Currency Management Indexes: What Do They Tell Us?*

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This presentation is for informational/academic purposes only.

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* Forthcoming in
Middleton, A (2009), "Foreign Exchange: A Practitioner's Approach to the Market", Risk Books

1) Motivation and Uses

2) Data description

3) Methodologies for index construction

4) Conclusion

1) Motivation & uses

- Hedge Fund Performance
  Relevant Benchmarks ?
  Zero (unfunded), Risk-free (funded), Peers ?

- HF indexes
  What do they tell us ?
  A) Non universal database of managers
  Issue of Completeness, Selection and Survival biases
  B) Different weighting schemes:
  Equally, Median, Asset Weighted
  Literature focus on [Average] Returns

- Shouldn't the analysis start with index volatility ?
  Different risk profiles could explain return variations

- Causes being
  - Managers/ Programs Volatility
    Potentially not Uniform across databases
  - Construction issues such as
    Equally weighted versus Median
    Number of Managers

- Risk standardisation necessary for return comparison

HF Database Providers

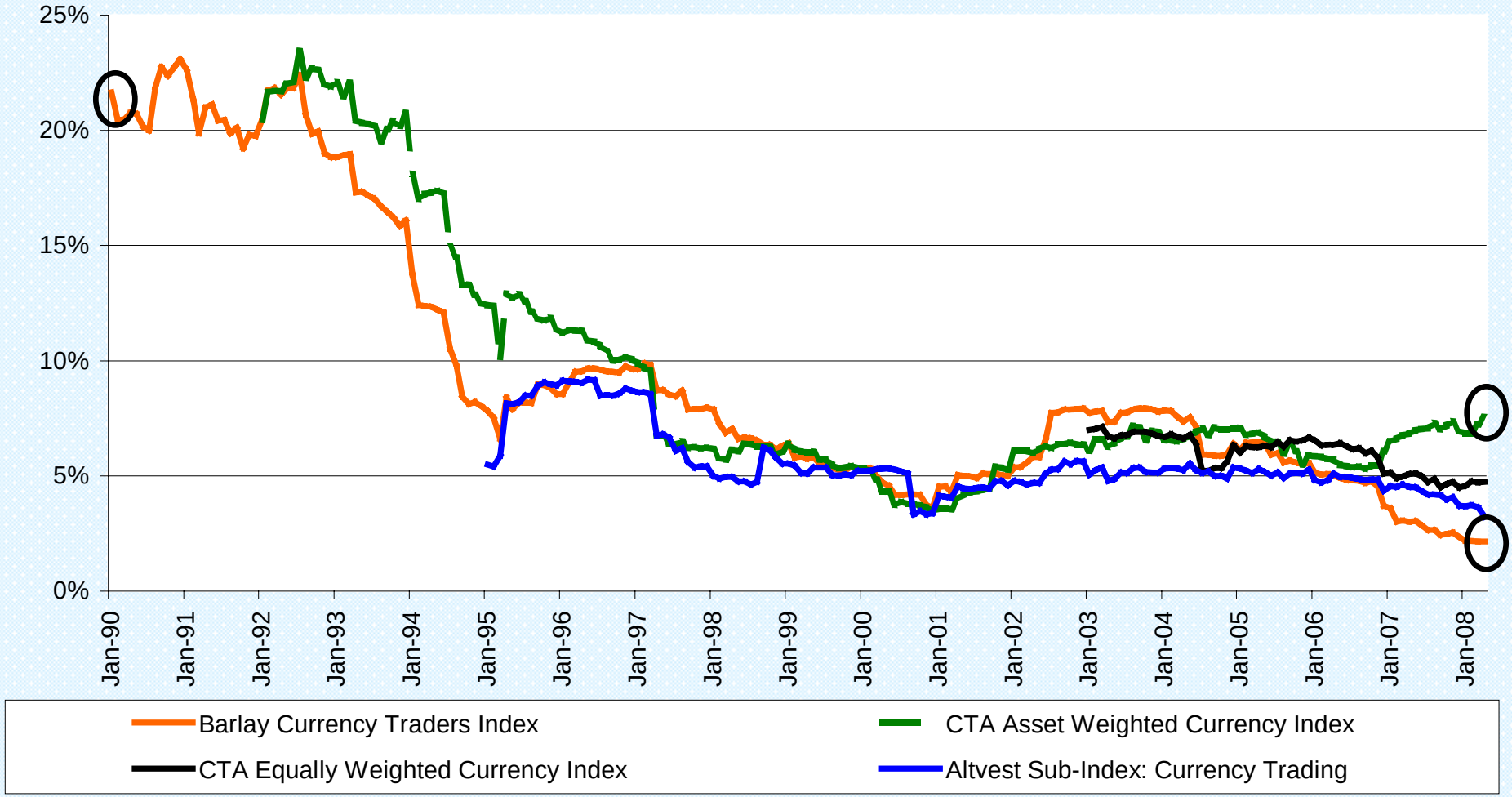
- Barclay Hedge
- Casam/Cisdm denoted CTA
- Altvest

- Others
  Tass/Tremont, Hedgefund.net,

$\Rightarrow$ Application to Currency Hedge Funds

(Parker FX index but no access to individual managers)

Volatility of Currency Indexes (24 Months Rolling)



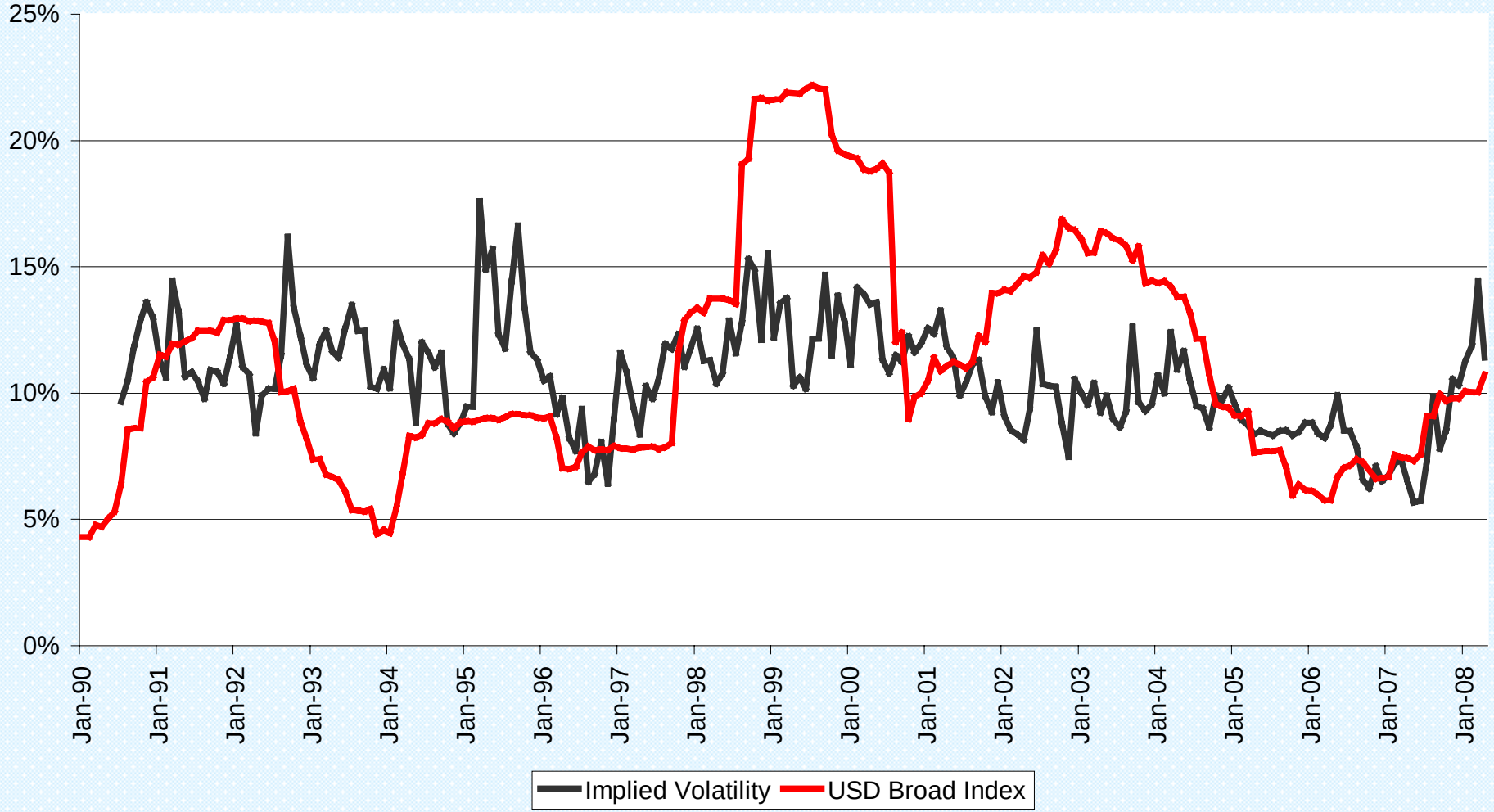
- Volatility profiles varies between

  a) Indexes
  As of end of Apr 08
  Barclay 2.15% Vs Asset Weighted 7.54%
  Ratio of 3.5 !

  b) Through time
  Barclay from 21.65% to 2.15%
  Divided by 10 between 1990 and 2008!

  Can it be [partly] explained by Market volatility ?

Volatility of the Foreign Exchange Market (24 Months Rolling)



2) Data description

- SEB FX Managed Account Platform*

  141 anonymous programs (called “managers”)
  Monthly excess returns over cash, net of fees
  From January 1990 until March 2008.
  At least 4 years track record ending March 2008.

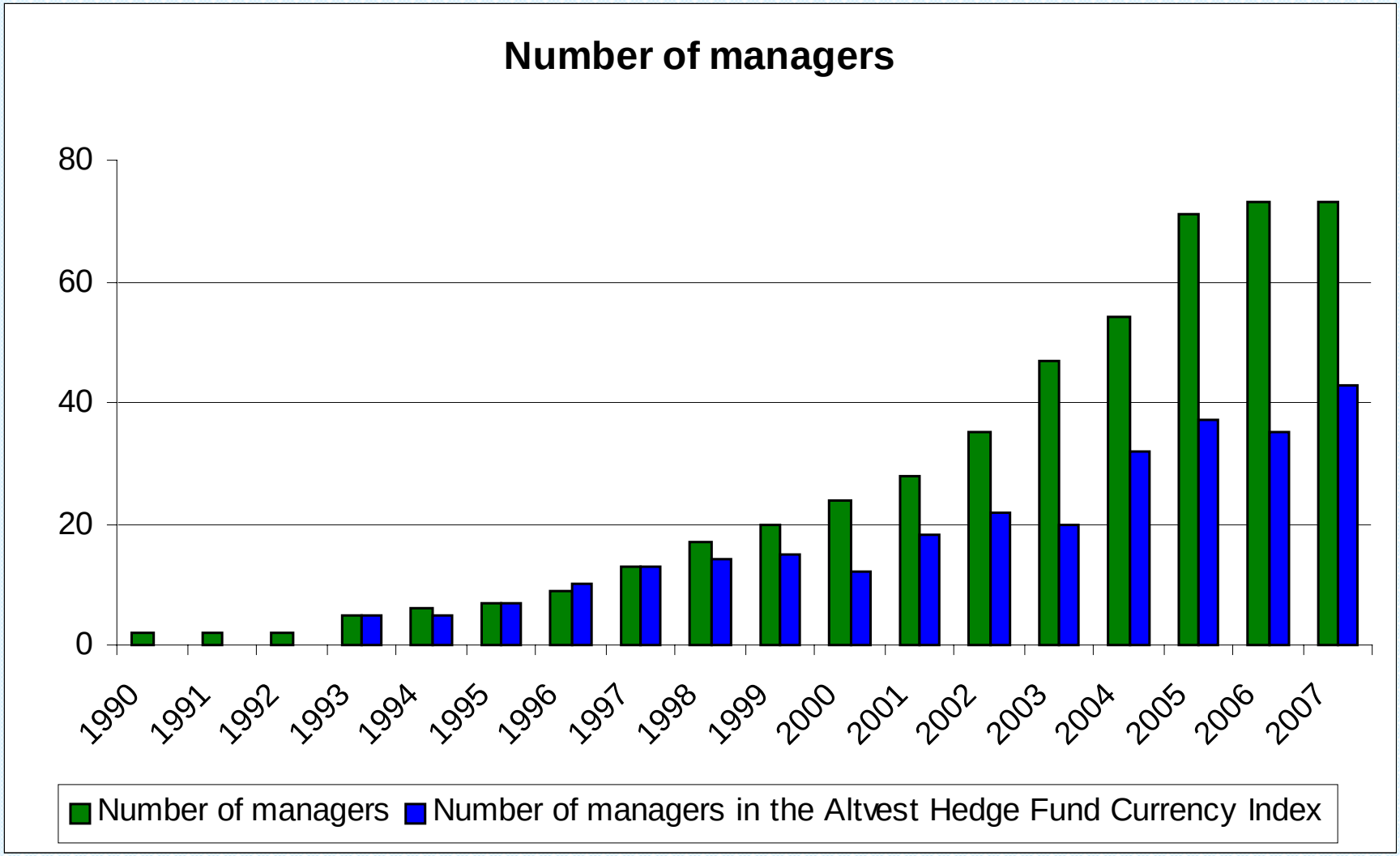
  => 73 managers.

* We are grateful to SEB for providing us the dataset without which this study would not have been possible. All errors remain ours.

Number of managers = Nb with at least 2 years track record at the end of that year

In line but not identical to http://www.barclayhedge.com/research/indices/cta/sub/cta.html

(4 years initially for a new manager, but 1 year for a new program)



73 Programs of # lengths Summary statistics

From overlay to leveraged managed accounts

	Average	Median	Min	Max
Volatility	9.01%	8.01%	0.76%	29.40%
Skewness	0.43	0.34	-1.43	3.28
Excess Kurtosis	1.99	0.92	-0.83	16.05

Trend following with some Carry ?

3) Methodologies for Index Constructions

- Portfolio Volatility

$$\sigma_p^2 = \sum_{i=1}^{n} \sum_{j=1}^{n} x_i x_j \rho_{ij} \sigma_i \sigma_j$$

where x is the proportion of total investment in manager i

ρi,j is the correlation coefficient between managers i and j

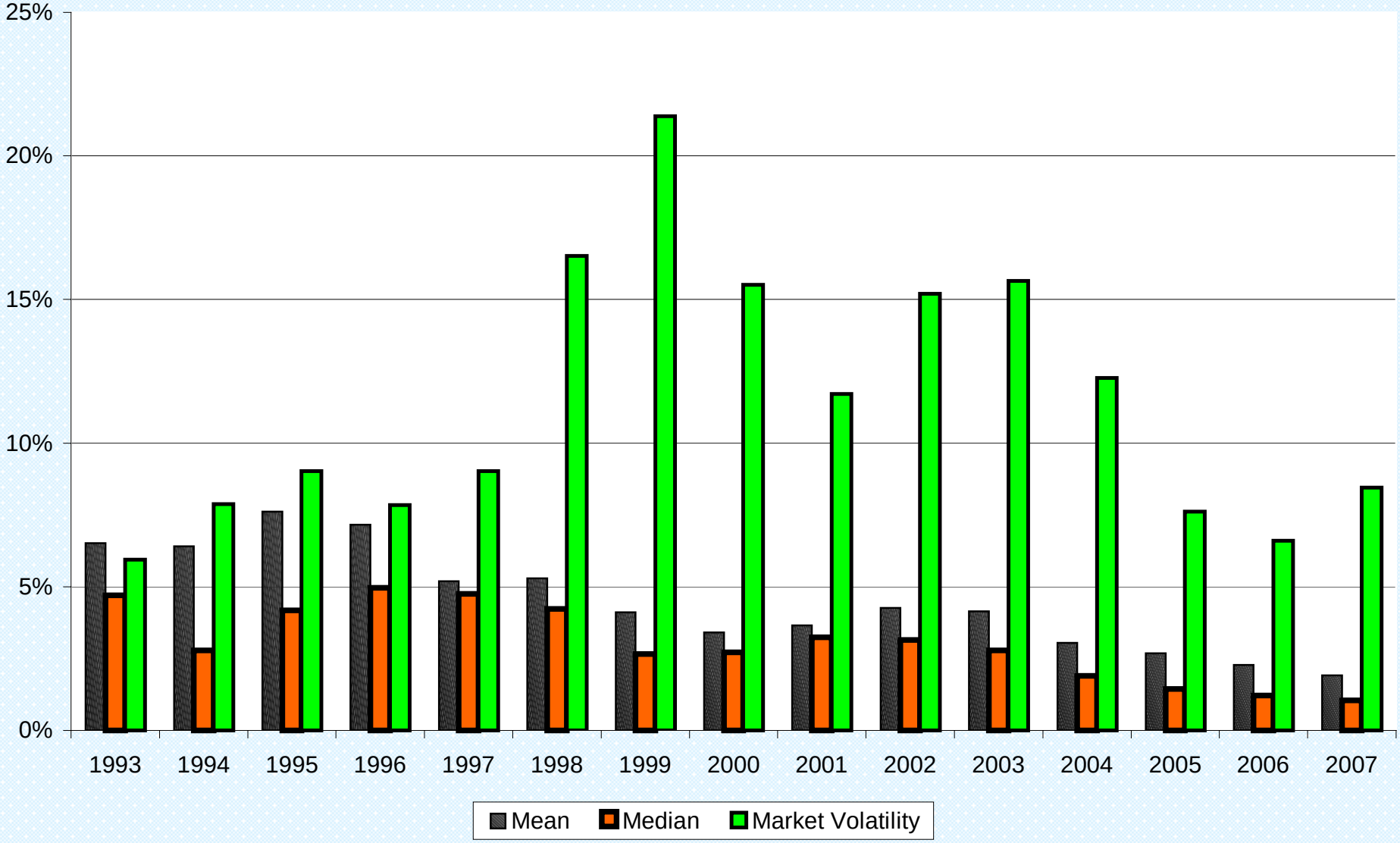
n is the total number of assets (managers)

Which weighting if changing universe ?

if n a stochastic variable

ρi,j fluctuates

Volatility of the Naïve Indexes and Market Volatility



- Naïve Indexes
  - Mean, Equally Weighted $n \uparrow \Rightarrow \sigma \downarrow$ with $\rho \rightarrow$
  - Median still dependent on ρ

- Volatility weighted
  - Mean

  1) at the end of each year σ over the past two years leverage/deleverage future monthly returns of each manager in order to target a given volatility profile 10%

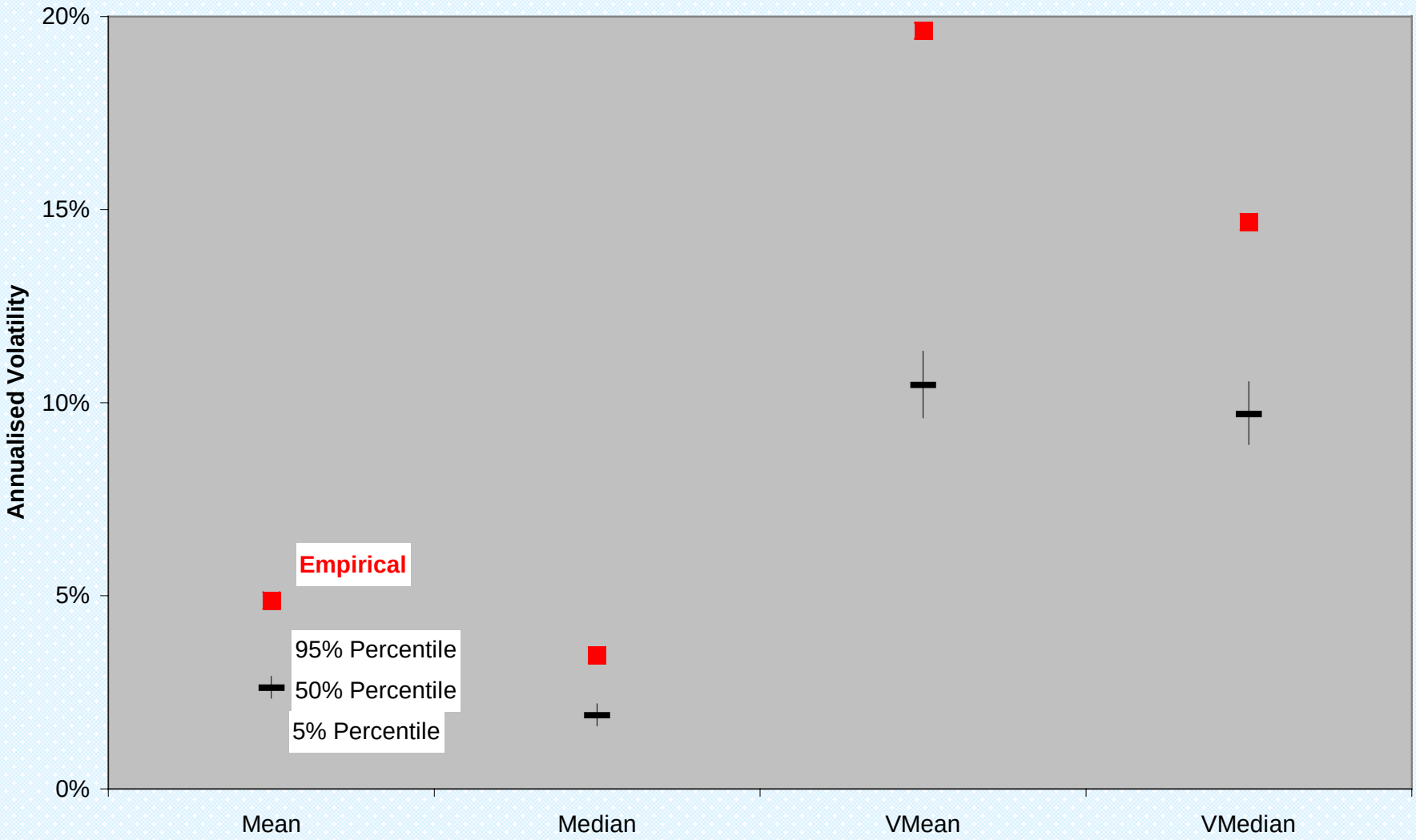
  2) Adjust for n assuming $\rho = 0$

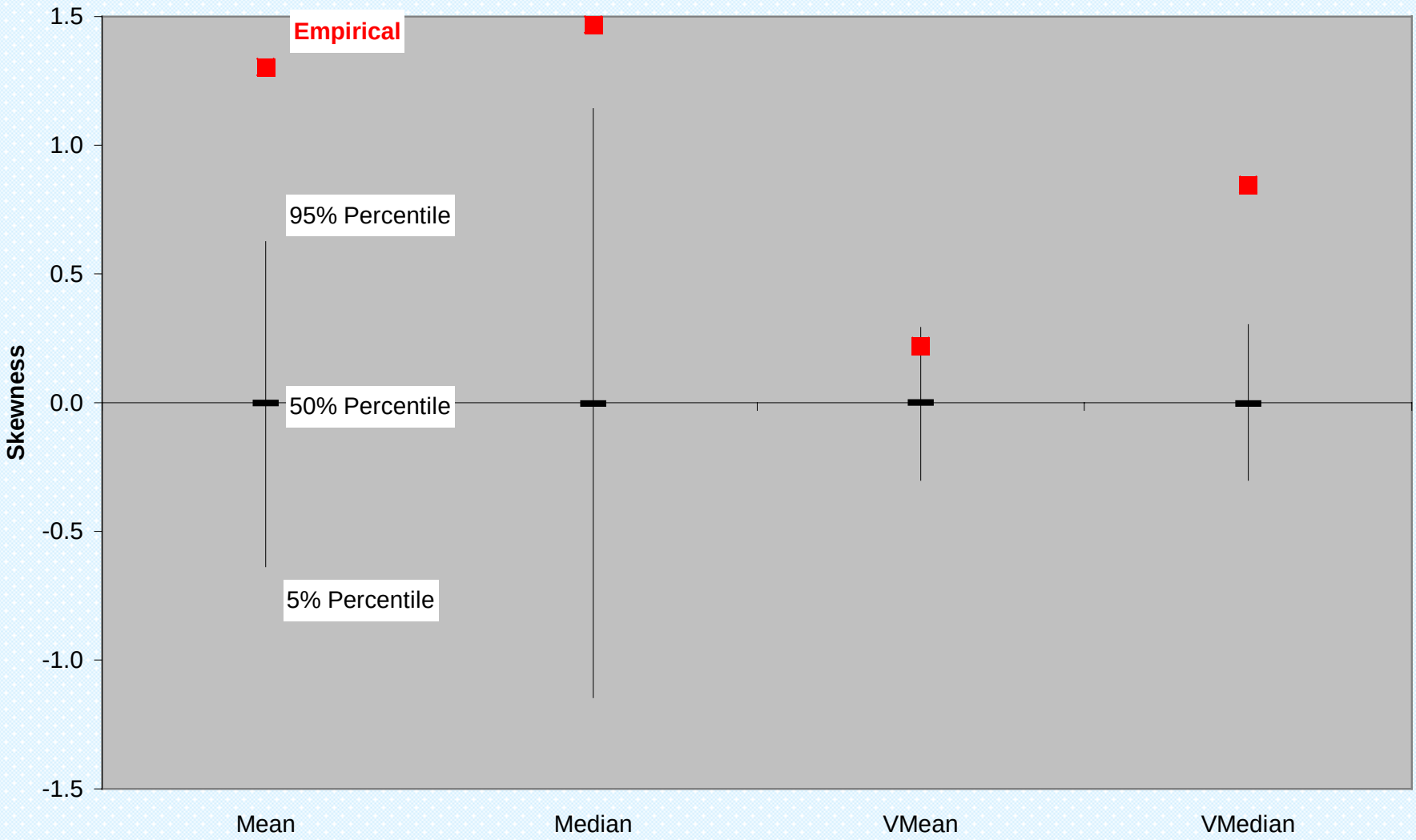
  - Median

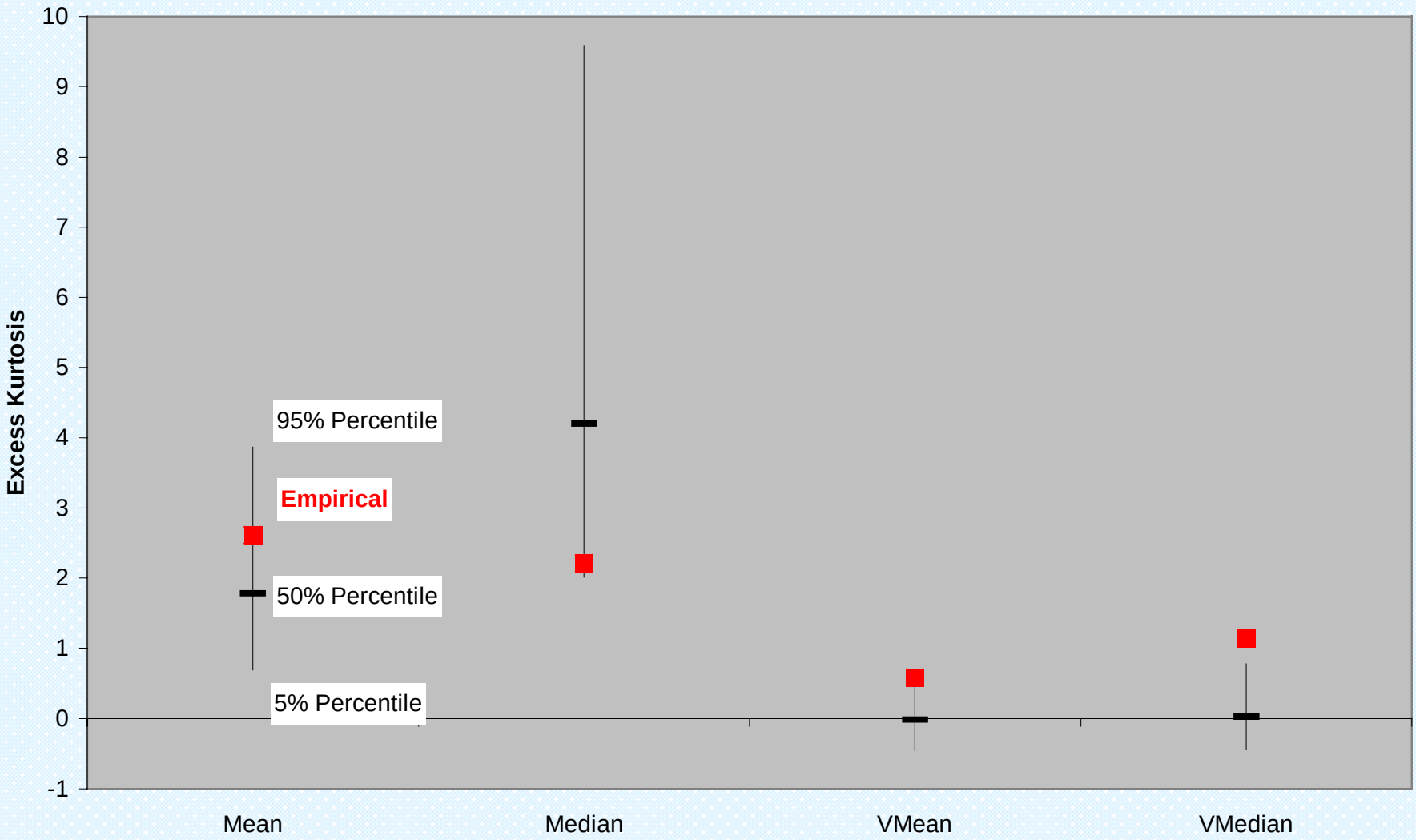
Monte-Carlo Simulations

- methodology impact on the higher moments first in isolation of the data itself
- replacing the manager's monthly returns by a normal distribution $(0, \sigma)$ and $\rho i,j = 0$
  All other things unchanged.
- 10,000 MC Simulations
  Percentiles statistics for Volatility, Skewness and Kurtosis
  Similar CI using Bootstrap without replacement

			Mean	Median	VMean	Vmedian
Volatility	Monte-Carlo	95%	2.91%	2.20%	11.34%	10.52%
		50%	2.61%	1.90%	10.43%	9.70%
		5%	2.34%	1.63%	9.59%	8.92%
	Bootstrap	95%	2.94%	1.80%	13.33%	8.91%
		50%	2.61%	1.47%	12.18%	8.15%
		5%	2.32%	1.25%	11.16%	7.47%
Skewness	Monte-Carlo	95%	0.63	1.15	0.29	0.30
		50%	-0.01	0.00	0.00	0.00
		5%	-0.63	-1.16	-0.30	-0.30
	Bootstrap	95%	1.34	2.72	0.74	0.70
		50%	0.43	0.95	0.30	0.32
		5%	-0.23	-0.23	-0.02	-0.03
Kurtosis*	Monte-Carlo	95%	3.93	9.66	0.70	0.77
		50%	1.82	4.17	-0.01	0.03
		5%	0.68	2.02	-0.46	-0.43
	Bootstrap	95%	7.06	18.40	1.85	1.59
		50%	2.36	5.21	0.19	0.32
		5%	0.86	1.92	-0.40	-0.29


20%
15%
10%
5%
0%
Annualised Volatility
Empirical
95% Percentile
50% Percentile
5% Percentile
Mean
Median
VMean
VMedian


Empirical
95% Percentile
50% Percentile
5% Percentile
Skewness
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
Mean
Median
VMean
VMedian


Excess Kurtosis
10
9
8
7
6
5
4
3
2
1
0
-1
95% Percentile
Empirical
50% Percentile
5% Percentile
Mean
Median
VMean
VMedian

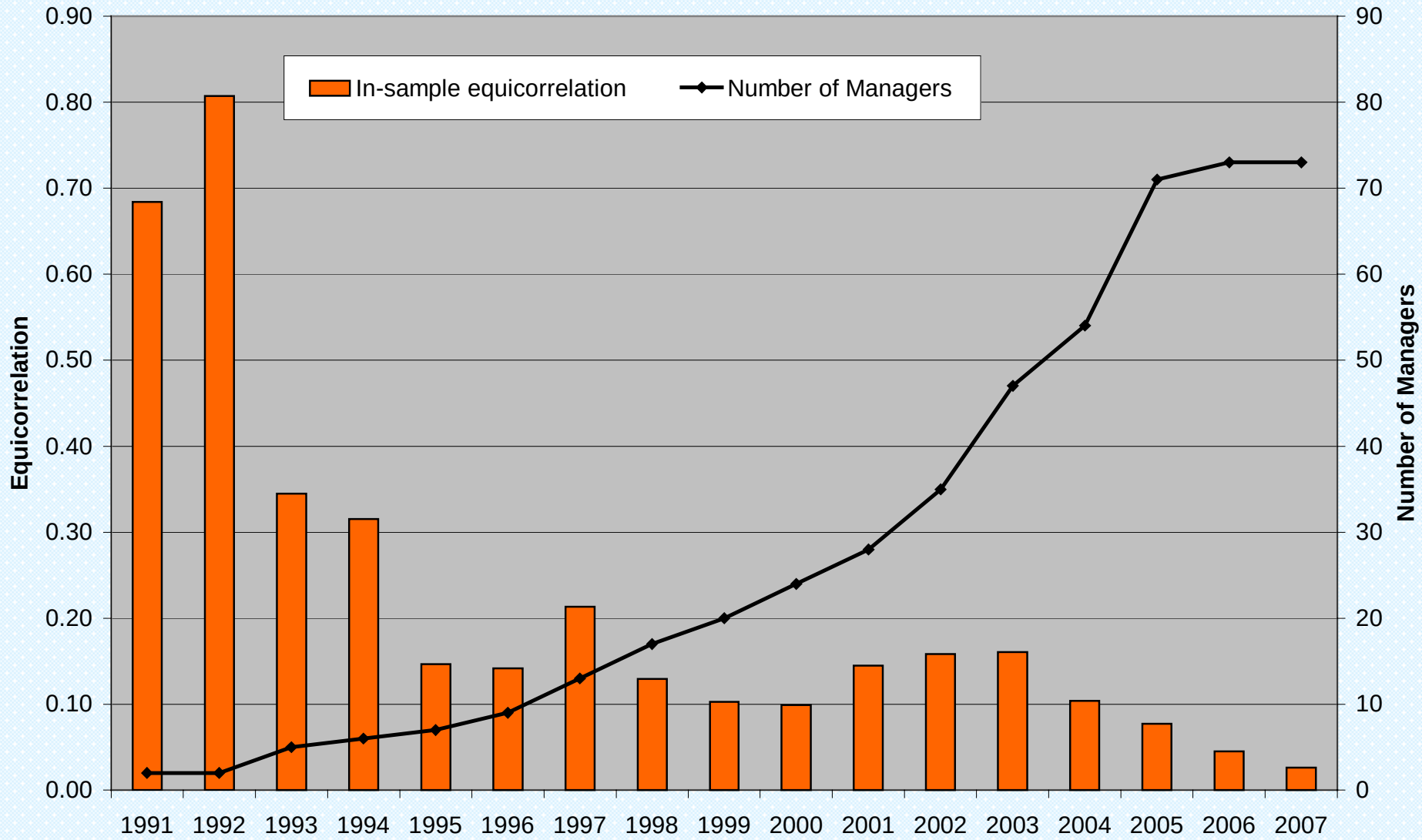
Empirical versus Theoretical

- Possible Causes for Deviations
  - Some Skewness and Excess Kurtosis
  If the only reason captured by Bootstrap

  - Zero correlation assumption
  Independency between managers

Equicorrelation

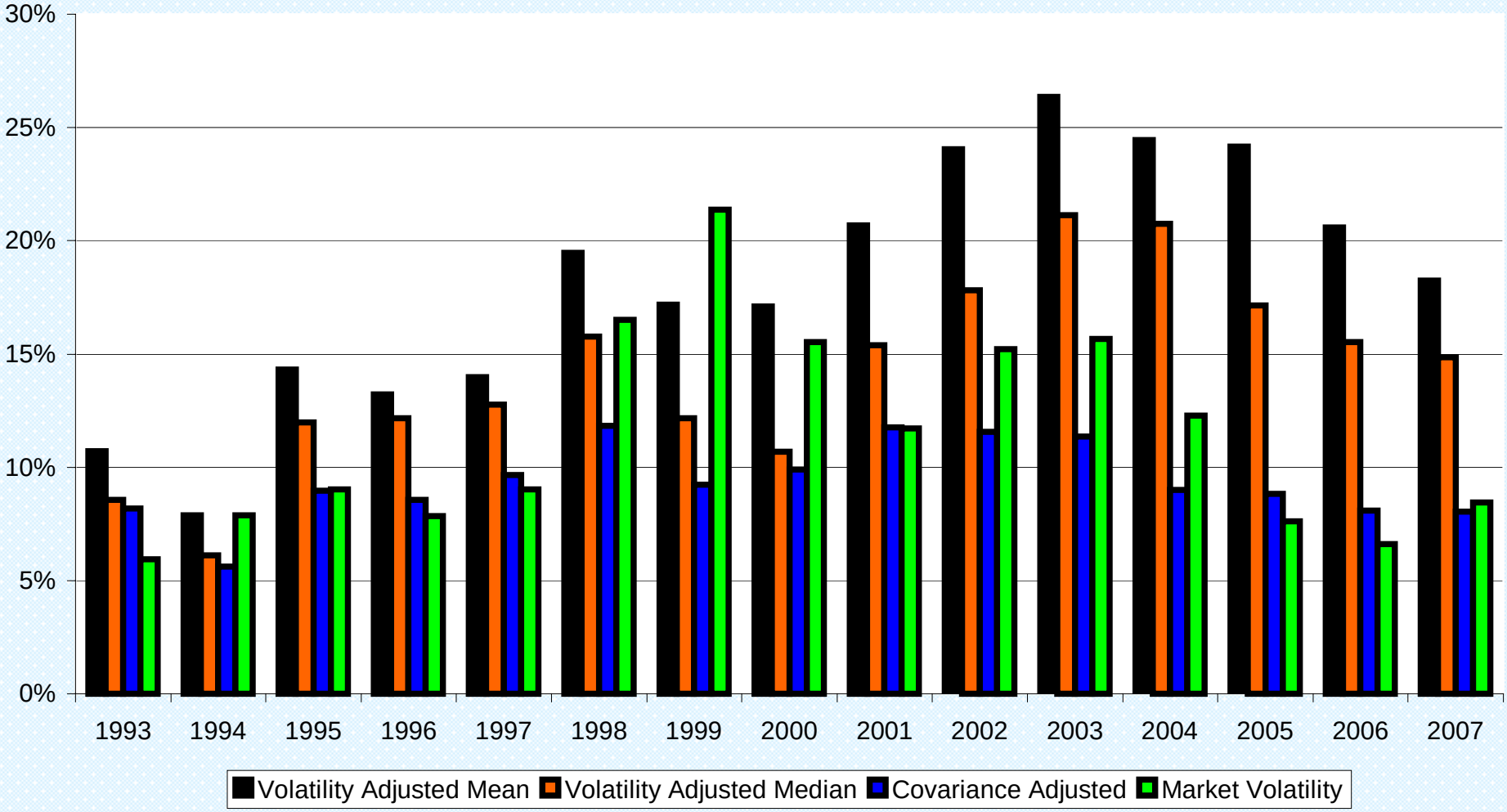
- Assume all pairs of managers have the same correlation $\rho_{i,j} = \rho$
  - reverse engineer from past 2 years volatility equicorrelation coefficient ρ
  - Single correlation coefficient to estimate rather than the full covariance matrix. Easier to interpret
  - In fact concept only used to exhibit the non-zero correlation. Estimate itself can be bypassed


In-sample equicorrelation
Number of Managers
Equicorrelation
Number of Managers
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
90
80
70
60
50
40
30
20
10
0
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007

- Be careful as n ↑ ρ ↘
  Misleading if interpreted as less important because
  What matters is the aggregate portfolio volatility

- Covariance weighted CW portfolio includes a rescaling factor derived from the backward-looking equicorrelation

Volatility Adjusted Indices, Covariance Adjusted and Market Volatility



		Mean	Median	VMean	VMedian	CW
Volatility	**Empirical**	4.87%	3.46%	19.64%	14.67%	10.25%
Monte-Carlo	95%	2.91%	2.20%	11.34%	10.52%	11.74%
	50%	2.61%	1.90%	10.43%	9.70%	10.87%
	5%	2.34%	1.63%	9.59%	8.92%	10.09%
Bootstrap	95%	2.94%	1.80%	13.33%	8.91%	14.10%
	50%	2.61%	1.47%	12.18%	8.15%	12.73%
	5%	2.32%	1.25%	11.16%	7.47%	11.63%
Skewness	**Empirical**	1.30	1.47	0.22	0.85	0.57
Monte-Carlo	95%	0.63	1.15	0.29	0.30	0.35
	50%	-0.01	0.00	0.00	0.00	0.00
	5%	-0.63	-1.16	-0.30	-0.30	-0.35
Bootstrap	95%	1.34	2.72	0.74	0.70	0.91
	50%	0.43	0.95	0.30	0.32	0.40
	5%	-0.23	-0.23	-0.02	-0.03	0.03
Excess Kurtosis	**Empirical**	2.61	2.21	0.59	1.15	0.61
Monte-Carlo	95%	3.93	9.66	0.70	0.77	1.27
	50%	1.82	4.17	-0.01	0.03	0.21
	5%	0.68	2.02	-0.46	-0.43	-0.35
Bootstrap	95%	7.06	18.40	1.85	1.59	2.60
	50%	2.36	5.21	0.19	0.32	0.44
	5%	0.86	1.92	-0.40	-0.29	-0.28

4) Conclusion

- Naïve indexes ill-conceived because ignore
  - [changing] number of managers
  - volatility profile of each program
  - dependency between managers

- Implications for the asset management industry
  - Returns not comparable through time

  2004 losses as big as 1994 ?

  Is +/-2% in the 00s equivalent to +/-20% in the 90s ?
  - Investors could get misinformed about

  a) what was achieved by currency managers, i.e. close to zero returns on average ?

  b) Future performance

- [Individual] Volatility weighted an improvement
  but best to account for Portfolio volatility
  - well behaved theoretically
  - satisfactory empirical results (luck ?)
  some persistence needed in vol/correl profile

- Further avenues
  - Other asset classes
  - Alternative solutions
  fixed number of managers while representative