Decentralized Investment Management: Evidence from the Pension Fund Industry

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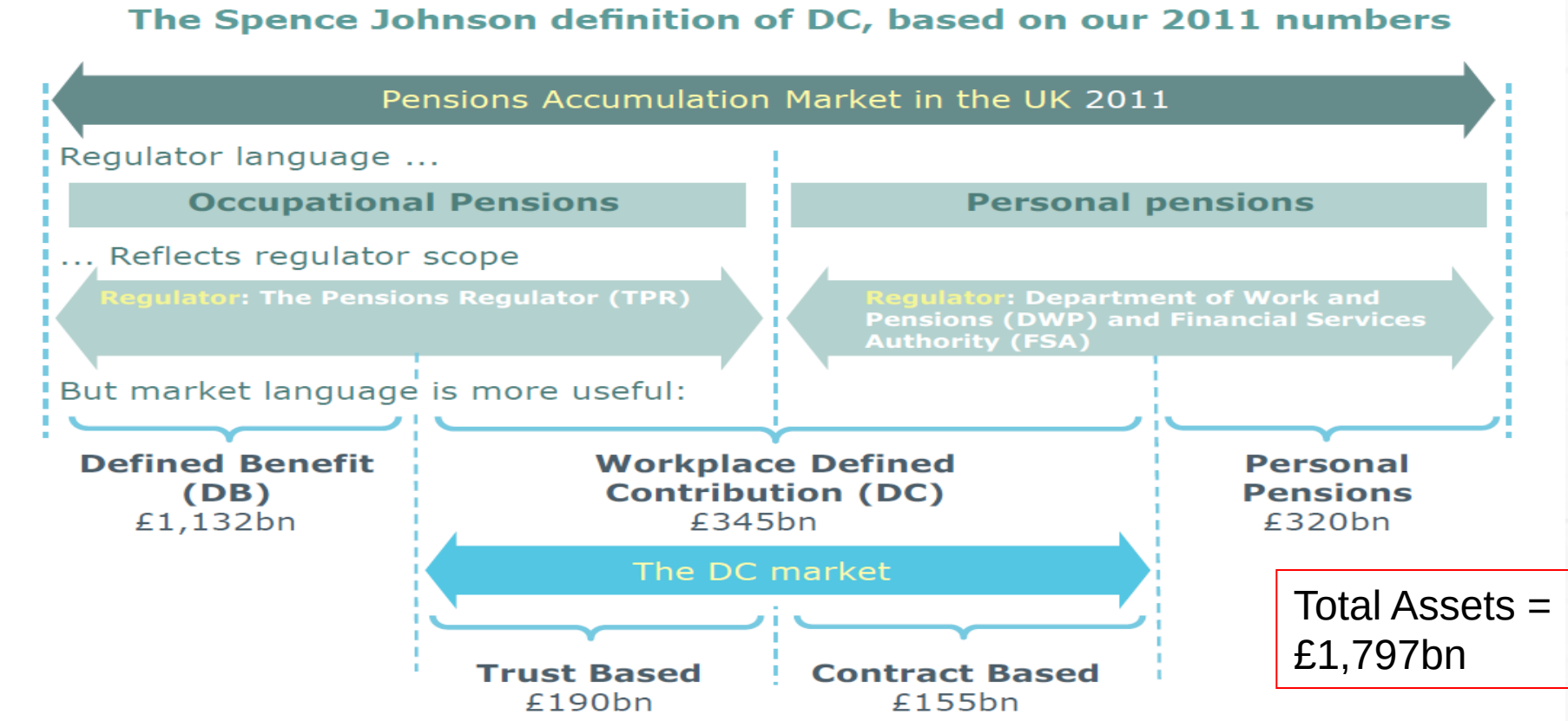
Funded pensions: some numbers



- Auto-enrolment (from 2012), steady state = £20bn per year,
  - after 20 years fund value (with return = 4.5%) is £675bn

Defined Benefit Pension funds

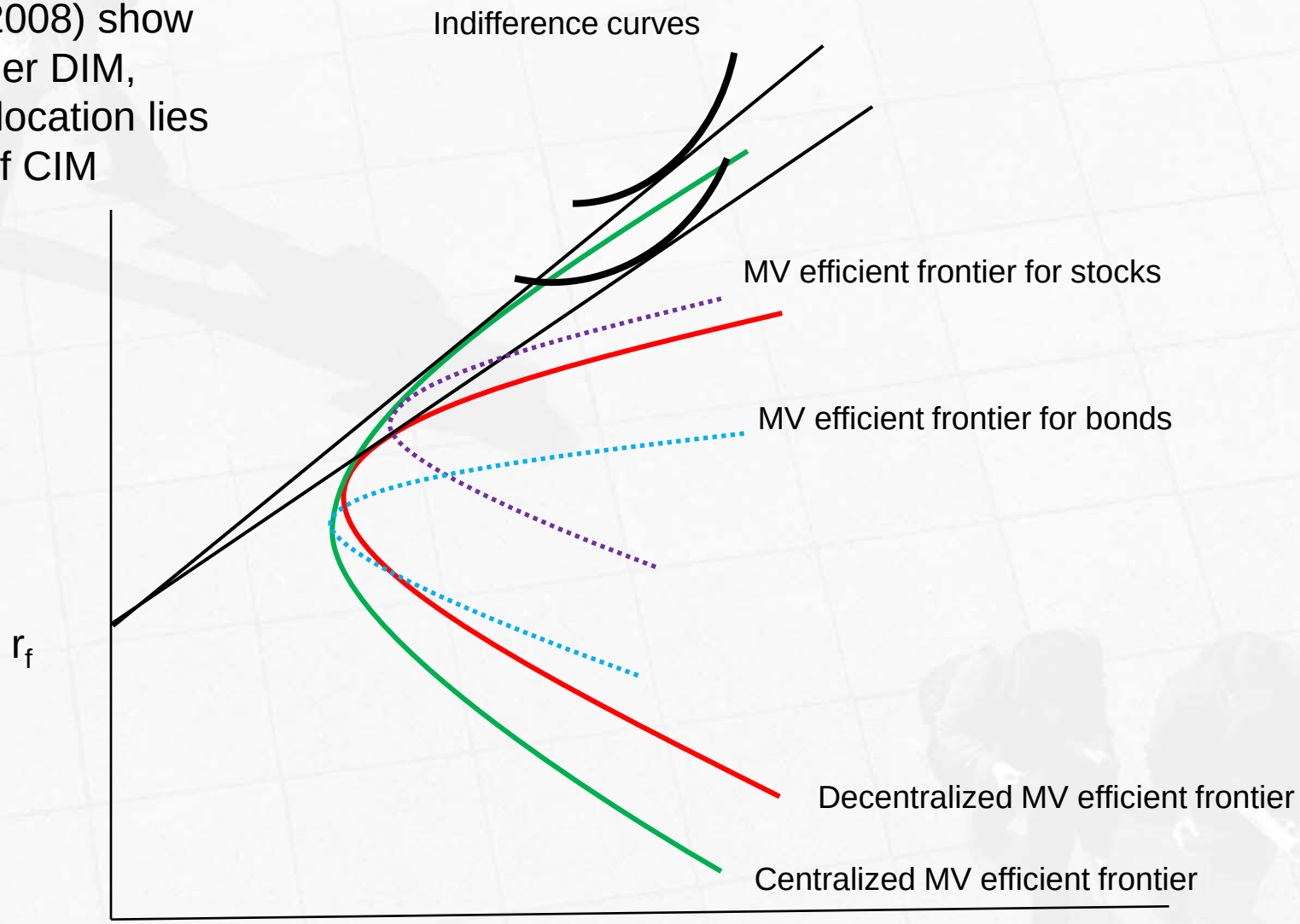
- DB pensions promise pension based on final salary
  - Liability for sponsor
- Private sector schemes = fully funded
  - Payments made by employers/employees
- These contributions accumulate in a fund which is then used to pay pensions after retirement
- Sponsor invest funds to meet pension liabilities
  - Seggregated funds
    - Funds are kept separately in a trust
- Since 2004, approx 6,000 private sector DB schemes protected by Pension Protection Fund

Asset Management by Pension Funds: Decentralized Investment Management

- CIO of pension fund (sponsor) employs (multiple) asset managers to implement and execute investment strategies in separate asset classes.
  - Specialization but diversification loss:
    - Sharpe (1981), Van Binsbergen, Brandt & Koijen (2008)
    - Bhattacharya & Pfleiderer (1984) DPM
  - Competition:
    - Holmstrom (1982); Shleifer (1985)
  - Diversify alpha strategies:
    - Kapur and Timmermann (2005)
  - Economies/Diseconomies of scale:
    - Berk & Green (2004), but higher fees
- Application to segregated pension funds:
  - Segregated pension schemes:
    - Pension fund owns the assets (cf mutual funds/unit trusts)
  - Pension fund allocates capital to fund managers who allocate these funds to the assets in their asset class.

vBBK (2008)

vBBK (2008) show that under DIM, asset allocation lies to SW of CIM



Decentralized MV efficient frontier is the CIO's optimal linear combinations of the stock and bond efficiency frontiers

Extend vBBK (2008) with skilled managers

1. For even low levels of manager skill CIO prefers decentralized skilled manager
2. Skilled managers always choose riskier portfolio than unskilled
3. CIO will choose a riskier overall portfolio
4. With uncertainty about manager skills,
   - may or may not decentralize
   - If DIM: CIO may choose less risky portfolio (*cf* #3)

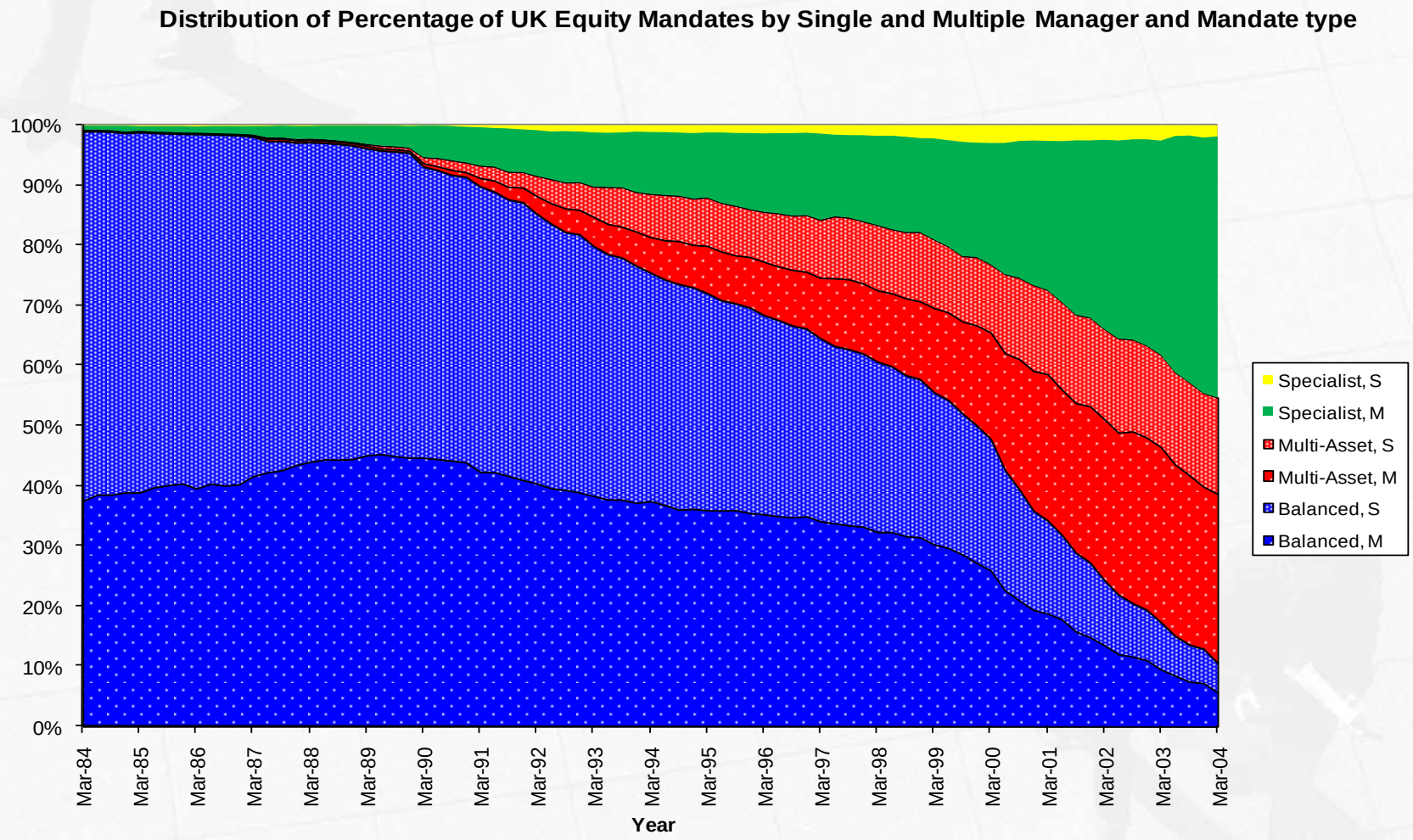
CAPS Sample

- Dataset provided by BNY Mellon Asset Servicing
  - formerly Russell-Mellon-CAPS — commonly known as "CAPS")
- Quarterly returns on coded investment portfolios of 2,385 self-administered UK pension funds from March 1984 to March 2004
- Seven asset categories
- Unique data on *type of mandate*, mandate size
- 364 coded fund management houses
  - in-house & external

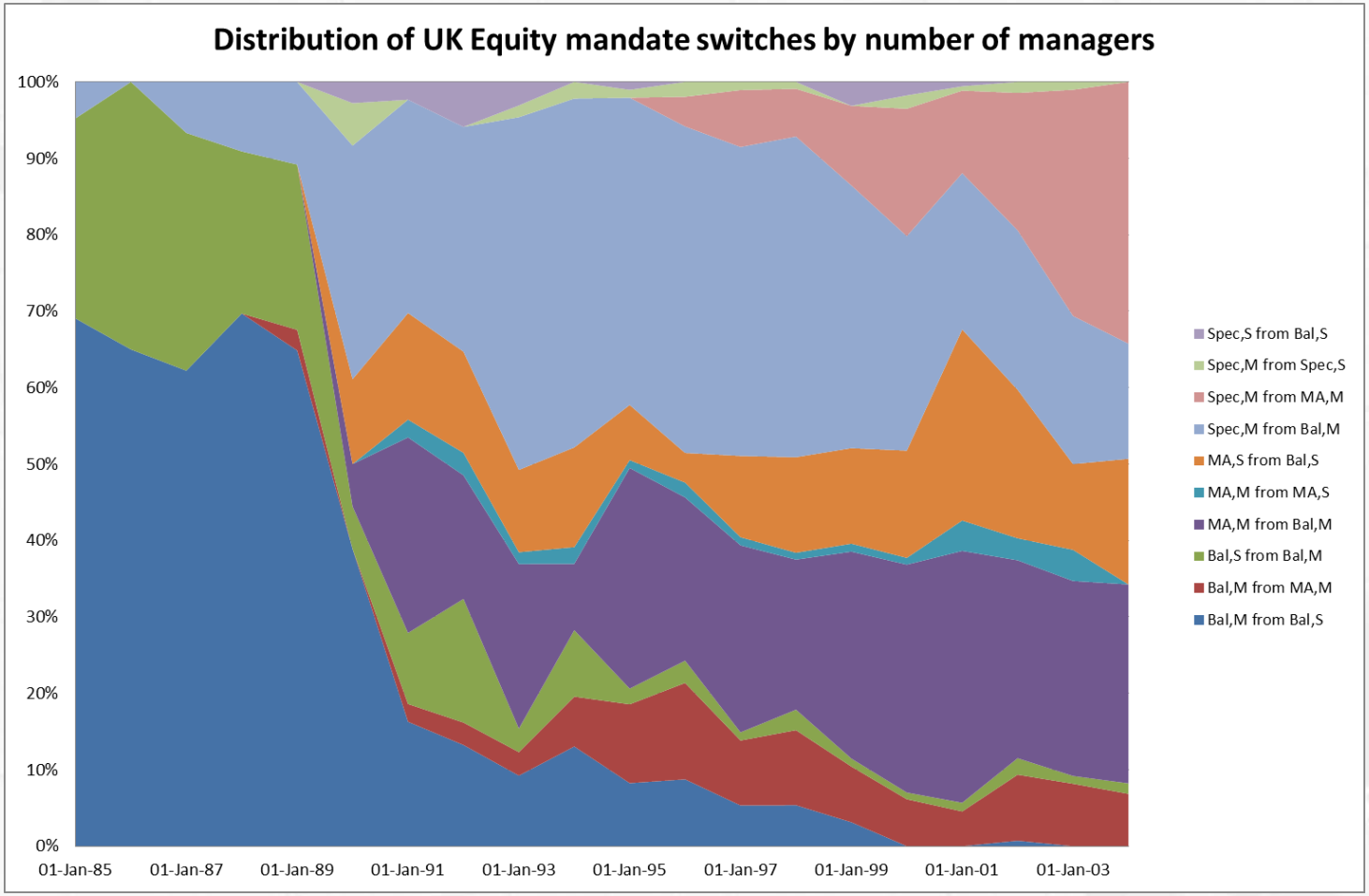
Segregated Pension Fund Management

- Different types of mandates
  - Balanced:
    - fund manager invests across full range of assets: market timing & selectivity
  - Specialist:
    - manager assigned single asset class; sponsor decides SAA
  - Multi-asset:
    - 1<asset classes<7
  - Use of Single/Multiple managers
- Investigate two shifts in Decentralized Investment Management with respect to segregated pension funds
  - Move from balanced to specialist
  - Move to multiple managers

Trends in CAPS Sample



Trends in CAPS Sample



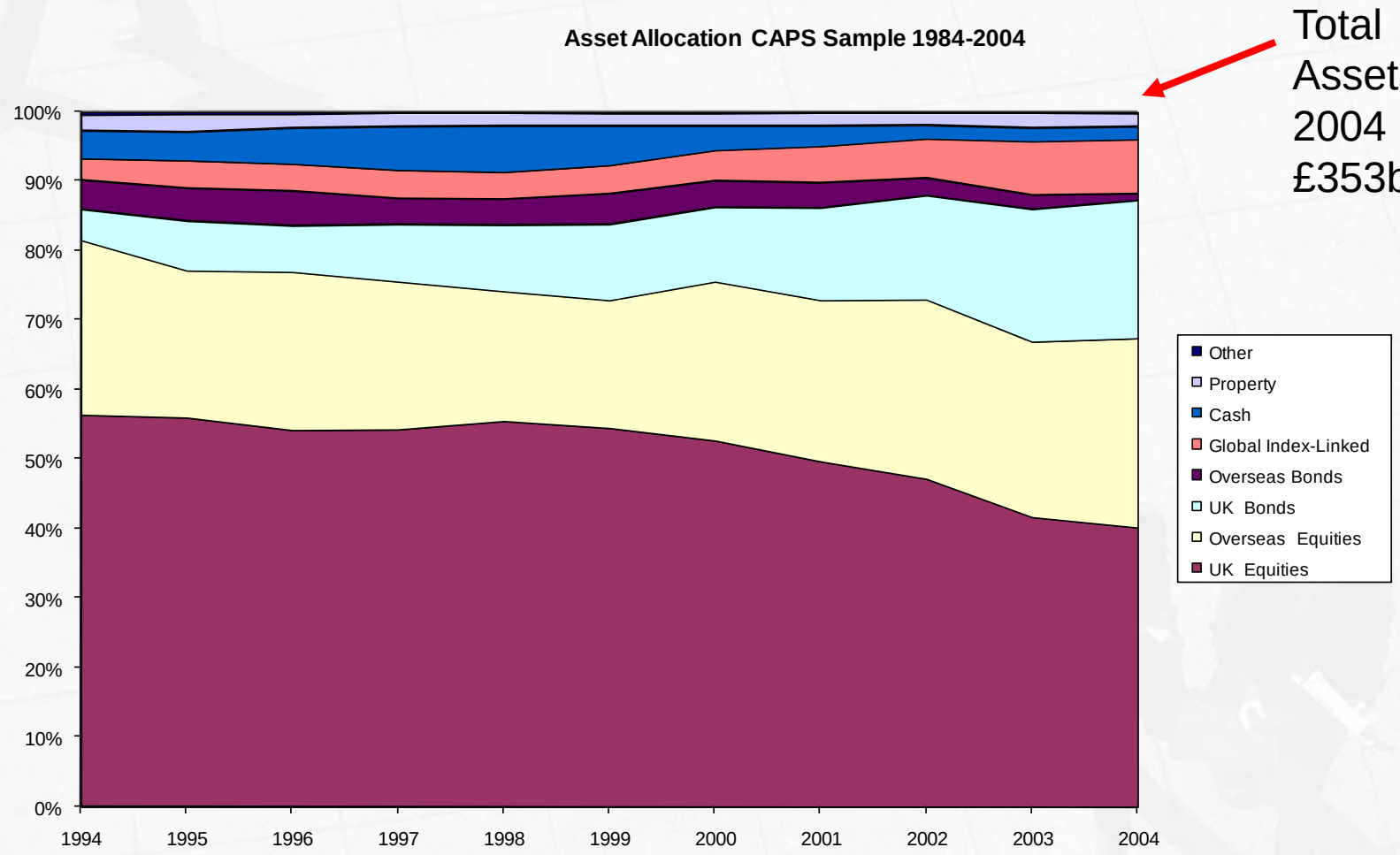
Who are the fund managers?

- Anonymous in CAPS sample

Manager	UK Pension Assets ($bn)	Market Share (%)
Schroders Investment Management	98.8	11.9
Merrill Lynch Mercury Asset Management	96.5	11.7
Barclays Global Investors	73.4	8.9
Phillips & Drew (UBS)	70	8.5
Hermes Pension Management	68.5	8.3
Gartmore	48.9	5.9
Deutsche Asset Management	46.5	5.6
Goldman Sachs Asset Management	33.9	4.1
Hill Samuel Asset Management	22.8	2.8
Prudential Portfolio Managers	20.9	2.5
Foreign & Colonial	16.9	2
Fidelity International	16.4	2
Henderson Investors	15.5	1.9
First Quadrant	13.2	1.6
Fleming Asset Management	13.1	1.6

Largest UK pension management firms.(in 1998). Source Myners (2001)

CAPS Sample Asset Allocation



Total Assets in 2004 = £353bn

Table 1: Distribution of Funds

of fund

Panel A: Distribution of funds by number of managers

		Jan-84		Jan-94		Jan-04	
# of managers		Mean Size	Percentage	Mean Size	Percentage	Mean Size	Percentage
	1	30.87	80.42%	72.06	72.99%	42.44	56.83%
UK Equities	2	32.01	14.76%	62.25	19.83%	45.76	26.19%
	3	38.06	4.82%	129.13	7.18%	71.51	16.98%

Panel B: Distribution of funds by mandate type

		Jan-84		Jan-94		Jan-04	
Mandate		Funds	Managers	Funds	Managers	Funds	Managers
	Specialist	12	2.33	119	2.03	284	2.17
UK Equities	Multi-Asset	2	2.00	173	1.36	384	1.67
	Balanced	952	1.26	821	1.36	83	1.46

Testing Performance by mandate

- Four factor model + timing for UK Equities

$$r_{ift} = \alpha_{if} + \beta_{1if} r_{mt} + \beta_{2if} SMB_t + \beta_{3if} HML_t + \beta_{4if} MOM_t + \beta_{5if} r_{mt}^2 + \varepsilon_{ift},$$

- Selectivity:

$$\bar{\alpha} = \frac{1}{F} \sum_{f=1}^{F} \frac{1}{M} \sum_{i=1}^{M} \alpha_{if}.$$

- Market Timing:

$$TM_{if} = \alpha_{if} + \beta_{5if} Var(r_m),$$

- Bootstrapped standard errors
- UK Bonds (Two factors)
- International Equities
    - international 3-factor model with market factor split

Fees

- Simulate segregated fees:
  - fees charged for segregated mandates top secret !!!
- Instead assume fee structure for retail products is same as for wholesale products by fund manager
  1. Defaqto management fees on 3,589 unit trusts by fund manager
  2. Use Mercer global fees survey of over 4,000 fund managers in segregated mandates

Fund Management Fees % AUM Across Mandate Type by Size of Mandate
(Median fees across managers for Segregated Portfolios)

UK Investments (Pounds sterling)	**25M**	**50M**	**100M**	**250M**
UK - Multi-Asset (ie Balanced)	0.49	0.43	0.35	0.29
UK - Equity All Cap	0.60	0.48	0.42	0.35
UK - Equity Small Cap	0.75	0.70	0.56	0.49
International Investments (US dollars)				
International Global Equity - Growth	0.75	0.70	0.65	0.54
International Global Equity - Value	0.80	0.76	0.65	0.57
Emerging Markets Equity	1.00	0.95	0.88	0.83

Source: Mercer (2007)

Table 2: Return performance by asset class 1984-2004

Mean Returns ;	Pre-fee	Post-fee
UK Equity	15.96%	14.17%
UK Bonds	10.87%	10.44%
Int. Equity	12.64%	11.12%
Alpha estimates:		
UK Equity	-0.05%	-0.40%
UK Bonds	0.70%	0.34%
Int. Equity	0.94%	-0.04%

Table 3: Performance by mandate

	UK Equities		UK Bonds		Int. Equities	
	Pre-fee	Post-fee	Pre-fee	Post-fee	Pre-fee	Post-fee
Specialist mandates						
Alpha	**0.67%***	0.35%	**1.17%***	**1.03%***	**2.26%***	**1.79%***
TM	**0.91%***	**0.59%***	**0.98%***	**0.83%***	**1.55%***	**1.16%***
MA mandates						
Alpha	**0.46%***	0.12%	**0.81%***	**0.46%***	**1.91%***	**1.58%***
TM	**0.43%***	0.09%	**0.55%***	0.20%	1.04%*	0.69%
Balanced						
Alpha	-0.24%	-0.54%	**0.62%***	0.29%	0.48%	0.16%
TM	0.09%	0.21%	**0.65%***	0.28%	-1.85%	-2.23%

Transitions/Switches:

1. Characteristics of funds switching managers
   - Anticipated dis-economies of scale:
   - Fund size/ fees
2. Event study on performance before and after switch
   - Bal2Spec; S2M, effect on incumbent
3. Competition
   - After conditioning on size
4. Risk

Table 4: Characteristics of Transitions

Relative size of fund's UK equity class to other fund's in same quarter
Note: these are small

Panel A. Single-to-Single Managers Switches

		Specialist	Multi-Asset	Balanced
Specialist	Num	9	NA	NA
	Size	0.40	NA	NA
	Fees	0.02%	NA	NA
	Returns	1.95%	NA	NA
Multi-Asset	Num	5	36	1
	Size	0.46	0.42	0.01
	Fees	0.14%**	0.02%	0.06%
	Returns	4.18%	0.38%	-8.10%
Balanced	Num	12	42	206
	Size	0.14	0.19	0.67
	Fees	0.15%***	0.03%***	0.03%***
	Returns	4.34%***	0.92%**	1.69%***

Differential in 4-quarters returns: Typically +ve, and > than Δ fees

Change in fees: typically higher

Table 4: Characteristics of Transitions

Panel B. Single-to-Multiple Managers Switches

		Specialist	Multi-Asset	Balanced
Specialist	**Num**	42	10	5
	Size	1.66	1.40	0.92
	Fees	0.03%	0.00%	-0.03%
	Returns	1.31%*	3.60%	-1.56%
Multi-Asset	**Num**	18	31	6
	Size	1.42	1.02	1.56
	Fees	0.08%**	0.05%**	0.00%
	Returns	1.34%	-0.05%	2.21%
Balanced	**Num**	30	14	218
	Size	1.32	0.67	1.01
	Fees	0.09%***	0.06%**	0.02%***
	Returns	1.53%**	2.19%*	0.63%**

Note: Much larger relative size for S2M than S2S

Note S2S switch having larger Δ Returns than S2M (*cf* previous slide)

S2S to find better manager; S2M to anticipate scale dis-economies

Size distribution of switchers

Figure 3: Distribution of Relative Fund-Size for Single- and Multiple-Managed Funds

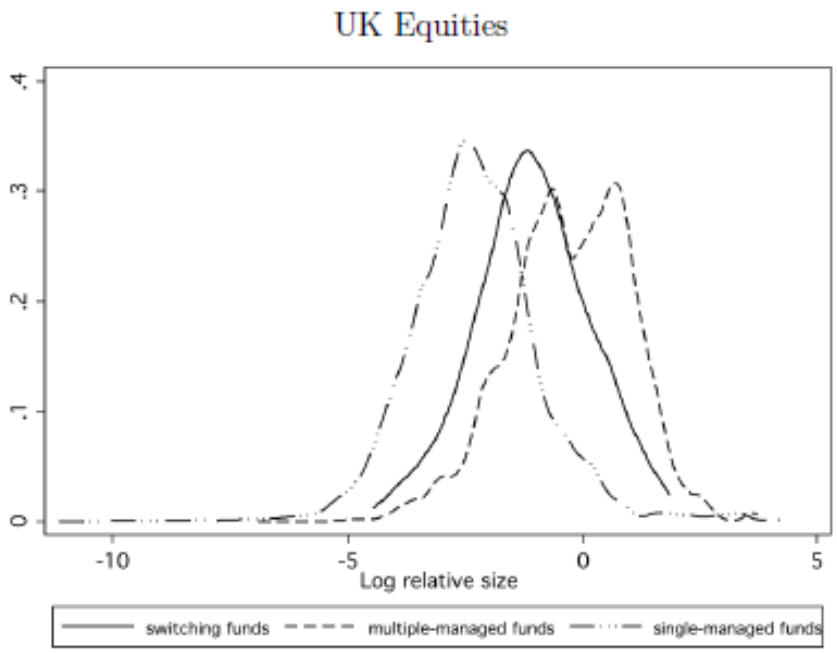


Table 5: Event study

Performance around switches balanced-to-specialist

A. Balanced to Specialist Mandates

Quarters Before/ After Switch	UK Equities Returns	UK Equities t-stat	UK Bonds Returns	UK Bonds t-stat	Int. Equities Returns	Int. Equities t-stat	Total Portfolio Returns	Total Portfolio t-stat
-4	-0.23%	-0.52	0.21%	0.49	2.87%	1.92	0.02%	0.04
-3	-0.79%	-1.57	0.63%	1.37	2.00%	1.37	0.05%	0.14
-2	-1.08%	-2.67	0.17%	0.33	0.62%	0.46	-0.52%	-1.46
-1	0.59%	0.90	0.08%	0.15	2.08%	1.38	-0.22%	-0.65
1	1.00%	1.73	0.61%	1.20	0.29%	0.20	0.62%	1.42
2	0.81%	1.93	1.60%	3.51	2.24%	1.77	0.48%	1.37
3	0.56%	1.06	0.84%	1.82	3.57%	2.48	0.83%	2.12
4	-0.34%	-0.87	0.18%	0.36	-1.50%	-1.12	0.24%	0.58
Performance Before	-0.36%		0.27%		1.89%		-0.17%	
Performance After	0.53%		0.82%		1.16%		0.55%	
P-value	0.0060		0.0544		0.7664		0.0040	

B. Single to Multiple Managers Switch

B1. Fund Performance

Quarters Before/ After Switch	UK Equities Returns	UK Equities t-stat	UK Bonds Returns	UK Bonds t-stat	Int. Equities Returns	Int. Equities t-stat	Total Portfolio Returns	Total Portfolio t-stat
-4	-0.57%	-1.18	-0.63%	-1.52	-1.55%	-1.10	-0.69%	-1.42
-3	-0.59%	-1.10	-0.02%	-0.05	1.90%	1.44	0.39%	0.83
-2	-1.24%	-2.59	-0.81%	-1.68	-0.65%	-0.48	-0.28%	-0.58
-1	0.22%	0.33	1.18%	2.04	-1.74%	-1.25	0.08%	0.13
1	0.28%	0.74	0.09%	0.21	-0.40%	-0.28	-0.26%	-0.70
2	0.54%	1.78	0.20%	0.50	0.08%	0.06	0.22%	0.65
3	-0.61%	-1.43	0.53%	1.27	-0.63%	-0.53	-0.51%	-1.30
4	0.11%	0.24	-0.45%	-1.09	-0.24%	-0.17	0.44%	0.81
Performance Before	-0.53%		-0.04%		-0.54%		-0.11%	
Performance After	0.09%		0.10%		-0.30%		-0.03%	
P-value	0.0345		0.3329		0.4028		0.4039	

B2. Performance of the Incumbent Manager

Quarters Before/ After Switch	UK Equities Returns	UK Equities t-stat	UK Bonds Returns	UK Bonds t-stat	Int. Equities Returns	Int. Equities t-stat	Total Portfolio Returns	Total Portfolio t-stat
-4	-1.09%	-1.77	-0.89%	-1.47	-3.93%	-2.04	0.44%	0.62
-3	0.31%	0.53	0.33%	0.56	2.06%	1.13	0.38%	0.73
-2	-1.13%	-2.23	-0.83%	-1.07	-0.43%	-0.26	-0.32%	-0.52
-1	-0.16%	-0.25	1.04%	1.76	-1.65%	-0.93	-0.03%	-0.04
1	0.23%	0.37	-0.48%	-0.75	-1.06%	-0.50	0.71%	0.99
2	1.51%	2.01	0.91%	1.32	-0.83%	-0.45	-0.13%	-0.16
3	-0.30%	-0.49	0.21%	0.36	-0.54%	-0.34	0.88%	1.07
4	-0.34%	-0.55	-0.95%	-1.57	0.63%	0.31	0.20%	0.33
Performance Before	-0.51%		-0.06%		-0.99%		0.11%	
Performance After	0.28%		-0.07%		-0.46%		0.41%	
P-value	0.0374		0.5064		0.3452		0.2716	

Table 6 Panel A: Portfolio variance & No. managers & Size

$$\overline{\sigma}^2_{SIZE,NMAN} = \frac{1}{T}\sum_{t=1}^{T}\left(\frac{1}{NMAN_t - 1}\sum_{i=1}^{NMAN_t}\left(r_{it} - \overline{r}_t\right)^2\right),$$

Total Portfolio

	Size tercile		
Managers	Small	Medium	Large
1	0.471	0.335	0.310
2	0.393	0.255	0.224
3 or more	0.240	0.221	0.189
	Size	0.054	
MR test	**Managers**	0.000	
	Joint	0.015	

Monotonic Relationship Test: Patton & Timmerman (2010)

Table 6 Panel B: Portfolio variance & No. managers

$$\overline{\sigma}_f^2 = \frac{1}{F_f} \sum_{i=1}^{F_f} \left(\frac{1}{\tau_i - 1} \sum_{t=1}^{\tau_i} \left(r_{it} - \overline{r}_i \right)^2 \right),$$

Panel A: Full Sample Results

	Mean of Variances of Returns	Funds	t-test
Single Managed funds	5.54	1473	4.18
Multi-Managed funds	5.01	655	

Summary of Findings

- Specialists outperform balanced managers
  - Some performance persistence of specialists
- Switch to specialists due to
  - Underperformance of balanced managers due to diseconomies of scale
- Multiple managers used to reduce diseconomies of scale, and subsequent co-ordination problems reduced with risk controls
- Competition: threat of new managers improves performance of incumbent
- Same Sharpe ratios of decentralised funds, implying
  - Performance improved

Conclusions

- Examined the properties of decentralized investment managements
- Separating mandates by mandate type identifies significant performance of specialist mandates:
    - Annualized alphas of 0.67% for UK equity specialists; & 0.46% for MAs
    - No evidence of market timing skills for balanced mandates
- Use of multiple managers
    - Weak evidence that competition produces better performance
    - Funds with multiple managers have lower risk levels
- Dynamics of mandate-type and # managers
    - Switches after poor performance, and short-term subsequent improvement
- Dynamics of switch to multiple managers an attempt to avoid diseconomies of scale in performance (Berk and Green, 2004)

Future Work

- Relationship between centrality of a fund in a network (of fund managers & consultants) and fund performance, risk taking and fund flows
- We find network centrality is positively correlated with risk-adjusted performance, and growth of assets under management for domestic but not international equity holdings
- Better connected fund managers are better able to turn higher past performance into higher net inflows