MEMBERS' MONEY MATTERS MOST

MEASURING ASSET CLASS PERFORMANCE

Presented to the

ILLINOIS PUBLIC PENSION FUND ASSOCIATION

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by

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INVESTMENT STRATEGY DECISION

EXAMPLE

50% publicly traded US stocks

20% publicly traded non-US stocks

30% US dollar fixed income

INVESTMENT POLICY STATEMENT

clear statement of investment strategy

clear statement of reasons

IMPLEMENTATION PERFORMANCE

ACTIVE MANAGEMENT COSTS MORE
DID YOU GET MORE?

COMPARE TOTAL RETURN TO POLICY PORTFOLIO

- **60% US stock market index**
- **20% non-US stock market index**
- **40% investment grade US bond index**

EXAMPLE:	**actual return**	**7.63%**
	policy return	**5.93%**
	implementation performance	**1.70%**

ASSET CLASS PERFORMANCE

DID YOU ACCOMPLISH THE GOAL?

over perform pure passive

COMPARE ASSET CLASS TO:

Index corresponding to the strategic decision

Index in the policy portfolio

EXAMPLE:	**actual US equity**	**10.16%**
	US equity index	**10.97%**
	implementation performance	**- 0.81%**

US EQUITY BENCHMARKS

DOW JONES:	**Dow Jones Industrial Average**
	US Total Stock Market
RUSSELL:	**3000**
S&P:	**500**
	1500

INDEX DIFFERENCES

SIZE and STYLE DEFINITIONS

UPDATE FREQUENCY

US versus NON-US

FLOAT FORMULA

COVERAGE

COVERAGE

RUSSELL 3000:	**largest 3,000 US stocks**
S&P 500:	**not the largest 500 US stocks**
S&P 1500:	**not the largest 1,500 US stocks**
DOW JONES US TOTAL:	**all publicly traded US stocks**

US STOCK BENCHMARK

DID YOU ACCOMPLISH THE GOAL?

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Index corresponding to US stock market

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- Dow Jones US Total
  - only index covering entire market
  - even if that is not the way you invest

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COUNTER ARGUMENTS

- Investability (liquidity and transaction costs)
- Cost of Changing
- Difference is too small to matter

INVESTABILITY

$100mm US EQUITIES, $4mm EXXON ($400bil market cap)

4% of asset class, equal to index weight

0.001% of Exxon

EASY

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EASY

$100mm US EQUITIES, $4mm XYZ ($50 mm market cap)

4% of asset class, 4.9995% over index weight

8% of XYZ

NOT PRACTICAL

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8% of XYZ

NOT PRACTICAL

$100mm US EQUITIES, $500 XYZ

0.0005% of asset class, equal to index weight

0.001% of XYZ

EASY

REPLICATION

INDEX FUNDS REPLICATE S&P 500

INDEX FUNDS DO NOT REPLICATE DOW JONES US TOTAL

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ACHIEVE LOW TRACKING ERROR THROUGH SAMPLING

- **approx. 0.10% per annum tracking error**
- **2,500 to 3,500 stocks**
- **not 1,500 stocks**
- **not the largest 3,000 stocks**

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INVESTABILITY IS NOT THE SAME AS REPLICATABILITY

INVESTABILITY

1980s	**perhaps 3,000 stocks was optimal**
2000s	**market is more liquid**
	market has lower transaction cost
	optimal number of stocks is higher

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MAKE INVESTMENT DECISIONS
BASED ON MARKET CONDITIONS TODAY
trustees or managers should decide

DO NOT MAKE INVESTMENT DECISIONS
BASED ON MARKET CONDITIONS 25 YEARS AGO
index provider should not decide

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WHATEVER THE DECISION, MEASURE THE IMPACT
benchmark should cover the entire US stock market

COST OF CHANGING

What is cost of changing $100 mm from Russell 3000 to Dow Jones US Total

100 bp transaction cost for US equities

Cost is not $1mm

Cost is $10,000 (1 bp)

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amount in US Total not in 3000	$5 mm
crossed trades	80%
amount traded	$1mm
transaction cost	1%
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BENCHMARK CHANGE DOES NOT REQUIRE PORTFOLIO CHANGE
DON'T CHANGE? MEASURE IMPACT.

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DIFFERENCE IS TOO SMALL

ARGUMENT:
LONG RUN RETURN OF S&P 1500 will be same as
LONG RUN RETURN OF Russell 3000 will be same as
LONG RUN RETURN OF Dow Jones US Total

BUT, FOR ANY GIVEN PERIOD, RETURNS WILL NOT BE THE SAME

WHAT IF THEY WERE?

RETURN OF US TOTAL = average return of all stocks
= 9.73% (for example)

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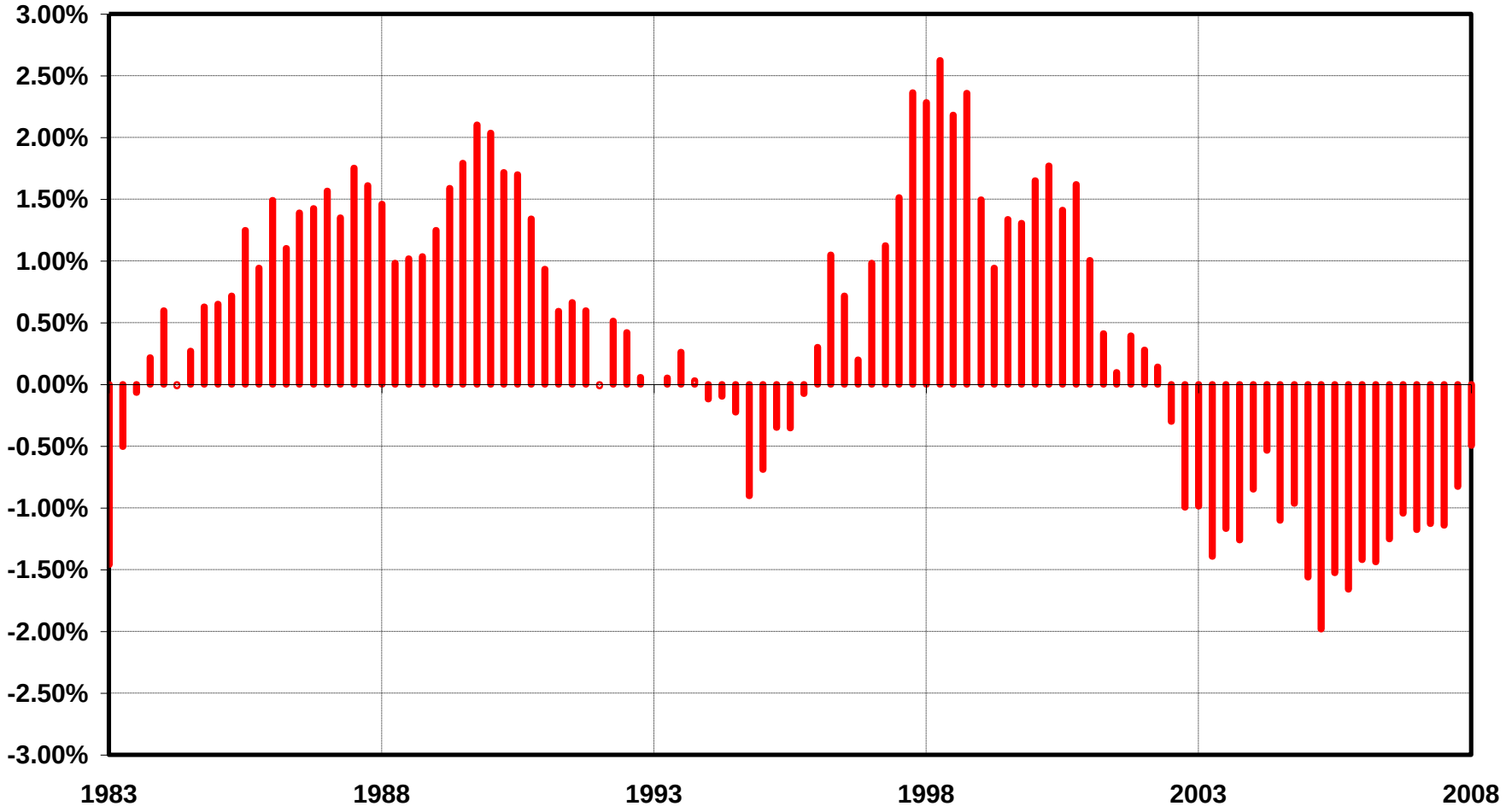
NOT PLAUSIBLE THAT RETURN OF LARGEST STOCKS
equals
RETURN OF SMALLEST STOCKS

S&P500 minus DJ US TOTAL

rolling five year returns



R3000 minus DJ US TOTAL

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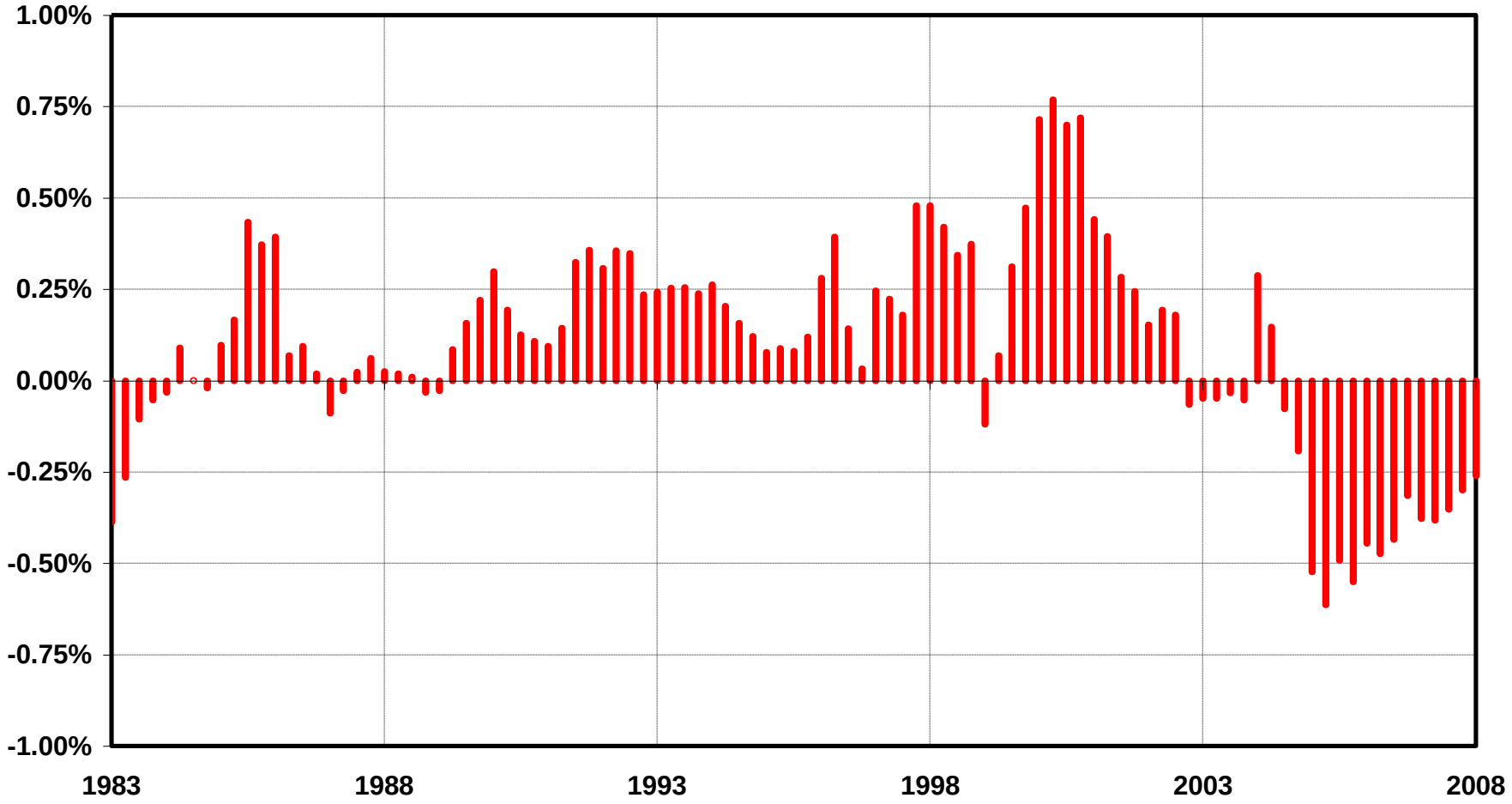

WHAT IS CLOSE ENOUGH?

BENCHMARK DIFFERENCES OF 0.5% p.a. OR MORE OVER FIVE YEARS ARE COMMON

often the difference between over and under performance

EXAMPLE	**actual US equity**	**3.88%**
	Russell 3000	**3.53%**
	US equity performance	**+ 0.35%**

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	actual US equity	**3.88%**
	DJ US Total	**4.02%**
	US equity performance	**- 0.14%**

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SLOPPY BENCHMARKING LEADS TO BAD DECISIONS

WHAT ABOUT LARGEST 5%

CLAIM:	**OK TO OMIT SMALLEST 5%**
BECAUSE:	**5% DOESN'T MATTER**
IN OTHER WORDS:	**95% IS CLOSE ENOUGH**

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IF TRUE THEN
CLAIM: **OK TO OMIT LARGEST 5%**
BECAUSE: **5% DOESN'T MATTER**
IN OTHER WORDS: **95% IS CLOSE ENOUGH**

NOBODY WOULD CLAIM THIS

CONCLUSION

MAKE YOUR IMPLEMENTATION DECISIONS

CORRECTLY MEASURE THE IMPACT OF YOUR IMPLEMENTATION DECISIONS

USE CORRECT PERFORMANCE BENCHMARK TO MAKE BETTER DECISIONS