111										11.1111	
(6) Init.CF @ Init.Yld (=4+5)	**9.00%**	-11.1111	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	12.1111	
(7) Capital CF @ Init.Yld.on(1)		-11.1111										13.5444	
(8) Actual Oper. CF @ Init.Yld (=1+7)	**11.00%**	**-11.1111**	**1.0000**	**1.0200**	**1.0404**	**1.0612**	**1.0824**	**1.1041**	**1.1262**	**1.1487**	**1.1717**	**14.7395**	
(9) Capital CF @ ActualYld.on(4)		**-11.1111**										10.0000	
(10) Init.CF @ Actual Yld (=4+9)	**8.32%**	**-11.1111**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**1.0000**	**11.0000**	

- **Initial yield = 9.00%,** computed from line (6) IRR.
- **Cash flow change component = 2.00%** = 11%-9%, computed as the line (8) IRR less the line (6) IRR: = IRR with actual CF – IRR with no CF growth, (with constant yld at initial rate).
- **Yield change component = -0.68%** = 8.32%-9.00%, computed as the line (10) IRR less the line (6) IRR: = IRR with actual yld chg – IRR with no yld chg, (with constant CF at initial level).
- **Interraction effect = -0.02%**, the difference bertween the line (3) overall IRR and the sum of the three other attributes [10.3%-(9%+2%-0.68%)].

Property-Level Performance Attribution . . .

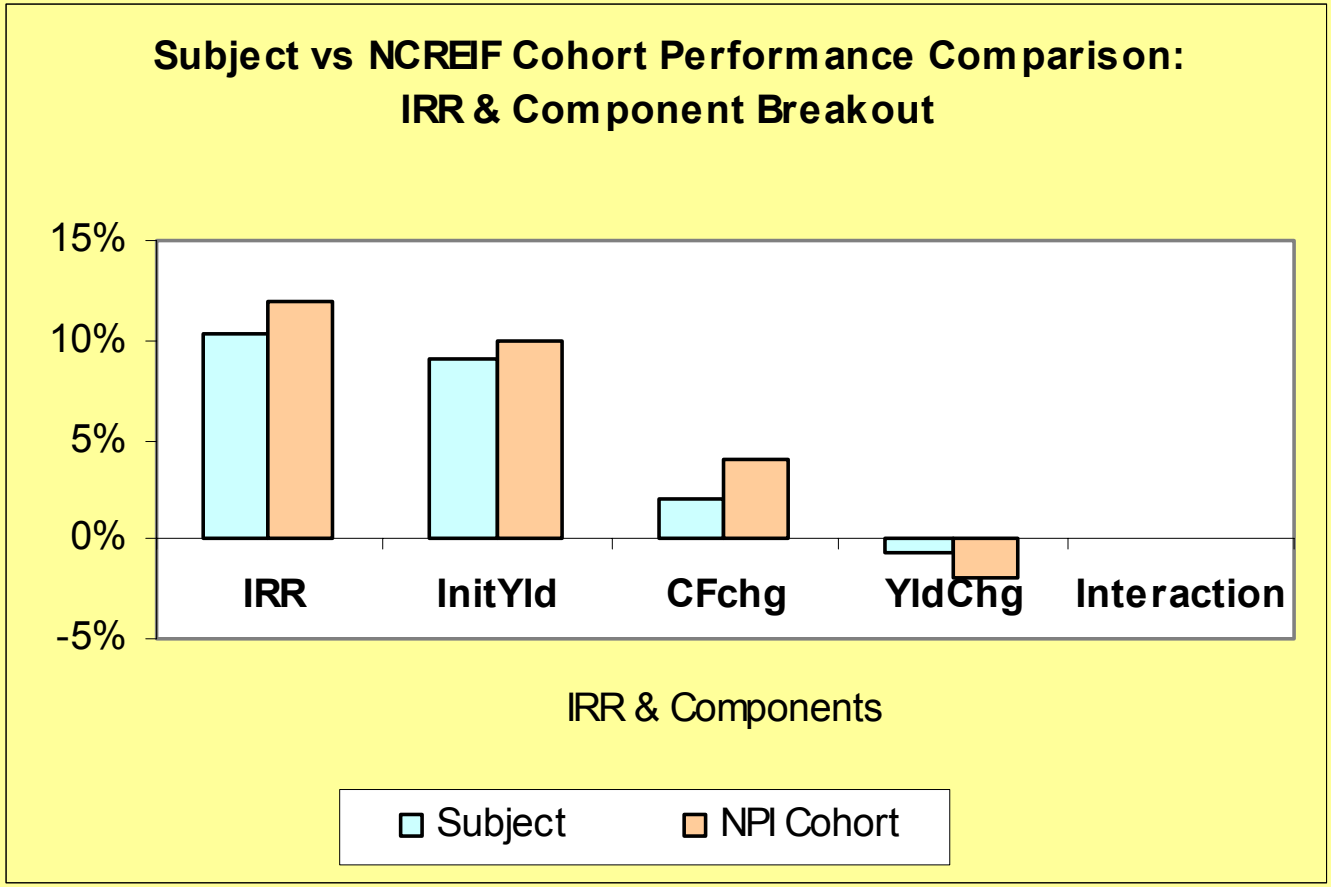
Here is a graphical presentation of the IRR-Based property-level performance attribution we just performed:



Suppose we computed the same type of IRR component breakdown for an appropriate benchmark, that is, a NCREIF sub-index cohort spanning the same period of time…

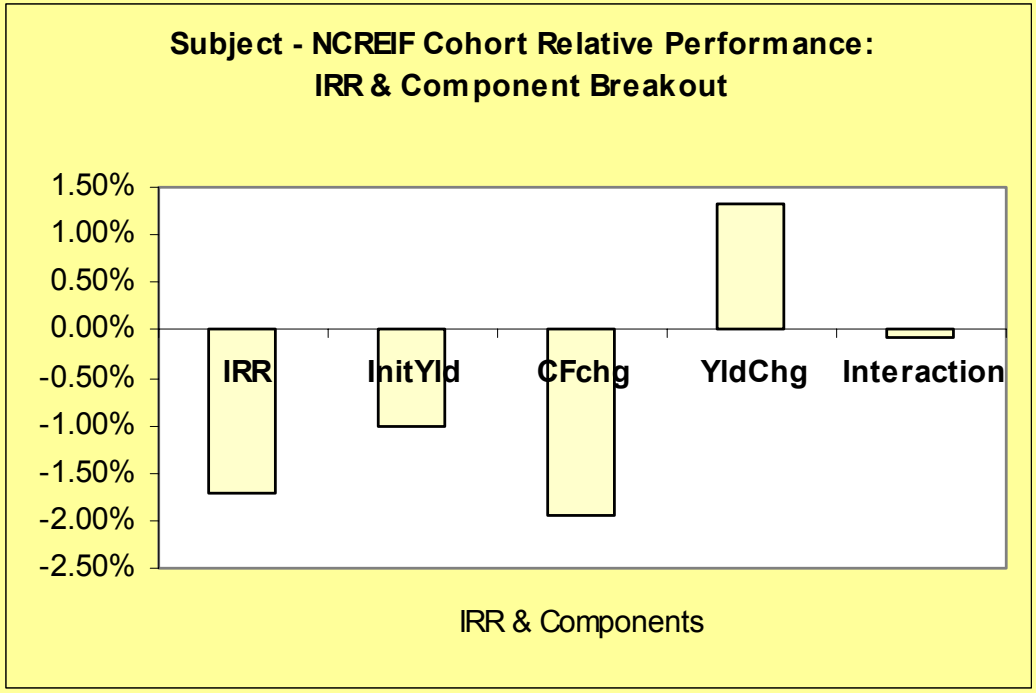
Property-Level Performance Attribution . . .

We could compare our subject performance with that achieved by a peer universe of managers, for similar properties (e.g., Calif. Industr. bldgs):



Property-Level Performance Attribution . . .

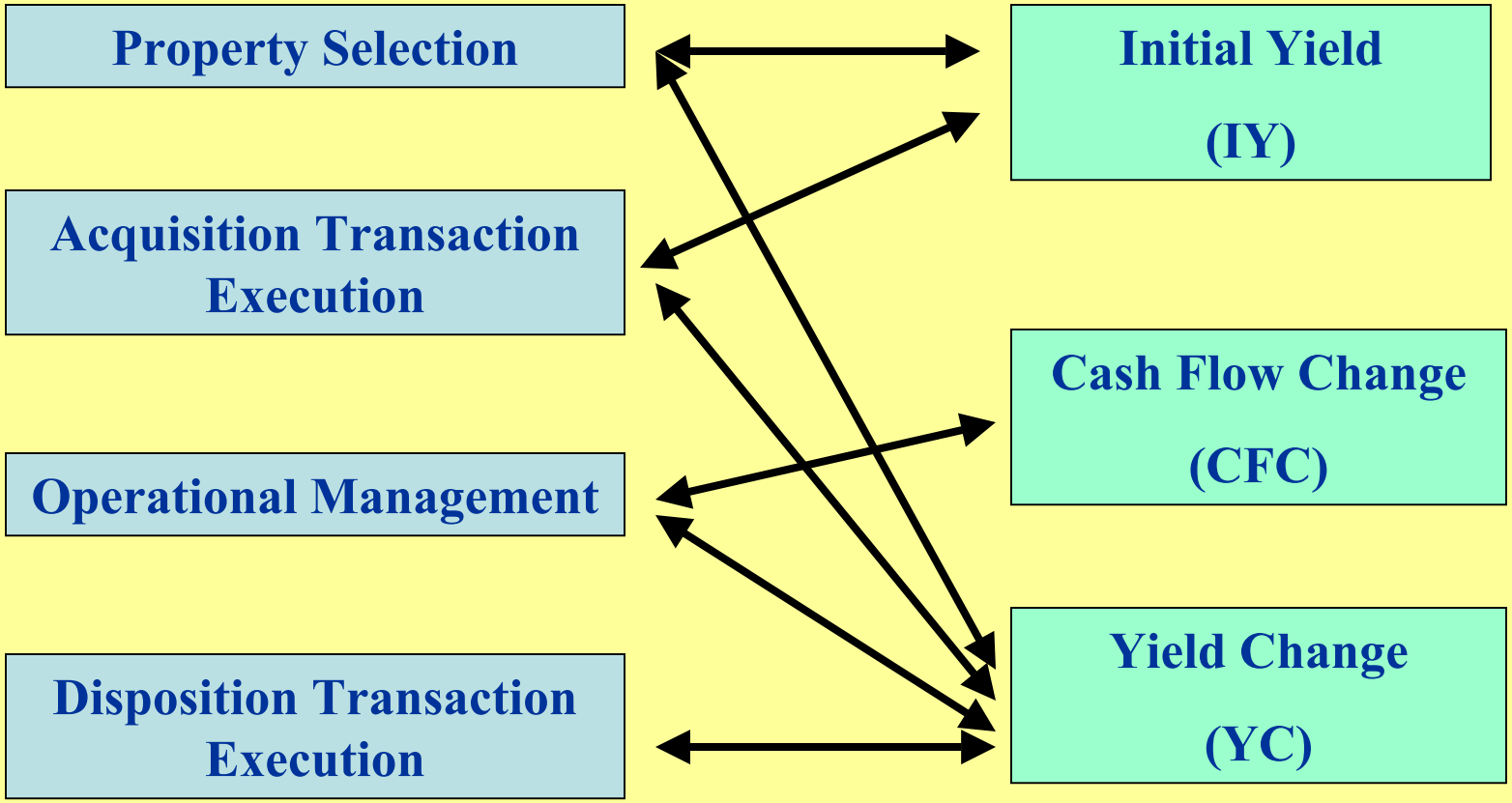
Here is the *relative performance*, the *difference* between our subject property and its benchmark, by attribute:



The above pattern could be plausibly interpreted as tentative evidence for the following hypothesis: Subject performed relatively poorly due largely to some combination of poor selection, acquisition, and operational mgt, partially offset by some combination of good disposition execution (or optimistic terminal appraisal), future-oriented capital improvements, &/or market movements during the holding period.

Property-Level Performance Attribution . . .

These property-level management functions are related generally to three attributes (components) of the property-level since-acquisition IRR, essentially as indicated below…



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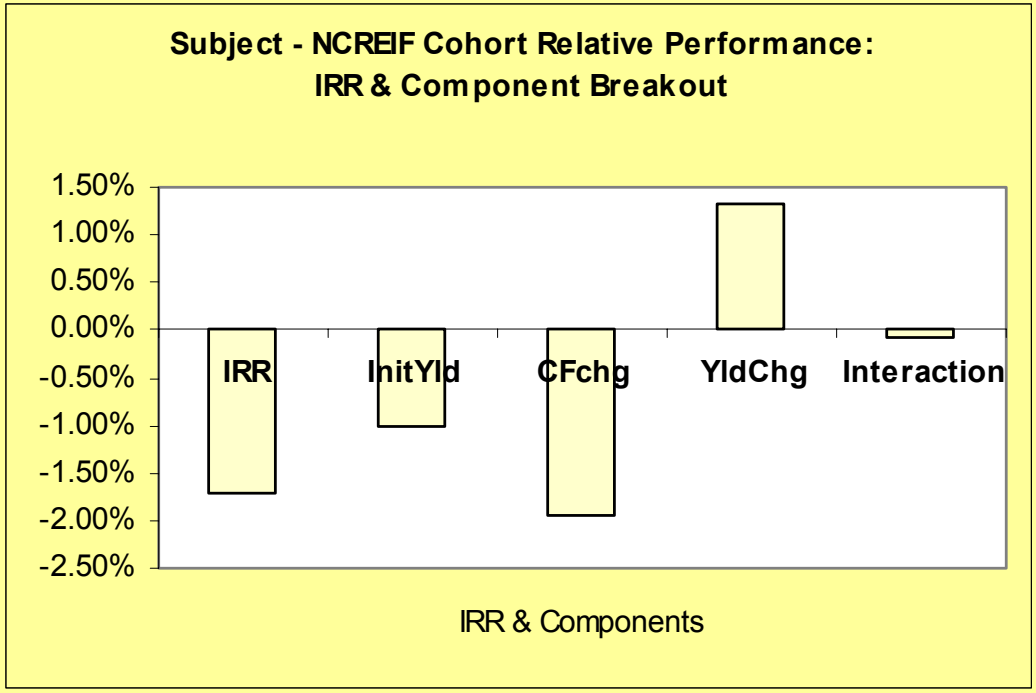
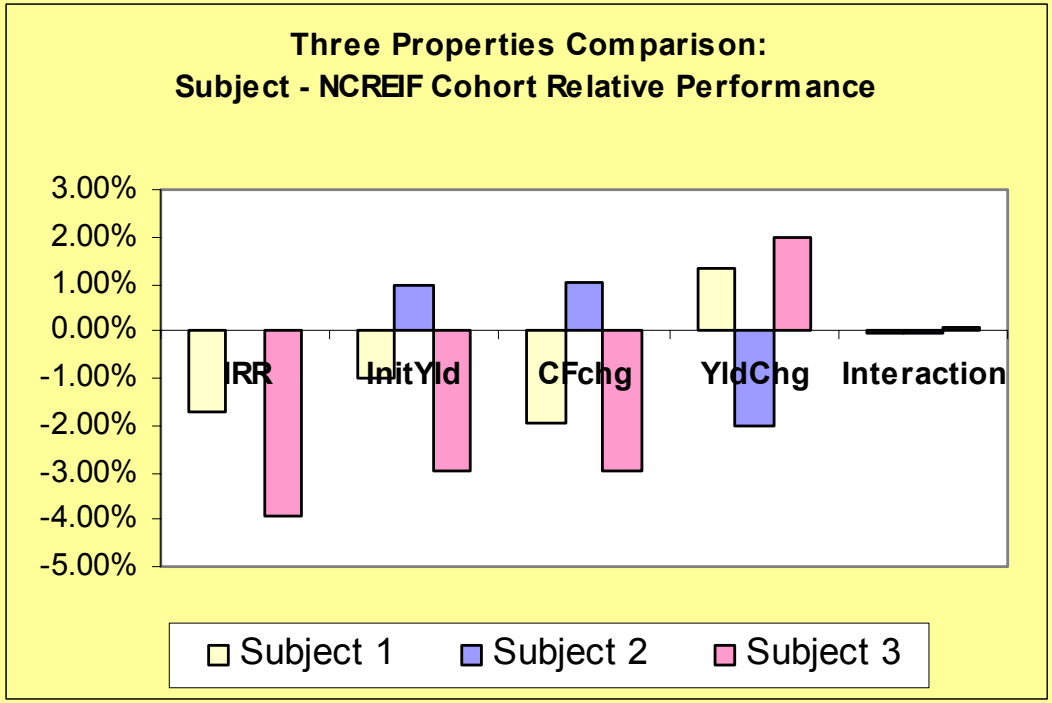


Now suppose we computed these relative performance differentials across a number of different properties (or portfolios) we have invested in…

Property-Level Performance Attribution . . .

We might gain some insights about our property-level investment and management performance:

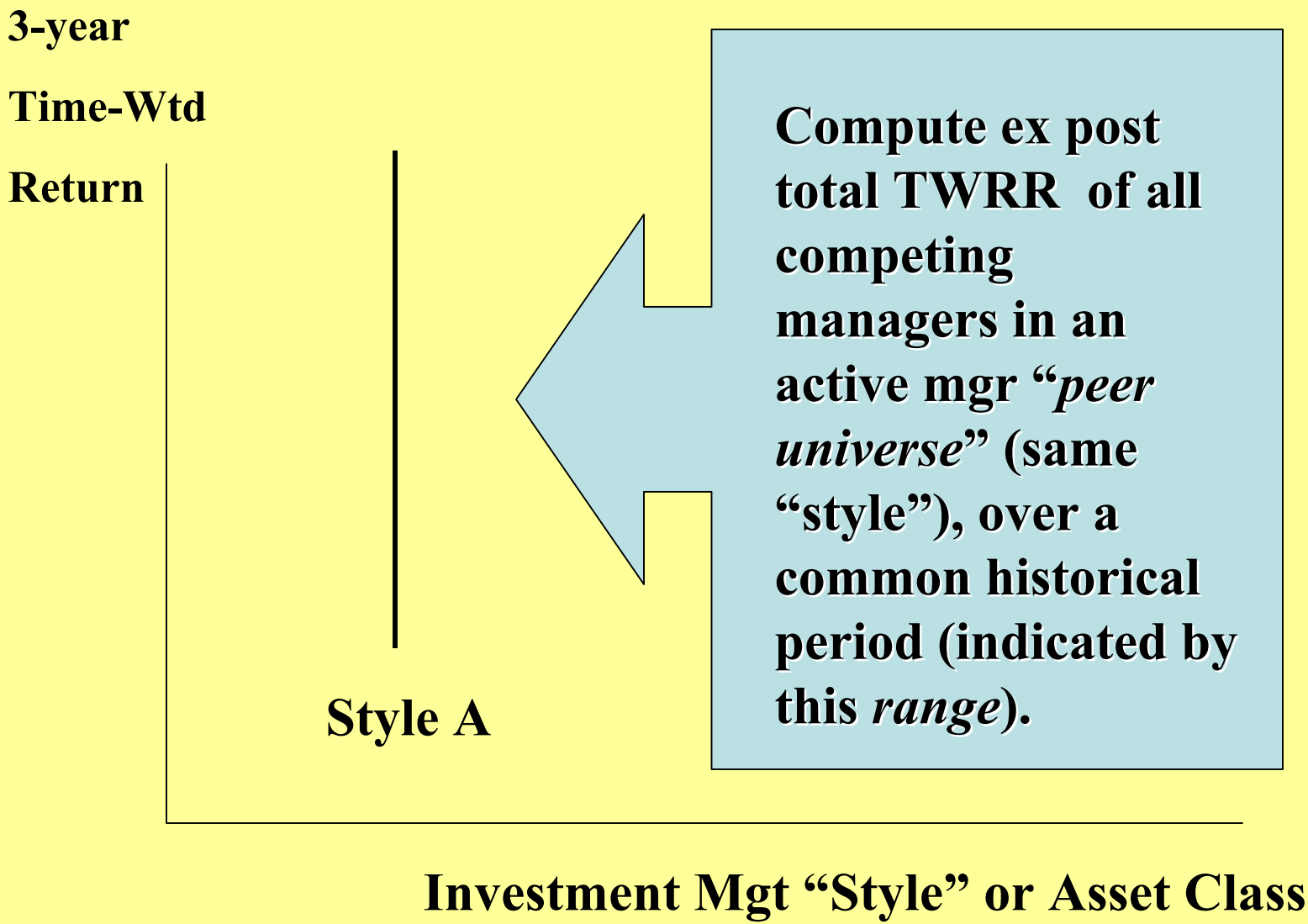


In this case Subject Properties #1 & 3 have similarly poor performance (rel to benchmk), due to poor initial yield & poor CF change, suggesting poor acquisition & poor operational mgt. Property #2 did better, with good InitYld & CFchg, but poor YldChg (suggesting good acquisition, but poor disposition or mgt actions that hurt future outlook (e.g., inadequate Cap.Improvement). Mkt movements can also affect these results (less so the longer the holding period).

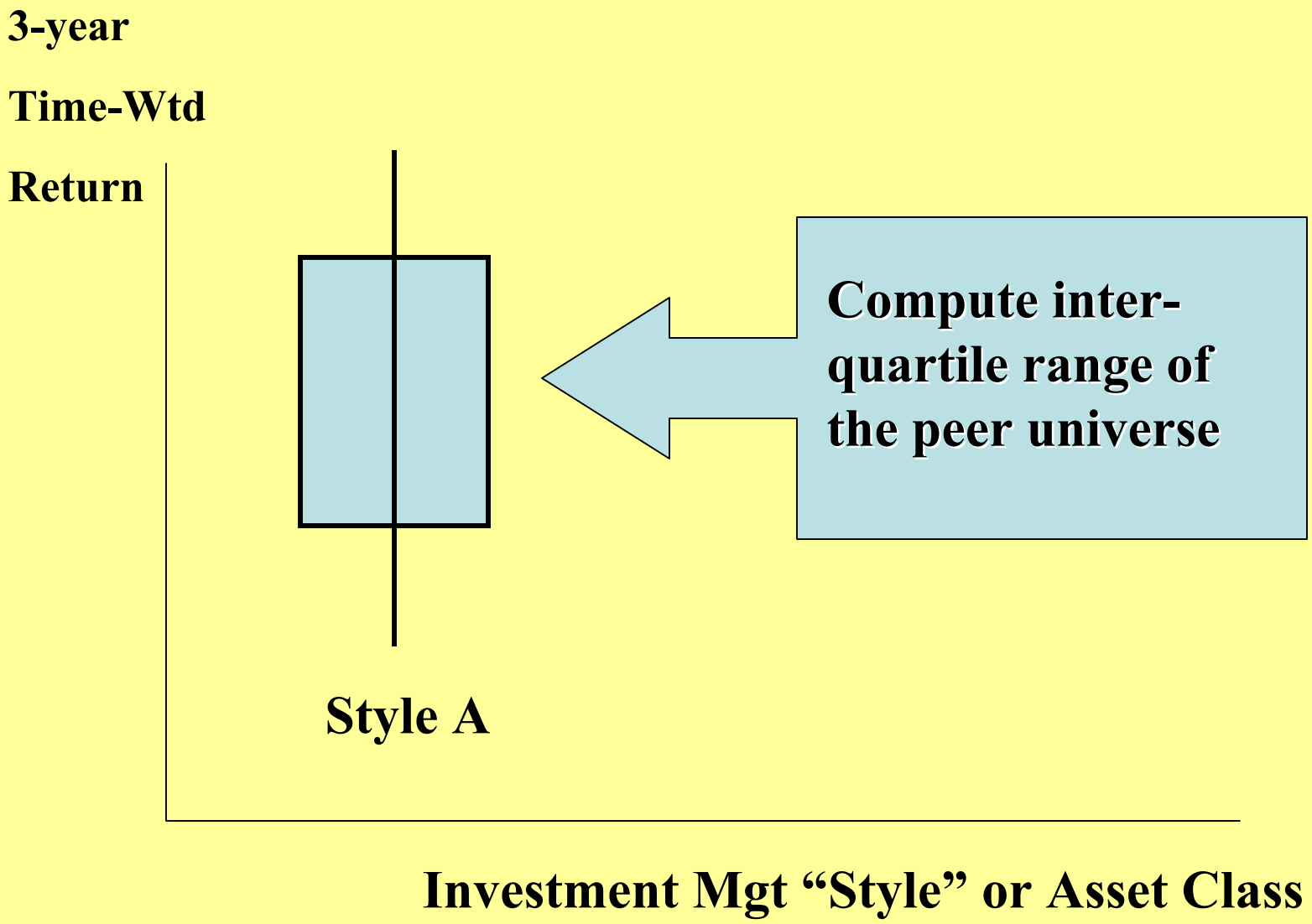
27.2 Investment Performance Evaluation & Benchmarking

- How Benchmarking Is Done
- Purpose & Role of Benchmarking
- Criteria of an Ideal Benchmark

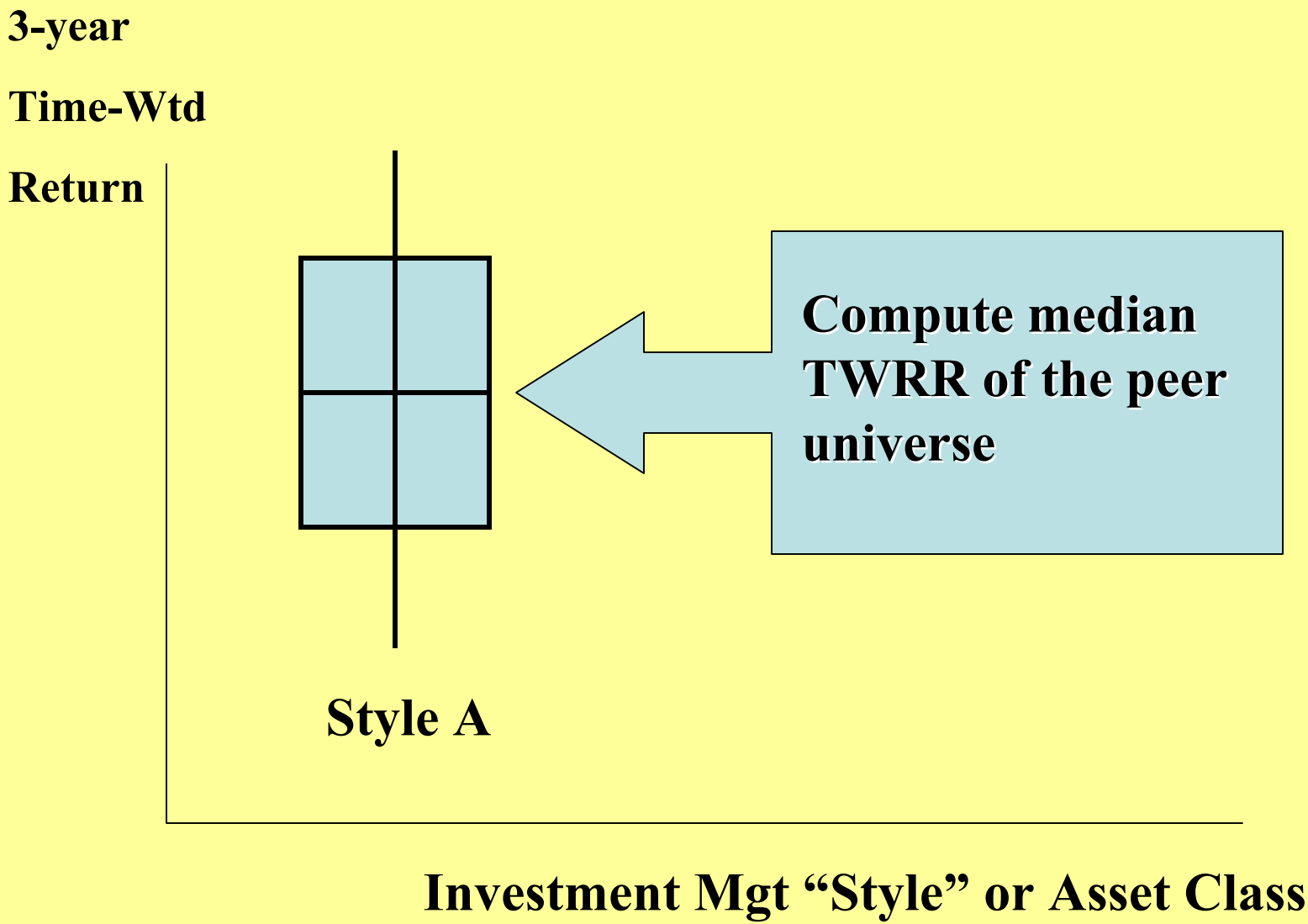
How Benchmarking Is Done in the Securities Industry. . .



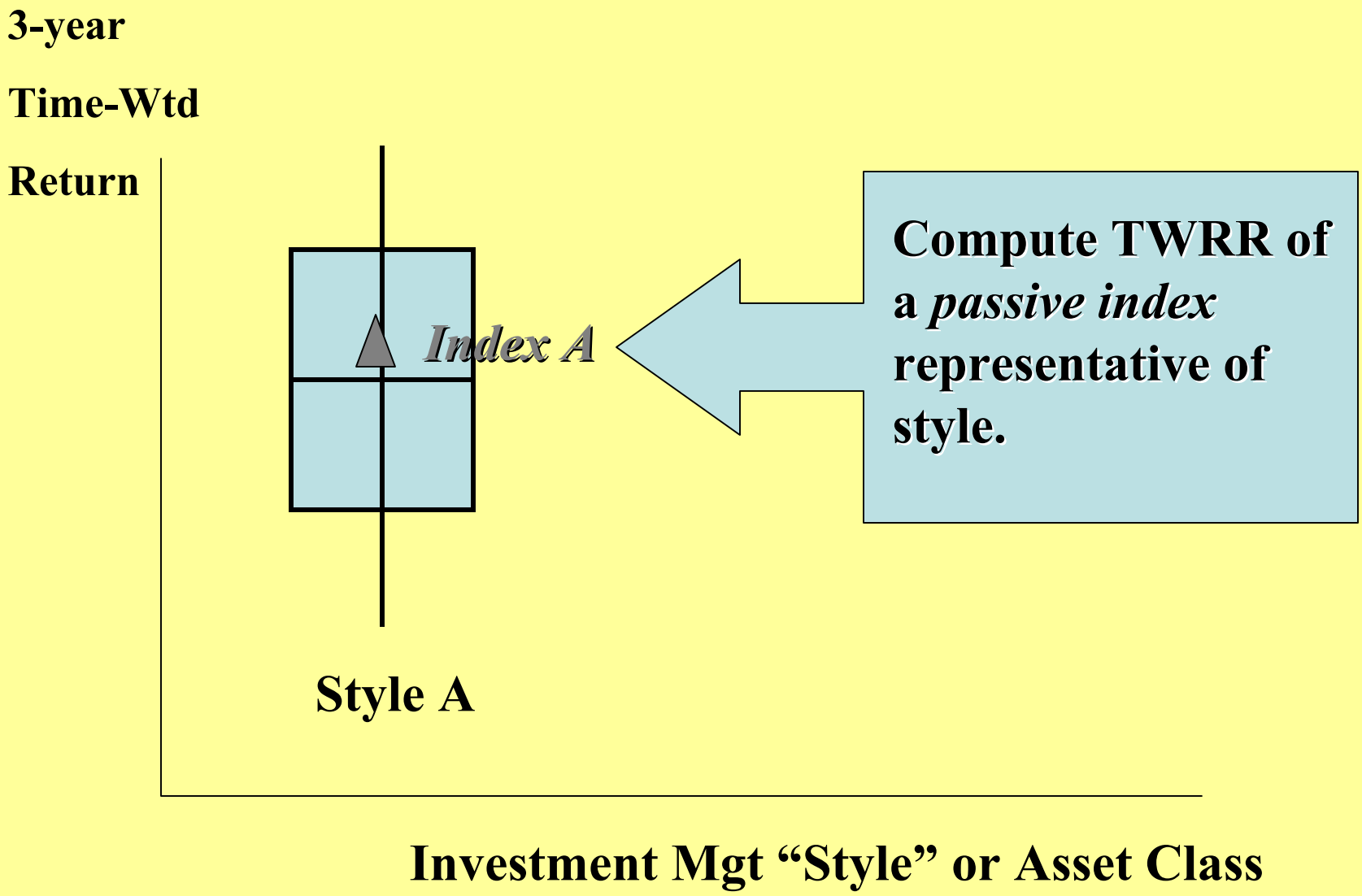
How Benchmarking Is Done in the Securities Industry. . .



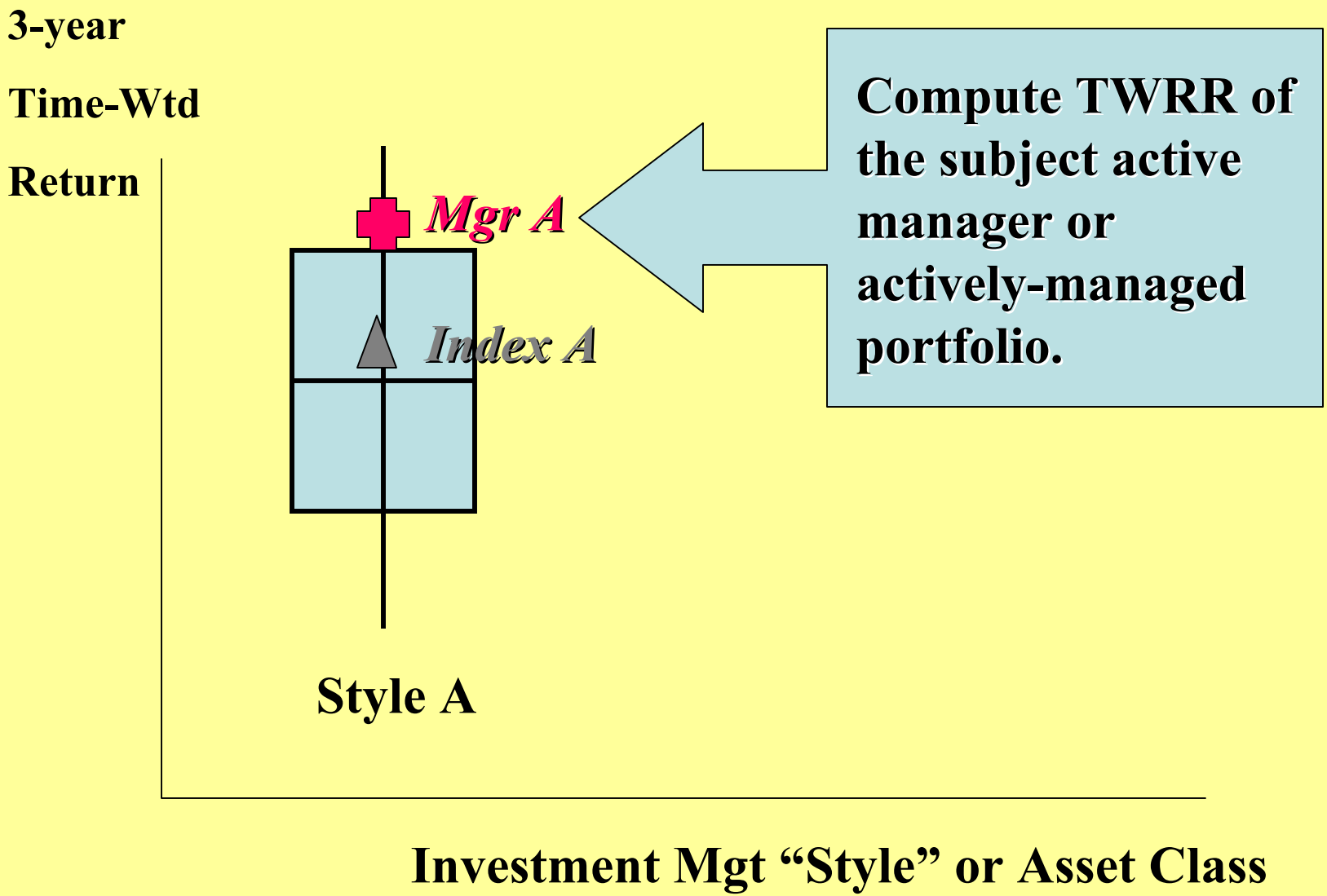
How Benchmarking Is Done in the Securities Industry. . .



How Benchmarking Is Done in the Securities Industry. . .



How Benchmarking Is Done in the Securities Industry. . .

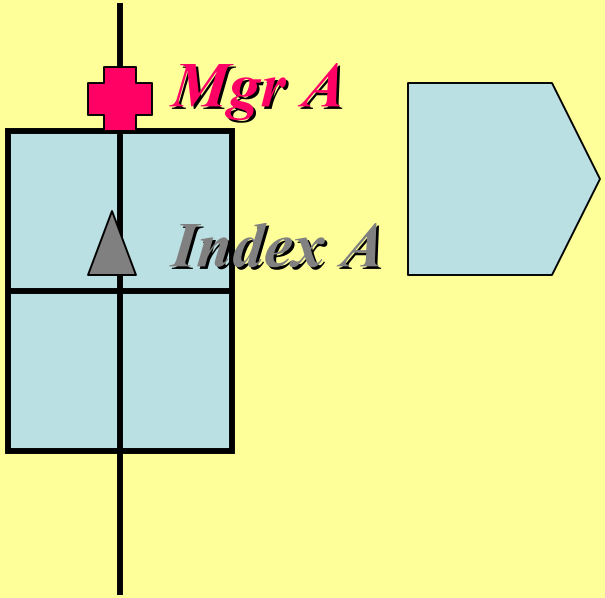


How Benchmarking Is Done in the Securities Industry. . .

3-year

Time-Wtd

Return



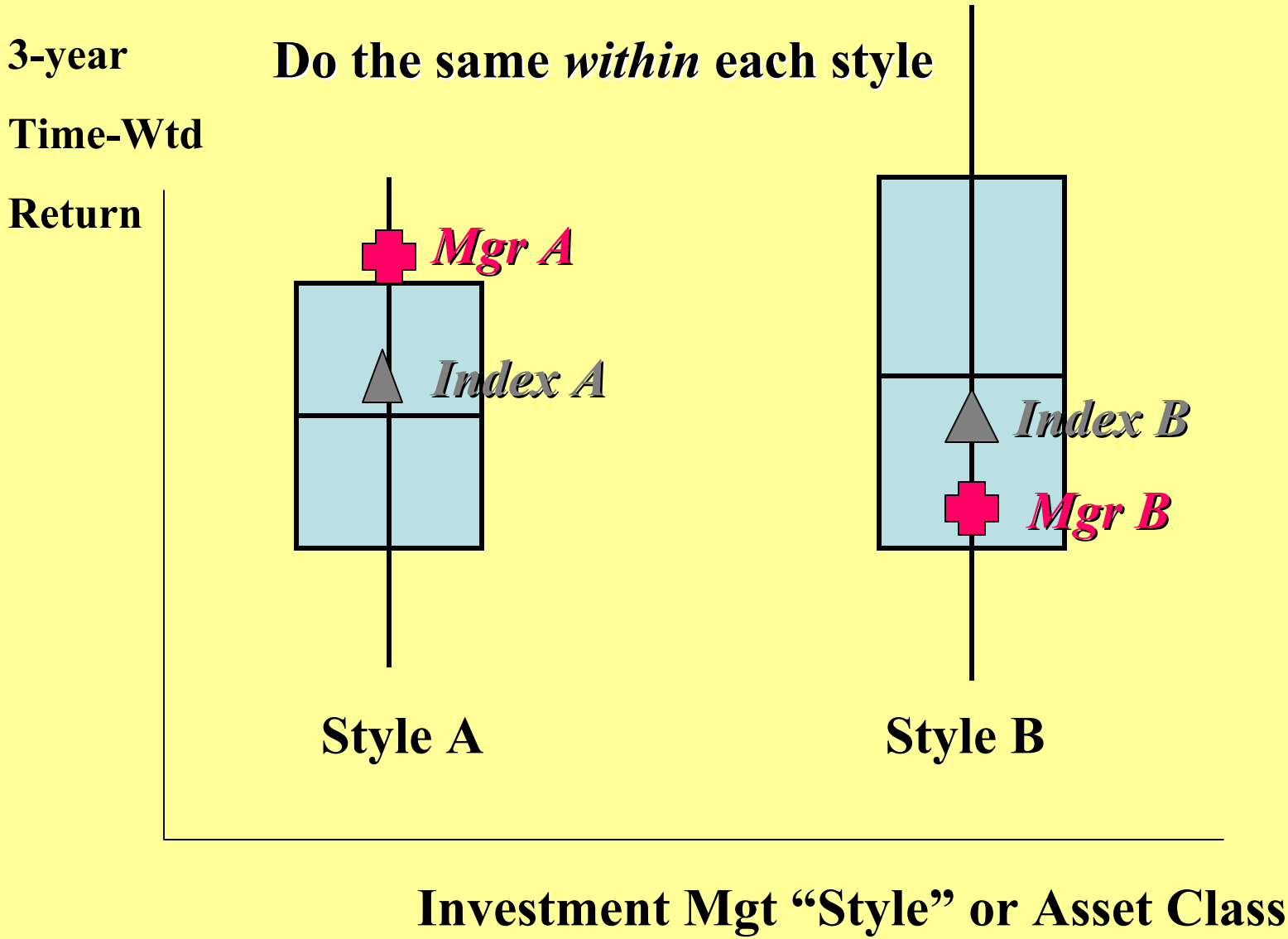
Style A

Compare subj mgr's performance to that of:

- **The passive index**
- **The peer universe**

Investment Mgt "Style" or Asset Class

How Benchmarking Is Done in the Securities Industry. . .



How Benchmarking Is Done in the Securities Industry. . .

The Importance of Style-Purity in the Benchmark:

- **Not appropriate to compare performance of one style of investment against that of another for evaluating a manager who is specialized in (and hired for the purpose of) investing in one particular style.**

- **Multi-style managers and portfolios can be benchmarked using composite indices constructed from an appropriate combination of style-pure indices.**

- **Comparative analysis and diagnostics regarding the differential performance of different types (styles) of investments is facilitated by the availability of style-pure indices.**

The Purpose of Benchmarking . . .

Ex Ante Purposes (most important):

1. Communication (Client → ← Manager).
2. Interest-Alignment (Client ← → Manager).
3. Weed out *inferior* managers.

Ex Post Purpose (less important or less feasible):

4. Identify *superior* managers (in combination with qualitative information).

The Purpose of Benchmarking . . .

Ex Post Purpose (less important or less feasible):

4. Identify *superior* managers (in combination with qualitative information).

Why is the identification of superior managers difficult in practice?

- **"Superior mgr" = One who can *consistently* beat mkt.**
- **"Superior mgr" = One who can *consistently* beat peers.**
- **This is *rare*, and normally only *marginal*.**
- ***Moving target*: Mkt (& peer universe) learns & improves over time.**

The Purpose of Benchmarking . . .

Why is the identification of superior managers difficult in practice?

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- **"Superior mgr" = One who can *consistently* beat peers.**
- **This is *rare*, and normally only *marginal*.**
- ***Moving target*: Mkt (& peer universe) learns & improves over time.**
- **But there is also a *statistical reason* . . .**

27.2.4: The Problem of Statistical Significance in Performance Measurement . . .

- **"Noise" (or *randomness*) in ex post returns obscures our ability to draw rigorous conclusions about managers' abilities to *consistently* beat a benchmark as a result of *skill* (& effort) rather than *luck*.**

- **There are three sources of randomness in empirically observable real estate returns:**

  1. ***Cross-sectional* (individ. prop. heterogeneity).**

  2. ***Longitudinal* randomness in true mkt (volatility).**

  3. ***Measurement error* (in R.E. returns).**

- **Any (& all) of these sources of "noise" obscures the "signal" about mgrs' true relative abilities.**

27.2.4: The Problem of Statistical Significance in Performance Measurement . . .

Numerical Example:

- **Quarterly returns, 3-yr comparison period.**
- **12 obs drawn from *true* difference between mgr(i) & benchmark(B) return: $E[\, r_i - r_B \,]$.**
- **Suppose favorable circumstances for making inference:**
  - **$E[\, r_i - r_B \,]$ constant over time.**
  - **Volatility of r_i & r_B = 5%/qtr (each).**
  - **$CORR\, [\, r_i, r_B \,]$ = +90%.**
- **Then mgr TWRR would have to beat benchmark by >500 basis-points per annum before we could conclude with statistical significance that the central tendency of the mgr's return exceeds that of the benchmark return (i.e., rigorous case for *skill* as opposed to *luck*).**

27.2.4: The Problem of Statistical Significance in Performance Measurement . . .

Calculations:

- **Standard error of quarterly difference in returns:**

$$\sigma_{i-B} = \left(\sigma_i^2 + \sigma_B^2 - 2C\sigma_i\sigma_B\right)^{\left(1/2\right)}$$
$$= \left[0.05^2 + 0.05^2 - 2(0.9)(0.05)(0.05)\right]^{\left(1/2\right)}$$
$$= 2.24\%$$

- **Standard error of observed qtrly avg difference =**

$$= \sigma_{i-B} \Big/ \left[(N-1)^{\left(1/2\right)}\right] = 2.24\% \Big/ \sqrt{12-1} = 0.675\%$$

- **X 2 std.errs for 95% statistical confidence: 2(0.675%) = 1.35%.**
- **Annualize: $(1.0135)^4 - 1 =$ 5.51% /yr. difference required.**

27.2.4: The Problem of Statistical Significance in Performance Measurement . . .

Implications:

- **You cannot use purely quantitative benchmarking comparisons to rigorously identify superior managers ex post.**
- **Don't apply such benchmarking *mechanistically* or in isolation.**
- **Include broader analyses and qualitative information in conjunction with quantitative benchmarking:**
  - **Performance attribution analysis may be useful in this regard.**
- **And remember . . .**

27.2.4: The Problem of Statistical Significance in Performance Measurement . . .

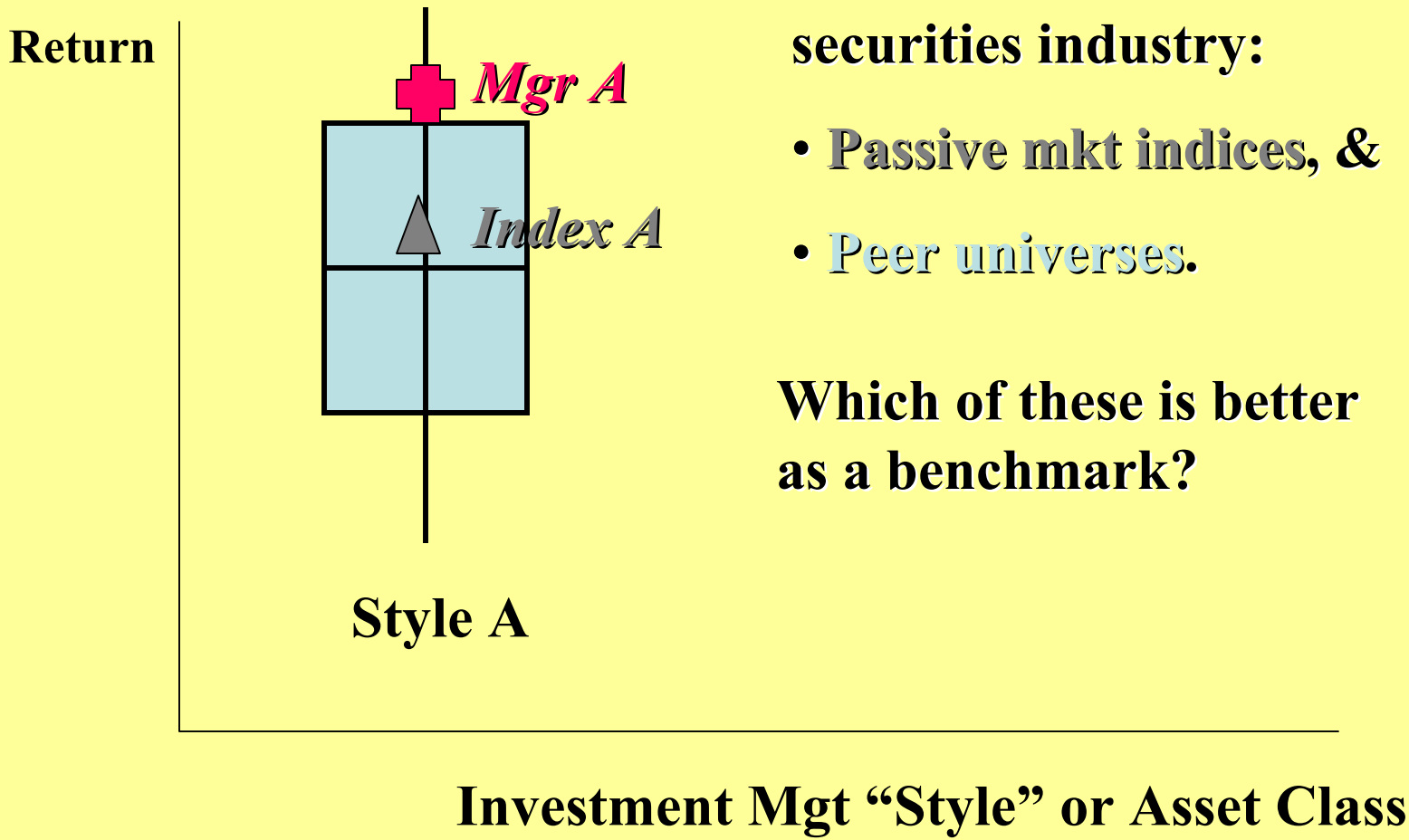
Implications:

***Ex Ante* Purposes (most important):**

- **Communication (Client → ← Manager).**
- **Interest-Alignment (Client ← → Manager).**
- **Weed out *inferior* managers.**

- **The *ex ante* role of benchmarking is not negated by the problem of lack of statistical significance:**
  - **Even with noise, a better mgr who works harder for the client is more likely to beat the benchmark.**
  - **Communication betw mgr & client is improved by identification of benchmark at outset of contract.**

27.2.2. Criteria for an Ideal Benchmark Index . . .



Recall that two different types of benchmarks are often used in the securities industry:

- **Passive mkt indices, &**
- **Peer universes.**

Which of these is better as a benchmark?

27.2.2. Criteria for an Ideal Benchmark Index . . .

In the securities industry, there is some argument that peer universes are not as good as passive market indices for benchmarking purposes:

- **Peer universes suffer from "survivor bias".**
- **Peer universes don't meet all of the "*Bailey Criteria*":**

The "*Bailey Criteria*":

- **Unambiguous**
- **Investable**
- **Measurable**
- **Specified in advance**
- **Appropriate to Mgr**
- **Reflective of Mgr**

27.2.2. Criteria for an Ideal Benchmark Index . . .

Alas, in private real estate, we don't really have a passive market index, that is, an index that:

- **Covers the entire commercial property market; &**
- **Maintains a constant set of assets.**

Private real estate benchmark indices are peer universe indices:

- **Indices that represent the performance of (almost) the *entire population* of properties held by the universe of investment managers competing for the business of the institutional "*core*" style of private real estate investment.**
- ***"Active"* mgt is *necessary* in private R.E. investment (operational control of assets).**
- **The NCREIF Index is a peer universe index in the US.**
- **The IPD Index is a peer universe index in the UK.**

27.2.2. Criteria for an Ideal Benchmark Index . . .

How serious a problem is the lack of a passive market index for the private real estate investment industry? . . .

- **Such an index would be very useful for *research* purposes.**
- **But, in contrast to the securities industry, the argument for the superiority of passive market indices for *benchmarking* purposes does not carry over to the private real estate investment industry:**
  - **There is not much of a survivorship problem in property-level indices such as NCREIF.**
  - **Investment turnover is not rapid in R.E. indices.**
  - **Some of the "Bailey Criteria" do not make sense for the private real estate investment industry.**
    e.g., perfect index investability is not possible in an asset class where unique, whole assets are traded.

27.2.2. Criteria for an Ideal Benchmark Index . . .

Fundamental Criteria of Benchmark Indices:

1. Measurability: **QUANTITATIVE COMPARISON.**

2. Client Investability: **MGR HIRED FOR *INCREMENTAL* CONTRIBUTION OVER WHAT CLIENT COULD DO.**

3. Manager No Forced Bet: **MGT PRINCIPLE: EVALUATION = RESPONSIBILITY = AUTHORITY.**

4. Appropriateness (Mgr Style & Spec.): **USEFULNESS FOR CLIENT STRATEGY IMPLEMENTATION, FAIRNESS FOR MGR.**

5. Non-manipulatability: **CREDIBILITY & *EX ANTE* ROLE.**

6. Agreement in Advance: **COMMUNICATION & FAIRNESS.**

27.2.2. Criteria for an Ideal Benchmark Index . . .

Peer universe indices (like the NCREIF Index) implement these criteria reasonably well for the private real estate investment industry. E.g.,:

Client Investability:	**Client could have hired any other competing mgr from peer universe, instead of subj.mgr., so peer universe is "*ex ante investable*".**
Manager No Forced Bet:	**Mgr can duplicate *types* of properties in peer universe index.**

- **Peer universe benchmark indices are like a *"Consumer Reports"* of the investment industry.**
- **You compare a given investment manager's performance with that of all of his relevant competitors ("peers" – managers the investor could have hired instead of the given manager: i.e., those with the same style & specialization).**

Peer universe indices are *reasonable* and *prudent* measures for benchmarking private real estate performance.

27.2.2. Criteria for an Ideal Benchmark Index . . .

Some practical implications of ideal benchmark criteria:

CRITERIA:

3. Manager No Forced Bet

&

4. Appropriateness

- **Fixed real return targets are *NOT* good Benchmarks.**
- **Direct (private) real estate investment mgrs or portfolios should *NOT* be benchmarked against REIT Indices.**

27.2 (cont.):

Issues in Benchmarking Private Real Estate

- Population vs sample implications.
- Controlling for risk.
- Segment weighting in the benchmark index.
- Valuation methodology.
- IRR vs TWRR benchmarking.

27.2.2 (cont.): Population vs Sample Implications . . .

Is the ideal benchmark index an entire *population*, or is it a *sample*?

What is the difference?, and why does it matter?

Census of entire population ➔ No need for statistical inference.

Sampling ➔ Can't avoid statistical inference issues.

Ideal benchmark index = Entire peer universe population:

- **Practical feasibility to include entire peer universe (almost).**
- **Legalistic function, Avoid "error" in comparisons.**

Ideal asset class research index = Scientific sample:

- **Asset class too large, Census impractical.**
- **But peer universe is not a "*scientific*" sample.**

27.2.2 (cont.): Population vs Sample Implications . . .

Implications for appropriate index construction methodology…

Index as Population ➔ Value-weighted returns (VW):

$$r_t = \sum_{i=1}^{N} \frac{V_{i,t-1}}{V_{t-1}} r_{i,t}$$

Index as Sample ➔ Equal-weighted returns (EW):

$$r_t = \frac{1}{N} \sum_{i=1}^{N} r_{i,t}$$

27.2.6. Controlling for Risk . . .

The Problem:

- **The Capital Market naturally provides higher returns (on avg over LR) for "more risky" assets.**
- **Manager must not be able outperform benchmark simply by investing in more risky assets or using leverage.**
- **Hence, we need to *CONTROL FOR RISK*.**

27.2.6. Controlling for Risk . . .

Two ways to control for risk:

- **Quantitatively, using "*risk-adjusted returns*", by adjusting the mgr's ex post return to reflect the market's "price of risk".**
- **Non-quantitatively, using "*style-based benchmarking*", by constraining manager to same style (similar-risk) assets, same style & risk as his benchmark.**

27.2.6. Controlling for Risk . . .

The Quantitative Approach: e.g., The Treynor Ratio...

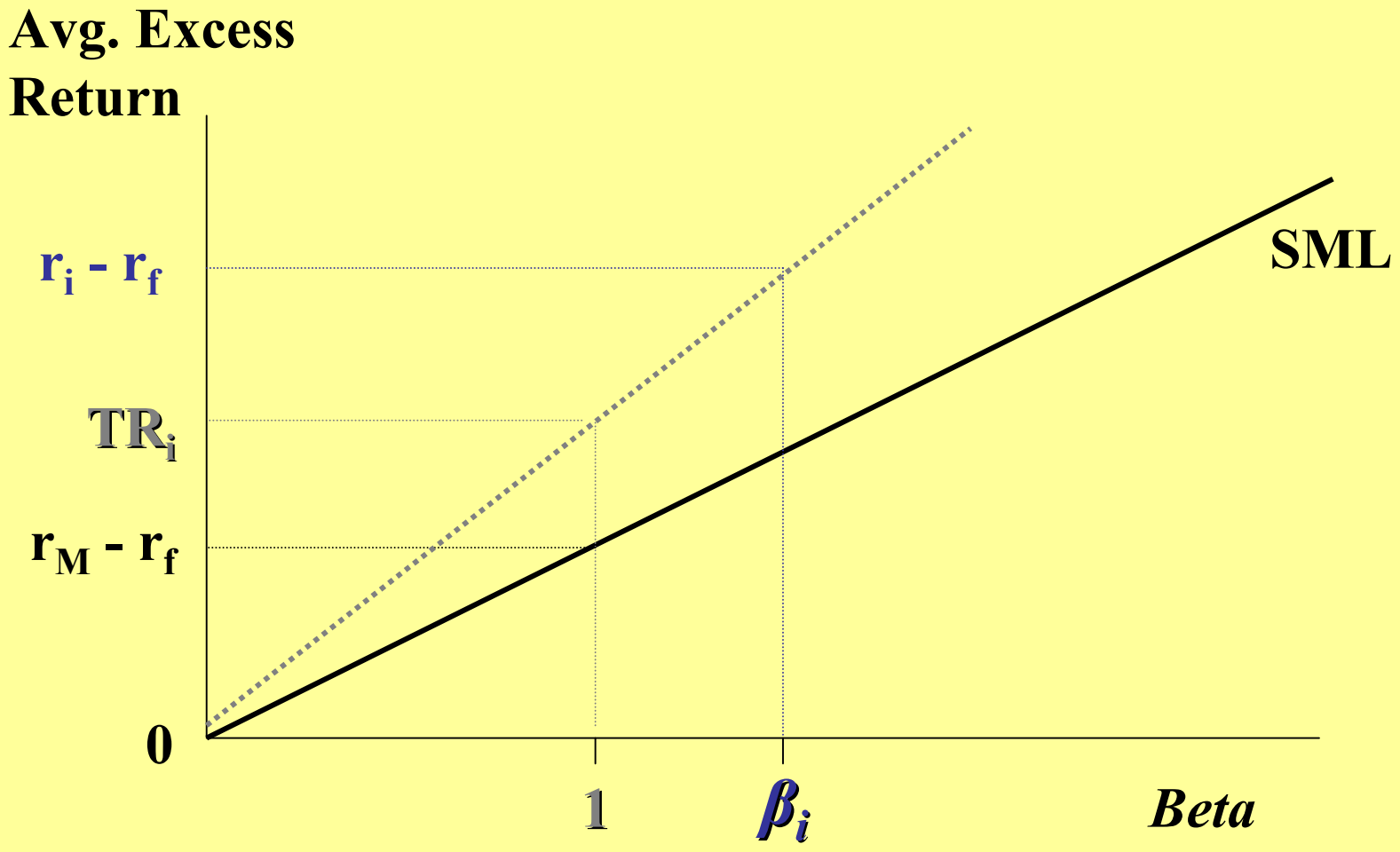
$$TR_i = \frac{\bar{r}_i - r_f}{\beta_i}$$

***Beta* = Amount of "Risk" *AS IT MATTERS TO THE CAPITAL MARKET*.**

This enables Portfolio "i"'s ex ante excess return, E[r_i-r_f], to be ADJUSTED FOR RISK.

27.2.6. Controlling for Risk . . .

The Quantitative Approach: e.g., The Treynor Ratio...



27.2.6. Controlling for Risk . . .

Within the private real estate investment industry, we must rely primarily on the "Non-Quantitative" (Style-Based) Approach to controlling for risk. *Why?*

27.2.6. Controlling for Risk . . .

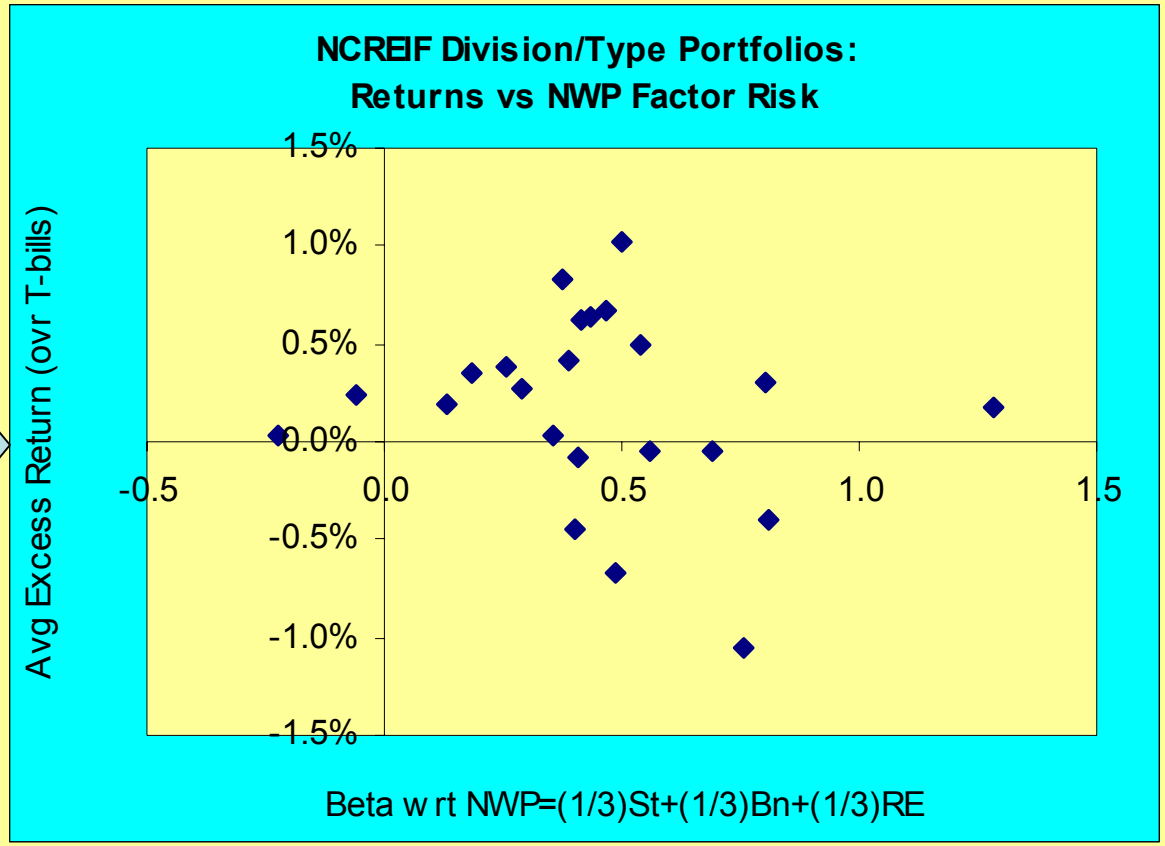
Within the private real estate investment industry, we must rely primarily on the "Non-Quantitative" (Style-Based) Approach to controlling for risk.

- **We cannot effectively quantify risk in the private real estate asset class *in the way that it matters to the capital market*, so we cannot quantify *risk-adjusted return measures* with sufficient credibility for use in benchmarking.**
- **The property market cannot distinguish between the amount of risk in different types or locations of properties (so long as they are all "institutional-quality").**

27.2.6. Controlling for Risk . . .

Within the private real estate investment industry, we must rely primarily on the "Non-Quantitative" (Style-Based) Approach to controlling for risk. *Recall Ch.22 (sect.22.3)*…

Horiz. Axis is Beta wrt "National Wealth Portf", but that doesn't matter.



27.2.6. Controlling for Risk . . .

Within the private real estate investment industry, we must rely primarily on the "Non-Quantitative" (Style-Based) Approach to controlling for risk.

At this level of detail, *WITHIN A GIVEN STYLE* of the (instl) R.E. asset class, the market cannot distinguish stable, reliable differences at the property level in "*beta*", the risk that matters.

Therefore, we not only *cannot*, but we *need not* adjust for risk, as long as the manager & his benchmark are both confined *WITHIN A GIVEN STYLE* of the institutional RE asset class.

27.2.6. Controlling for Risk . . .

Real Estate "Styles" are a bit vaguely defined:

- **Domestic "Core"**
- **Value-added/Opportunistic**
- **International**
- **etc (NCREIF currently working on standardized style definitions).**

Discrete style/risk categories defined by:

- **Property size limits;**
- **Leverage limits;**
- **Development project exposure limits (occupancy).**

In practice, this approach requires considerable specification & elaboration betw agent & principal at outset of mgt contract, & perhaps on-going.

27.2.6. Controlling for Risk . . .

Example:

- **Fund restricted to fully-stabilized core property investments, but *allows use of high leverage* (up to 75%, at discretion of fund mgr).**

- **Appropriate benchmark & risk control could be either:**
  1. **Peer universe of all (& only) other such funds, or**
  2. **NCREIF Index adjusted for leverage using a WACC formula, with a pre-specified target leverage ratio:**

$$r_E = r_D + (r_P - r_D)LR$$

Where:

r_E **= Levered equity return,**

r_D **= Debt return,**

r_P **= Property (unlevered) return (NPI),**

LR **= Leverage ratio (*V/E*), pre-specified.**

27.2.6. Controlling for Risk . . .

Some implications of style-based benchmarking:

- **Fixed real return targets are not good benchmarks.**
- **Direct property investment should not generally be benchmarked against a REIT Index, *however*:**
  - **Property operational level performance comparisons & attribution analyses may be of interest for diagnostic purposes at the property-level across all properties of a given type, including different types (or styles) of investor/owners.**
  - **Comparisons *across* styles or peer groups are of interest at a broader level, relevant for strategic investment and asset class *research* (as opposed to agent performance evaluation benchmarking, per se).**

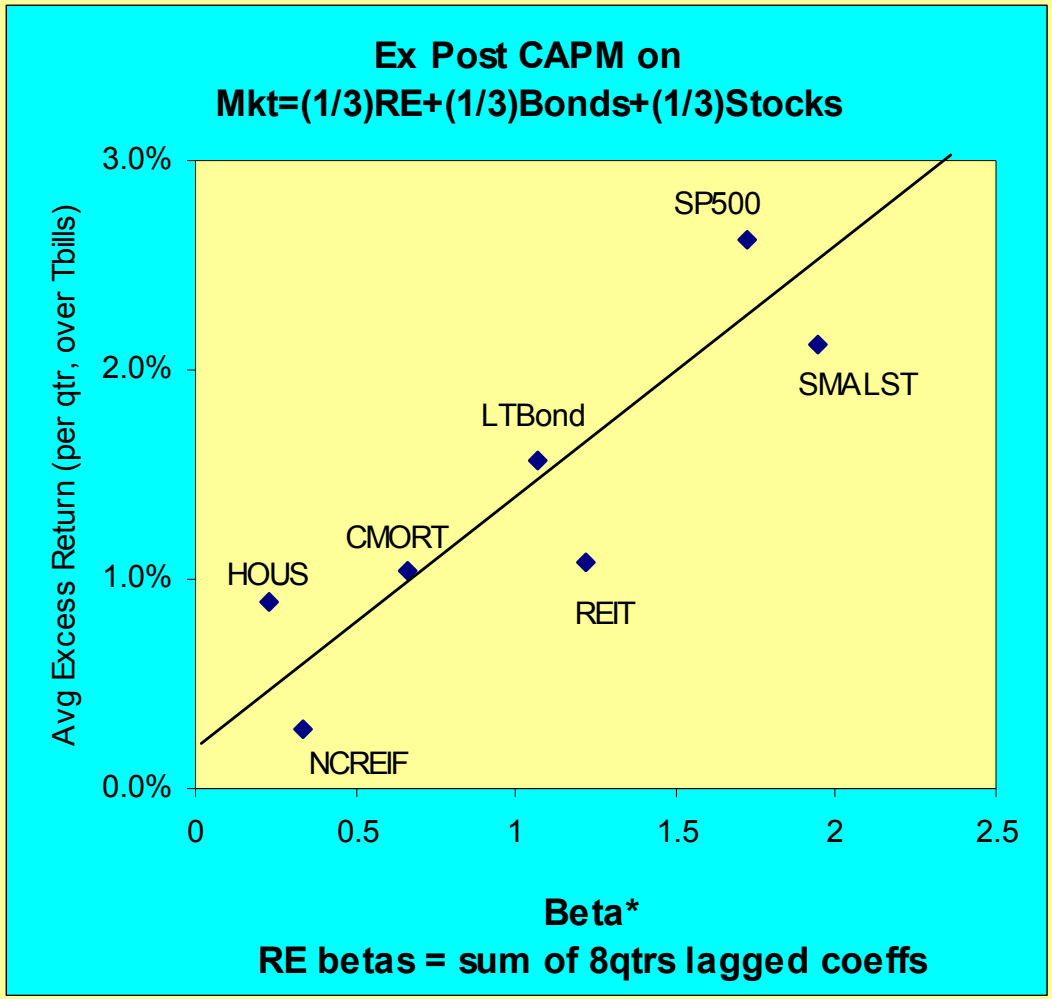
Controlling for Risk at a Broader Level (Ch.22, Sect.22.2). . .

The previous conclusion about inability to use quantitative (risk-adjusted return-based) control for risk does not necessarily hold for portfolios (or mgrs) that span ACROSS multiple asset class quadrants. . .

- **REITs**
- **CMBS**
- **Whole Loans**
- **Private R.E. Equity**
- **etc. . .**

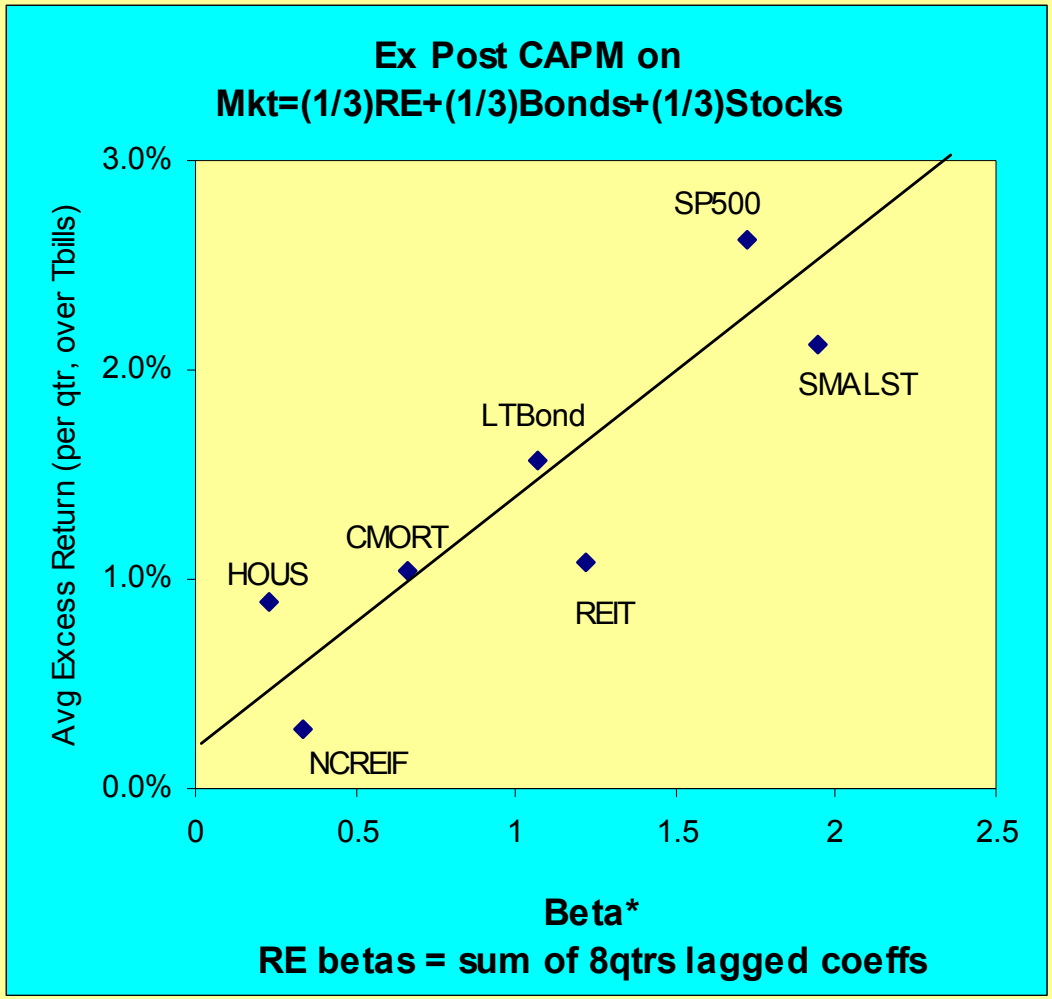
Controlling for Risk at a Broader Level (Ch.22, Sect.22.2). . .

Look at this plot of average returns and betas ACROSS multiple quadrants. . .



Controlling for Risk at a Broader Level (Ch.22, Sect.22.2). . .

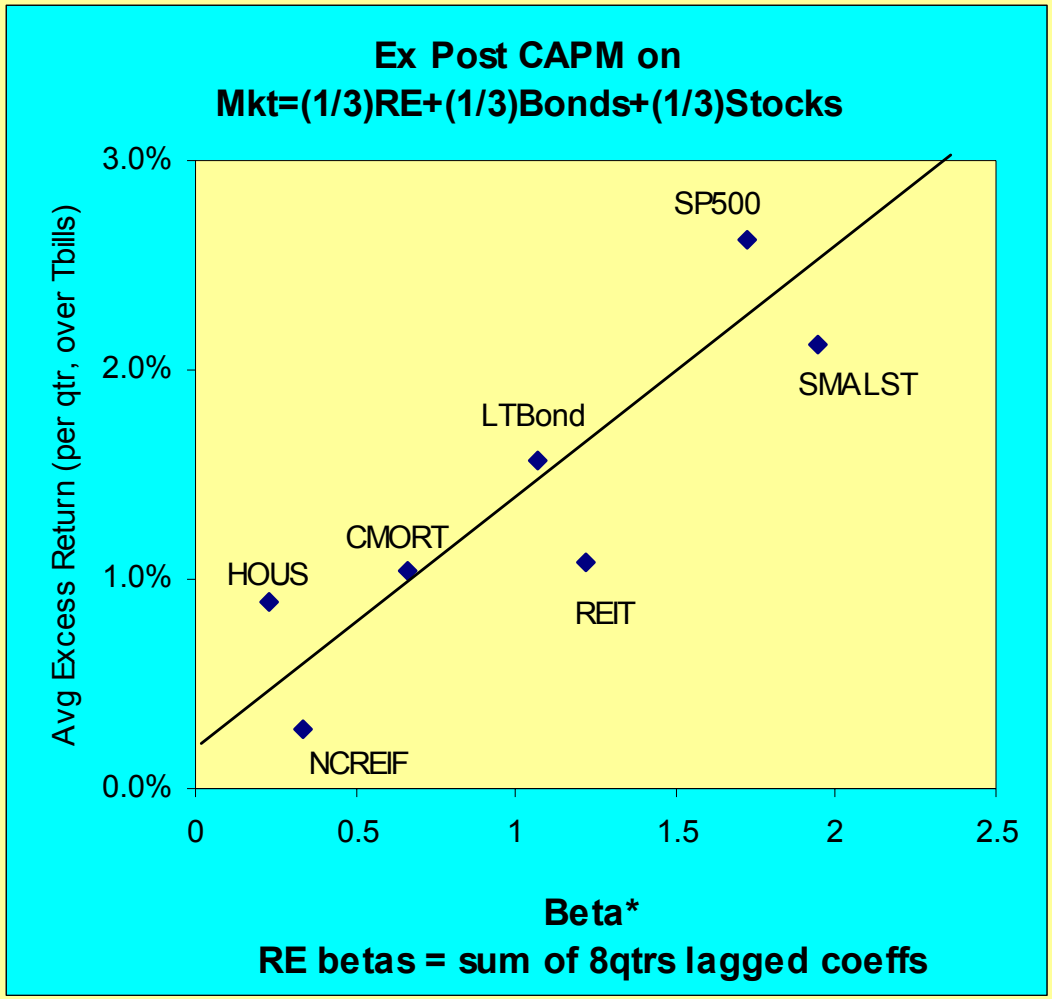
Regression statistics for historical returns ACROSS multiple quadrants. . .



- **Adj. R^2 = 73%**
- **Intercept is Insignif.**
- **Coeff on Beta is Pos & Signif.**

Controlling for Risk at a Broader Level (Ch.22, Sect.22.2). . .

"*Beta*" wrt "National Wealth" is priced *ACROSS* the quadrants . . .



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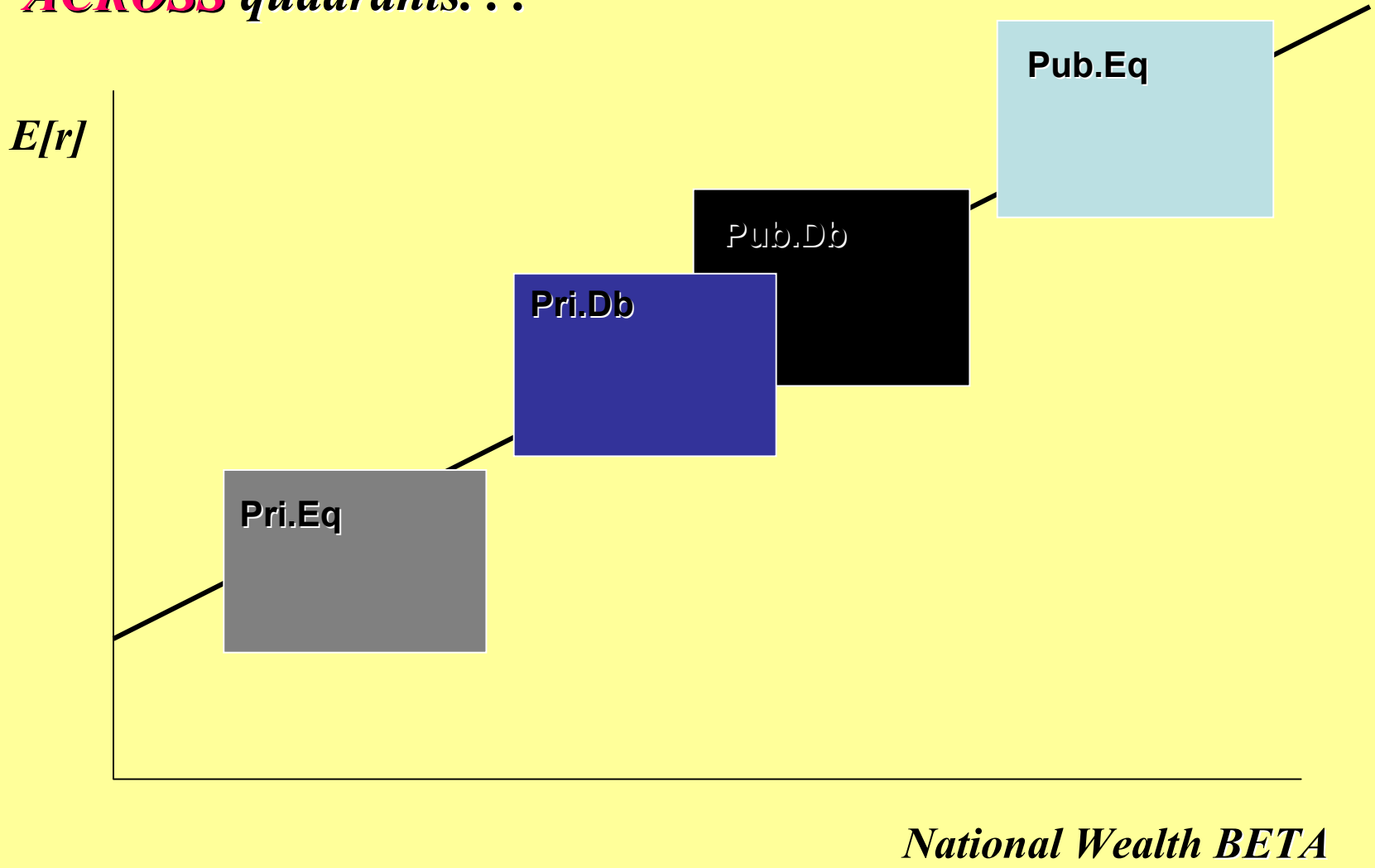
- **Coeff on Beta is Pos & Signif.**

"CAPM works..."

Controlling for Risk at a Broader Level (Ch.22, Sect.22.2). . .

The Capital Market does perceive (and price) risk differences ACROSS quadrants. . .



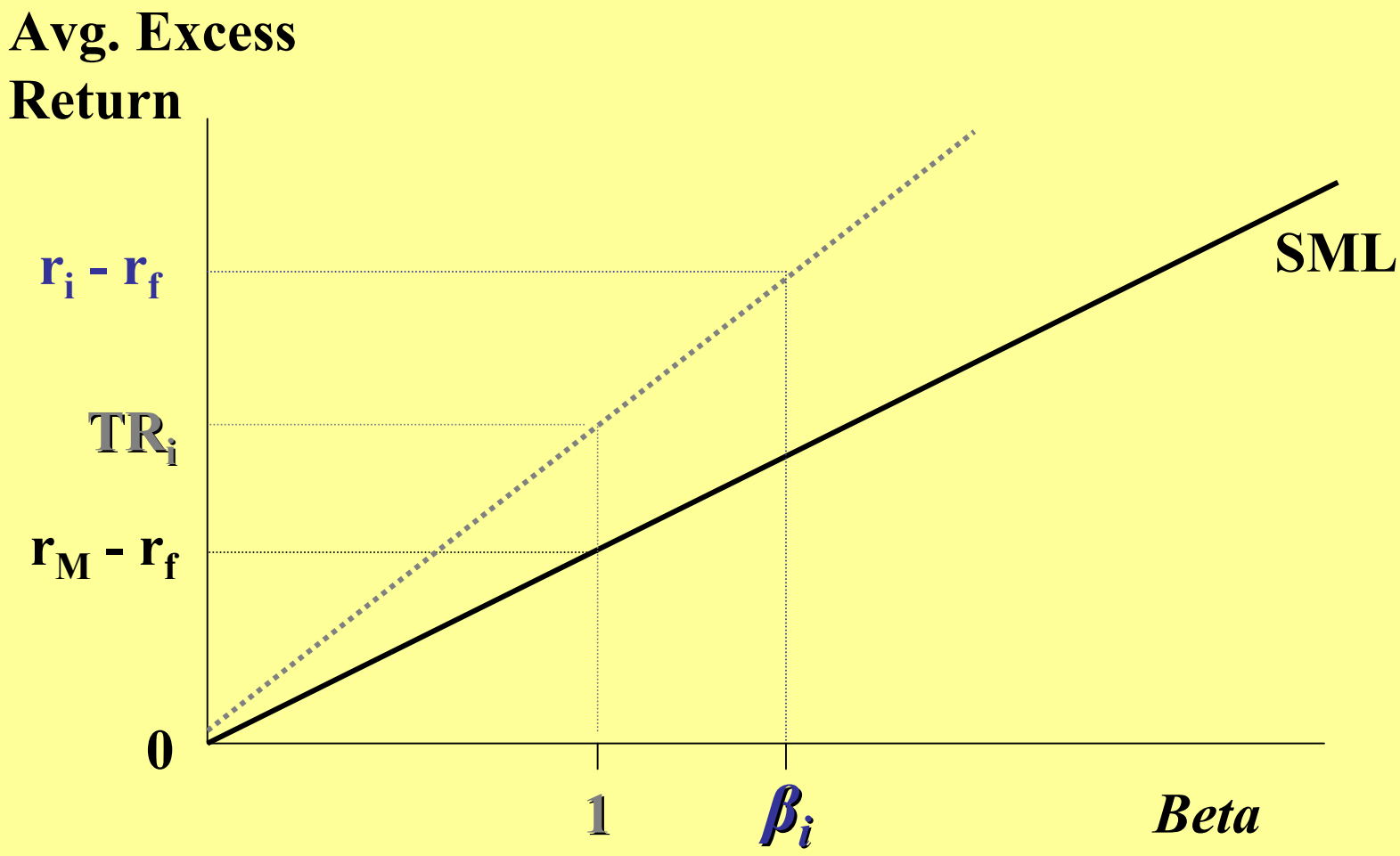
Controlling for Risk at a Broader Level (Ch.22, Sect.22.2). . .

Asset Class Ex Post Betas and Risk Premia (Per Annum, over T-bills, 1981-98)...

Asset Class:	Excess Return:	Beta:
Small Stocks	8.48%	1.94
S&P500	10.48%	1.72
REITs	4.32%	1.22
LT Bonds	6.24%	1.07
Com.Mortgs	4.15%	0.66
NCREIF	1.15%	0.34
Houses	3.59%	0.23

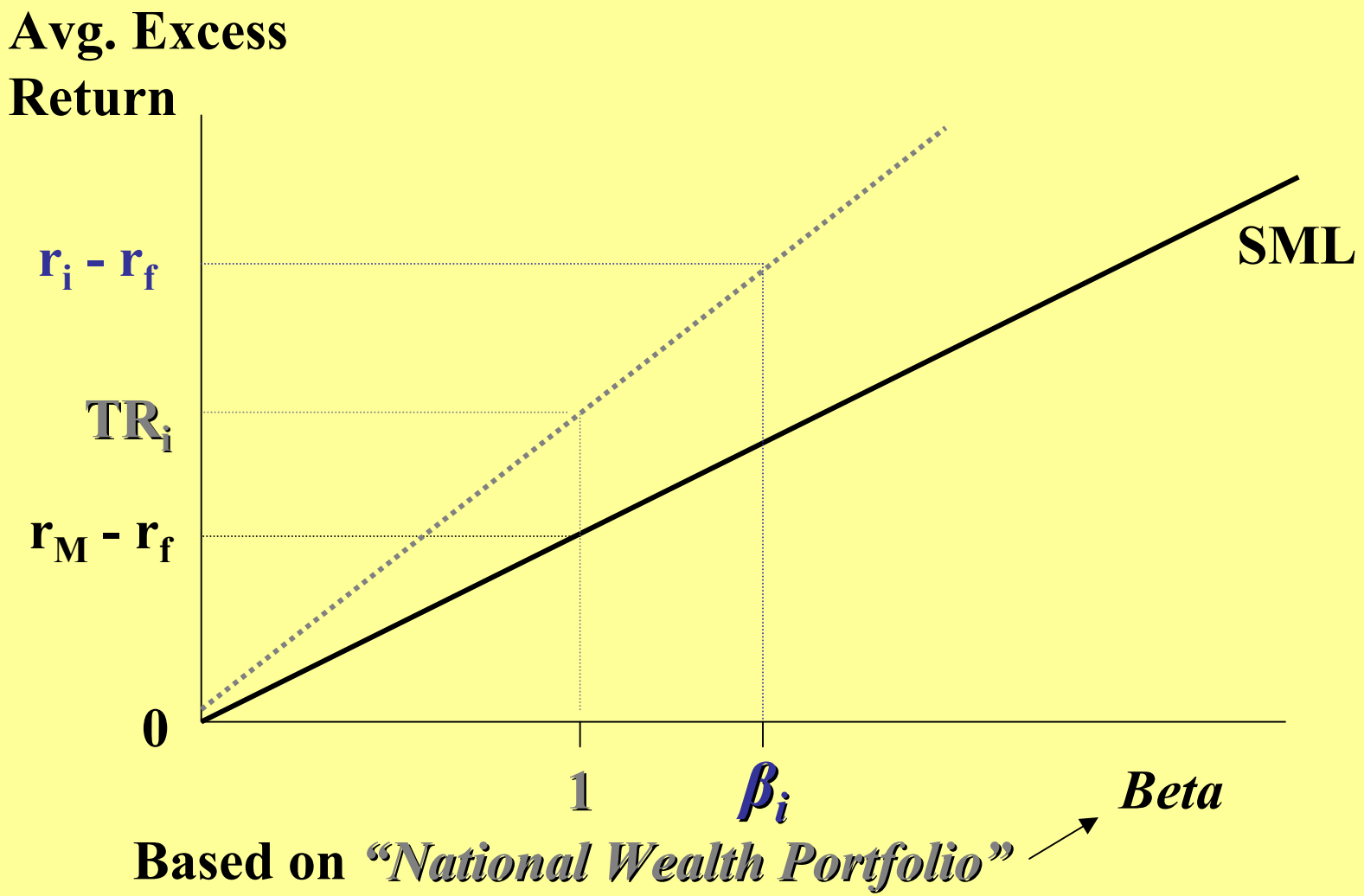
Controlling for Risk at a Broader Level (Ch.22, Sect.22.2). . .

The Treynor Ratio (or something like it) should be applied to multi-quadrant managers (portfolios)...



Controlling for Risk at a Broader Level (Ch.22, Sect.22.2). . .

The Beta can be estimated based on the "National Wealth Portfolio" (= (1/3)Stocks + (1/3)Bonds + (1/3)RE) as the multi-quadrant "Risk Benchmark".



27.2.3. Segment weighting in the benchmark index. . .

Definition:

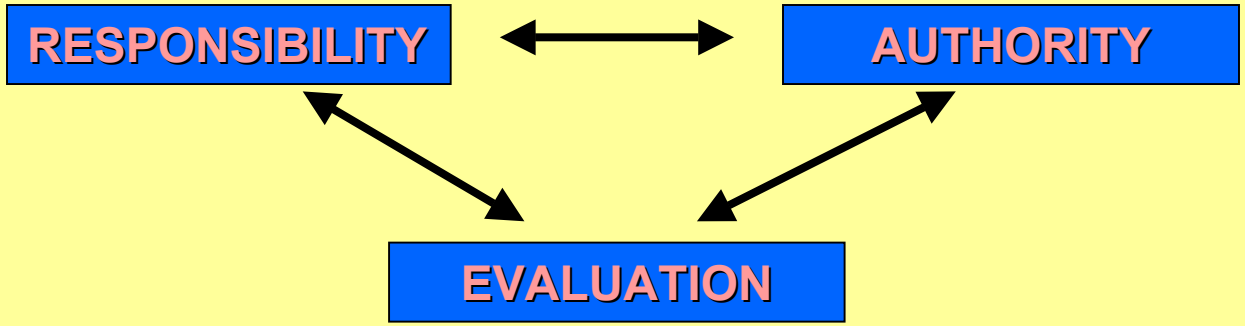
Real estate asset market "*segment*"

= Property type & geographic location.

- **Suppose manager has discretion to allocate capital across more than one segment.**
- **Then benchmark should include all the segments manager could choose among.**
- **But what should be the allocation weights across the segments in the benchmark index? . . .**

27.2.3. Segment weighting in the benchmark index. . .

- **No single general rule for benchmark segment allocation weights.**
- **Weights should be "*appropriate*". Should reflect:**
  - ➔ ***Client's objectives*** **for the manager;**
  - ➔ ***Manager's specialization*** **and;**
  - ➔ **Manager's range of *discretion* over allocation policy.**
- **General management principle involved is:**



Equate responsibility to authority, & evaluate accordingly.

27.2.3. Segment weighting in the benchmark index. . .

General implications:

- **Peer universe sub-indexes should often be used to construct custom-weighted benchmark, with weights fixed in advance (i.e., NPI used only for benchmark *within-segment* return performance).**
- **Example:**
  - **Mgr hired to place capital into industrial & office properties at her discretion:**
  - **Benchmark = 50% NPI Office + 50% NPI Industrial.**
- **In absence of clear reason otherwise, simple equal-weighting may make sense.**
- **Typical mgr will avoid bet against benchmark, so benchmark weight should reflect client's allocation target objective. (e.g., skew weights accordingly).**

27.2.3. Segment weighting in the benchmark index. . .

Note:

Previous general point about fixing benchmark weights in advance to reflect client's target objective for the mgr holds not only for market segment weighting in the benchmark, but also for other characteristics of the benchmark, such as the degree of leverage, the allocation across different styles (e.g., development exposure), etc. (e.g., for benchmarking a multi-style manager).

27.2.3. Segment weighting in the benchmark index. . .

Other alternatives for benchmark segment weighting:

- **A reasonable (& popular) alternative is to use the peer universe weights (e.g., NPI weights for the segments the mgr has discretion to invest in).**
  - **Rationale is "*client investability*" criterion:**
    - **It's what client would have gotten (ex ante) if they had chosen a "typical" alternative (competing) mgr.**

27.2.3. Segment weighting in the benchmark index. . .

Other alternatives (cont.):

- **Theoretical alternative: Use *market* weights – Share of each segment in total asset class market value.**

- **Advantage of this approach:**
  - **May reflect mgr's relative ability to find available properties.**
  - **May reflect relative ability of market to absorb new capital.**

- **Problems with this approach:**
  - **Since CAPM doesn't work well for R.E., we don't know if market weights are theoretically optimal from a portfolio strategy perspective.**
  - **Empirically it is difficult to precisely determine the market weights.**

Ch.23 & Ch.25: Valuation Methodology. . .

How asset & portfolio values are measured or estimated in constructing the benchmark index (and also in computing the subject manager's performance record).

- **Fundamental issue relevant not just for benchmarking.**
- **Issue that is unique and particular to private real estate.**

Fundamental source of the problem is that in private real estate markets:

- ***unique, whole assets*** **are traded**
- ***infrequently and irregularly*** **through time,**
- **in deals that are privately negotiated between** ***one buyer and one seller*****.**

(All three of these characteristics differ from securities mkts.)

IRR vs TWRR Benchmarking. . .

Benchmarking is an exercise in comparison of multi-period returns.

Recall from Chapter 9 that there are two types of multi-period return measures (TWRR & IRR), and that:

- **TWRR is the standard performance measure in the securities industry and in traditional ("core") real estate investment.**
- **TWRR is neutral with respect to the *timing* of capital flow in and out of the investment.**
- **IRR reflects such timing, and**
- **IRR can be computed without regular periodic "*marking-to-market*" (appraisals).**

IRR vs TWRR Benchmarking. . .

IRR benchmarking is the standard practice in the private capital (e.g., "venture capital") investment industry.

It is also appropriate for performance evaluation in at least two applications in the real estate investment industry:

- **Benchmarking certain types of *"opportunistic"* real estate investments, most notably *development projects*.**
- ***Property-level performance attribution* of the type described earlier in this lecture.**

Because, in both cases:

- **The subject investments are often *not regularly marked-to-market*, and**
- **The responsible investment managers (whose performance is being evaluated) are largely responsible for cash flow *timing* decisions that can significantly effect returns.**

IRR vs TWRR Benchmarking. . .

IRR-Based benchmarking requires the use of:

Inception-date Cohorts

(or "Acquisition-date cohorts").

- **IRR is computed since inception (or acquisition) of portfolio (or property).**
- **IRR is computed for appropriate benchmark cohort, defined as similar investments with same inception (or acquisition) date, over same period of time as subject.**
- **Benchmark cohort IRR normally "*pooled*" (all cash flows aggregated together each period).**
- **Terminal (current) value must be estimated for all assets remaining in pool at end of evaluation period, based on appraisal at terminal point in time.**

IRR vs TWRR Benchmarking. . .

In real estate, IRR-based benchmarking will often require the use of *simulated IRR cohorts* as the benchmark, because of lack of sufficient data.