

**Do Companies Change Their Pension
Asset Allocation Following New
Accounting Standards: Evidence from
the UK and the US**

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Pension Asset Allocation Boots Plc.

- In 2001, Boots plc. liquidated all of its equity holdings in its £2.3 billion pension fund and moved the proceeds into long-dated bonds. The sterling bond market received a boost in the week that this news was announced. The Company lists plan maturity, plan size, *FRS 17*, risk reduction and plan management costs as possible reasons for switching to a bond portfolio.**
- Although the company's head of corporate finance rejects the view that *FRS 17* motivated the switch, he stated that "[T]he Boots *FRS 17* surplus at 30 September 2001 was £300 pretax. Had we remained at the 30 March 2000 asset allocation, this would have been a £50 million deficit" (Ralfe 2002).**

Pension Asset Allocation: Sainsbury Plc.

	<u>Equities</u>	<u>Bonds</u>	<u>Other</u>
3/2007	52%	37%	11%
3/2006	61	34%	5
3/2005	66	29	5
3/2004	67	30	3
3/2003	60	39	1
3/2002	76%	21%	3%

Pension Asset Allocation: General Motors Corporation

	<u>Equities</u>	<u>Bonds</u>	<u>Real Estate</u>	<u>Other</u>
12/2007	26%	52%	9%	13%
12/2006	38%	43%	8%	11%
12/2005	47%	32%	7%	14%

*** With fair value of plan assets over \$120 billion, moving 21% from equities to bonds means selling \$25 billion of stocks and buying \$25 billion of bonds.**

Accounting for Corporate Defined Benefit Pension Plans in US

- **US (until 12/2006): SFAS 87, Prior Service Costs are deferred and amortized. Actuarial Gains & Losses are deferred and amortized subject to the “Corridor Method;” Minimum Liability Requirement; Pension deficit/surplus partly off balance-sheet; Full Disclosure.**
- **US (from 12/2006): SFAS 158, Prior Service Costs are recognized immediately in Income; Actuarial Gains & Losses are recognized immediately in Equity. Pension deficit/surplus is fully recognized on the balance-sheet. Full Disclosure**

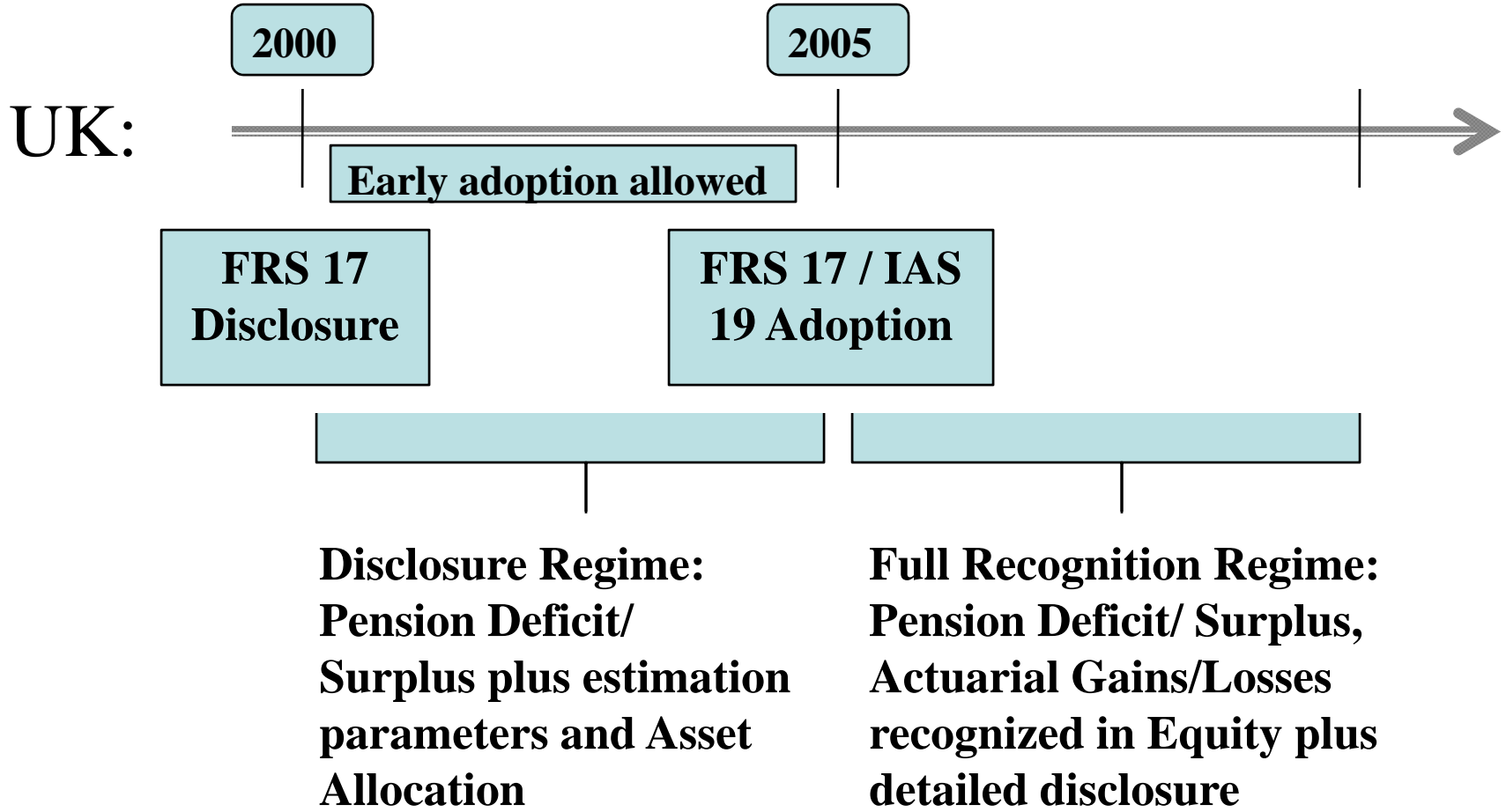
Accounting for Corporate Defined Benefit Pension Plans in UK

- **UK: From 2000 to 2005, FRS 17:**
 - **Choice between Recognition and Disclosure**
 - **Recognition: Prior Service Costs are recognized immediately in Income; Actuarial Gains/Losses are recognized immediately in Equity; Full Disclosure.**
 - **Disclosure: Pension deficit/surplus largely off balance-sheet; Disclosure in notes of pension deficit/surplus, prior service costs, asset allocation etc.**

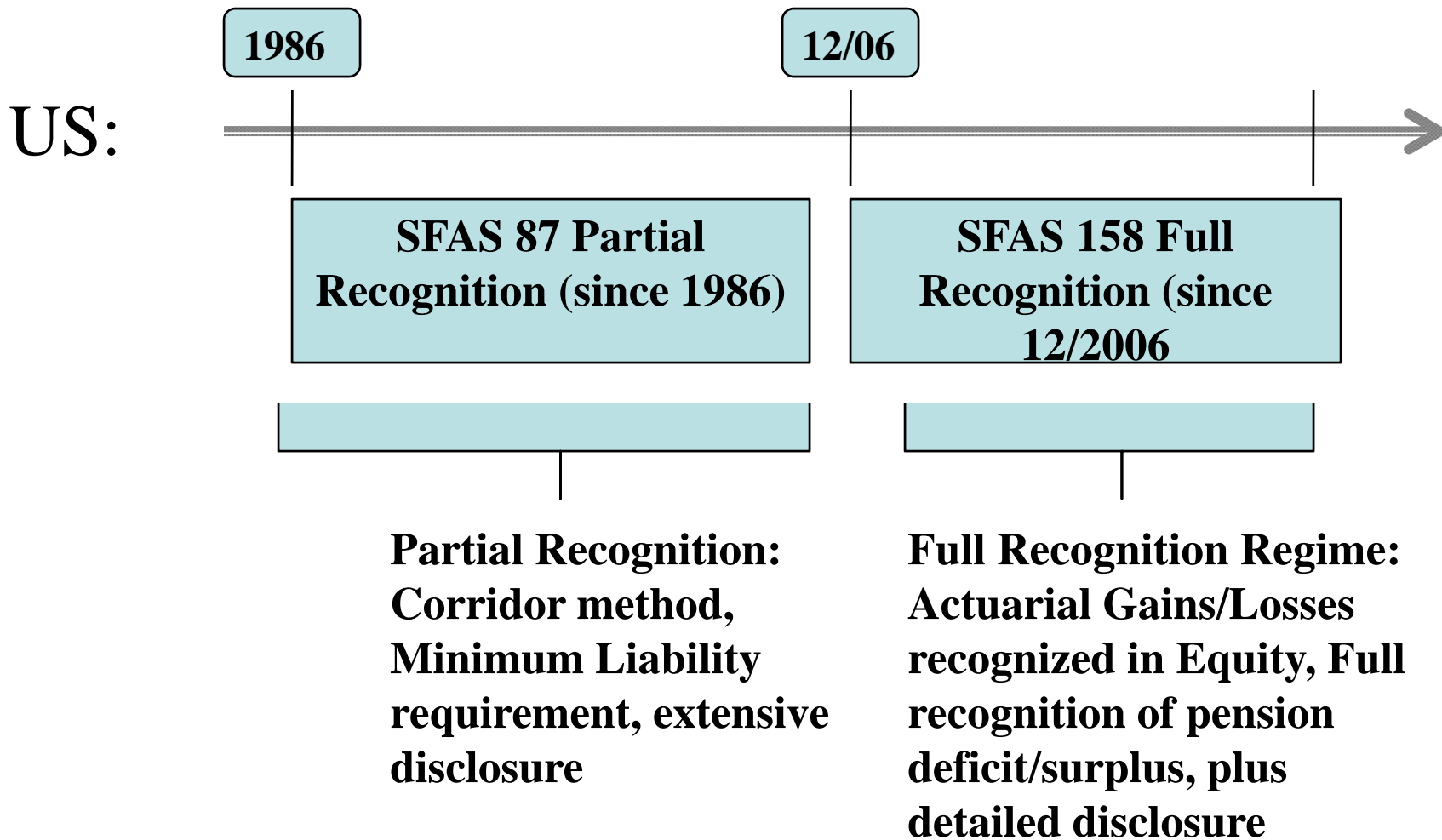
Accounting for Corporate Defined Benefit Pension Plans in UK

- **UK: From 2005 - Present, IAS 19, Prior Service costs are fully recognized in income; Full disclosure; Actuarial Gains/Losses can either:**
 - **Fully recognized in Equity (as in FRS 17 and SFAS 158); and Deficit/Surplus is fully recognized.**
 - **Amortized subject to the Corridor method (e.g., British Airways); and pension Deficit/Surplus is partly off balance-sheet.**

Time Line



Time Line



The Questions:

- **Do firms respond to new Pension Disclosure requirements by changing the mix of pension plan assets?**
- **Do firms respond to new Pension Measurement requirements by changing the mix of pension plan assets?**

Consequences of New Pension Disclosures

- **Greater transparency of the pension scheme;**
- **Employees (beneficiaries) have access to more accurate pension data; increased scrutiny by investors, lenders and pension trustees;**
- **Under-funded companies are perceived as more risky because pension under-funding is considered debt. Minimum funding requirements increase the magnitude and volatility of future pension contributions;**
- **Disclosed under-funding could trigger pressure to reduce plan risk.**
- **Better matching of assets and liabilities reduces the likelihood of deficits, and is achieved by investing more in bonds.**

Consequences of Full Pension Recognition

- **Pension deficit is recognized as a liability and pension surplus is recognized as an asset.**
 - **Contractual effects – Possible violations of covenants in under-funded companies**
 - **Dividend restrictions**
- **Shareholders' Equity and Comprehensive Income is more volatile (volatility of actuarial gains & losses)**
 - **Downside risk**
 - **Negative contractual effects when market decrease**
 - **Dividends may restricted due to lower equity**
 - **Ability to evaluate management performance (e.g., ROE)**
- **Possible cure – Better matching of assets and liabilities, reduces volatility of pension surplus/deficit, thus reduces balance-sheet volatility.**

Balance Sheet Volatility

- **Do Companies care about balance sheet volatility?**
 - **Volatile Shareholders' Equity could affect the stability of dividends over time.**
 - **Higher volatility increases the likelihood of violating balance-sheet based covenants.**
 - **Market volatility filters into the balance sheet and may change the perception of firm risk.**
 - **Higher volatility is associated with less management control.**

How to reduce pension-induced balance sheet volatility?

- **Terminate or reduce benefits in Defined Benefit Pension plans.**
- **Switch to Defined Contribution plans (or other cash balance plans).**
- **Reduce exposure to market volatility by changing the asset allocation. In particular, invest less in equities and more in bonds.**

Predictions

- *UK companies will shift pension assets from stocks to bonds during the FRS 17 Disclosure period.*
- *UK companies will shift pension assets from stocks to bonds during the Full Recognition period.*
- *The shift is stronger for those UK companies with relatively larger pension schemes.*
- *US companies will shift pension assets from stocks to bonds during the Full Recognition period (SFAS 158).*

A Model of Pension Asset allocation

- **Dependent Variable: The percentage of pension assets allocated to equity securities.**
- **Independent Variables:**
 - **Impact on Balance Sheet**
 - **Funding Levels (allow non-linear relation)**
 - **Investment Horizon (service cost, firm age, closed to new employees)**
 - **Covenants (Dividends, debt structure)**
 - **Tax rates**
 - **Offsetting firm Risk (size, cash flows volatility)**

A Model of Pension Asset allocation

$$rEQUITY_{it} = \beta_0 + \beta_1 IMPACT_{it} + \beta_2 FUND_{it} + \beta_3 FUND_{it}^2 + \beta_4 HOR_{it} + \beta_5 LEV_{it} + \beta_6 DIVP_{it} + \beta_7 TAXR_{it} + \beta_8 SDCF_{it} + \beta_9 SIZE_{it} + \beta_{10} FAGE_{it} + \beta_{11} CLOSE_{it} + \varepsilon_{it}$$

The initial model explains the percentage of pension assets allocated to equity securities.

IMPACT – The relative size of the pension scheme and actuarial gains/losses (denoted as EXPOS1 EXPOS2 ACTGL1 ACTGL2)

FUND – Funding levels, FV Assets / ABO

HOR – investment horizon, ln(PBO/SC)

LEV – Financial leverage [LT DEBT / (LT DEBT + MV Equity)]

DIVP – Dividends payout (Dividends / Retained Earnings)

TAXR – Effective tax rate

SDCF – Standard deviation of earnings over book equity over last 5 years

SIZE – Firm size, ln(MV Equity)

FAGE – Firm age, ln(years since incorporation)

17 CLOSE – Dummy variable, 1 if the pension plan is closed.

Dependent Variables

UK:

- $rDISCLOSE = rEQUITY$ (year 2000) - $rEQUITY$ (Pre-Adoption year).
- $rADOPT = rEQUITY$ (Pre-Adoption year) - $rEQUITY$ (Post-Adoption year).

US:

- $rDISCLOSE = rEQUITY$ (year 2000) - $rEQUITY$ (Pre-Adoption year),
- $rADOPT = rEQUITY$ (Pre-Adoption year) - $rEQUITY$ (Adoption year).

A Model of Pension Asset Allocation

$$\begin{aligned} rDISCLOSE_i &= \beta_0 + \beta_1 \Delta IMPACT_i + \beta_2 \Delta FUND_i + \beta_3 \Delta FUND_i^2 + \beta_4 \Delta HOR_i \\ &+ \beta_5 \Delta LEV_i + \beta_6 \Delta DIVP_i + \beta_7 \Delta TAXR_i + \beta_8 \Delta SDCF_i + \beta_9 \Delta SIZE_i \\ &+ \beta_{10} \Delta FAGE_i + \beta_{11} \Delta CLOSE_i + \varepsilon_{it} \end{aligned}$$

$$\begin{aligned} rADOPT_i &= \delta_0 + \delta_1 \Delta IMPACT_i + \delta_2 \Delta FUND_i + \delta_3 \Delta FUND_i^2 + \delta_4 \Delta HOR_i \\ &+ \delta_5 \Delta LEV_i + \delta_6 \Delta DIVP_i + \delta_7 \Delta TAXR_i + \delta_8 \Delta SDCF_i + \delta_9 \Delta SIZE_i + \\ &\delta_{10} \Delta FAGE_i + \delta_{11} \Delta CLOSE_i + \eta_i \end{aligned}$$

Measuring the Effect of Pensions on Balance Sheet Volatility

- ***EXPOS1*** - The fair value of pension assets deflated by book value of shareholders' equity.
- ***EXPOS2*** - The Projected Benefit Obligation (*PBO*) deflated by book value of shareholders' equity
- ***ACTGL1*** - The absolute value of realized actuarial gains/losses deflated by book value of shareholders' equity
- ***ACTGL2*** - *ACTGL1* divided by the percentage of pension funds allocated to equity.

Figure 1

Pension Asset Allocation: UK vs. US Companies

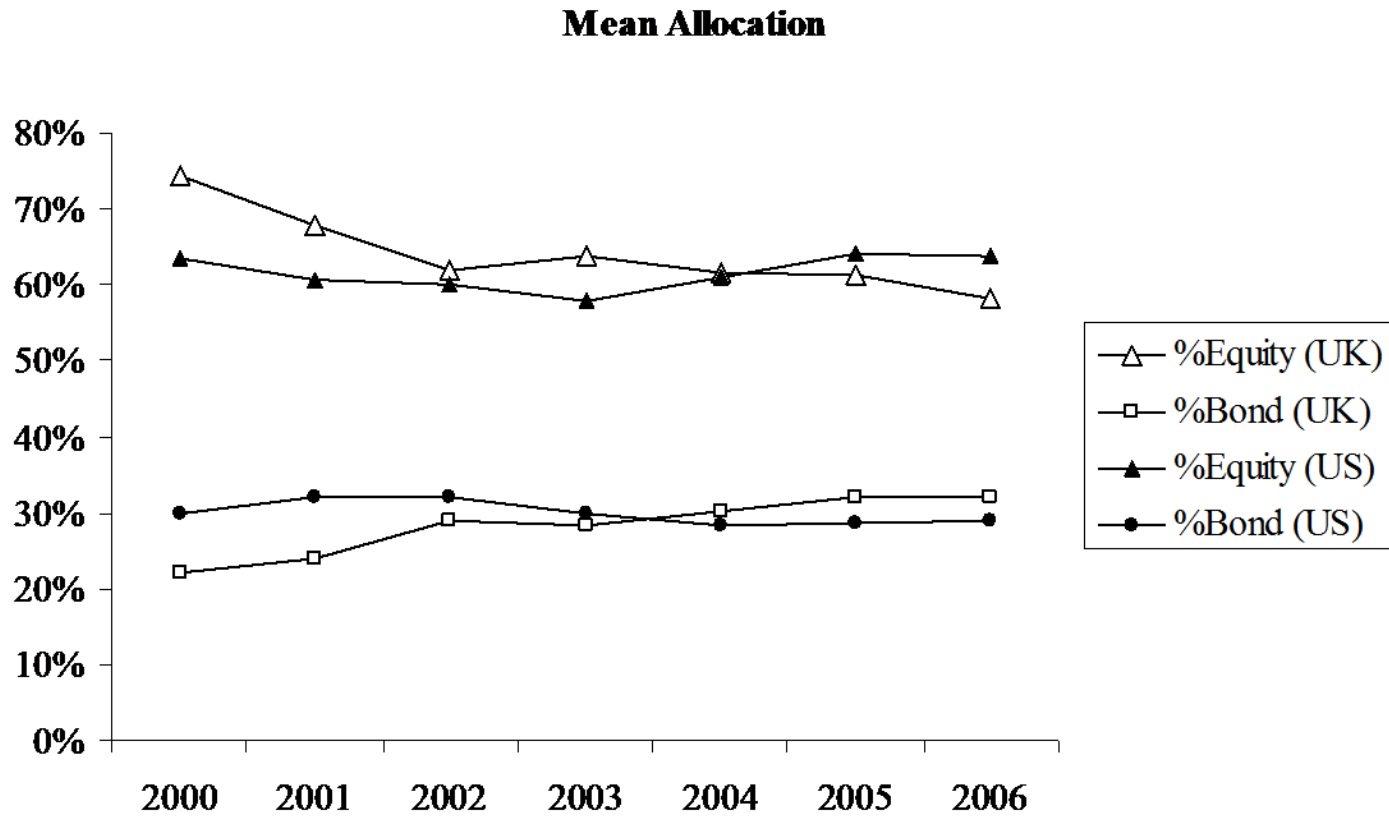


Figure 2

Pension Asset Allocation for UK Companies around the Adoption of Full Pension Recognition (*FRS 17* or *IAS 19*)

Figure 2b: Median Allocation

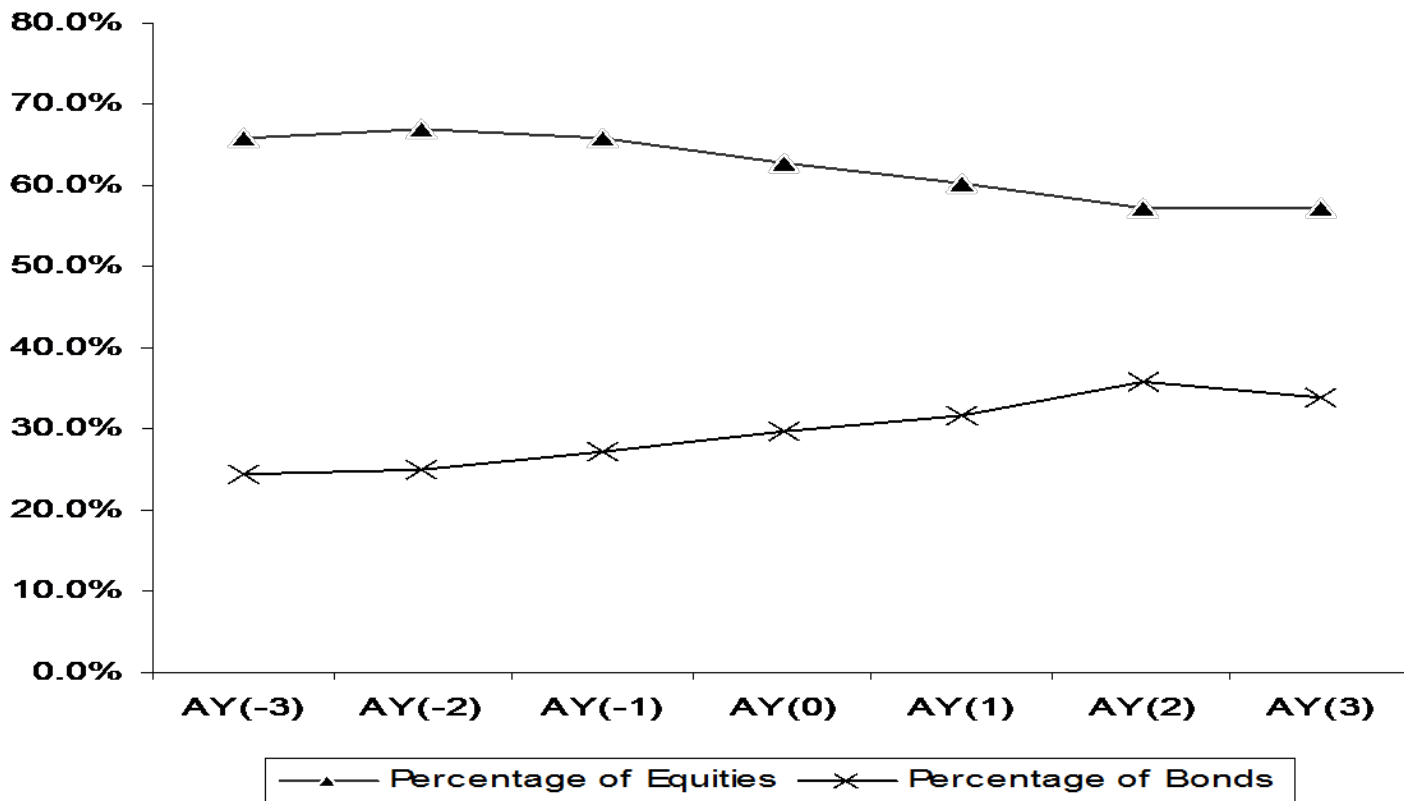


Table 4**Composition of Pension Assets by Country, Year and Portfolio Type: Portfolios based on index-adjusted market values**

Asset Category	2000	2001	2002	2003	2004	2005	2006	<i>t</i>-Test (<i>p</i>-val.) (2006 vs. 2001)
UK Sample								
Observations	144	239	245	252	248	238	220	
-Equity	74.4%	73.8%	70.3%	69.3%	65.7%	63.2%	58.4%	-9.07 (0.00)
-Bonds	22.2%	19.9%	21.3%	22.7%	25.6%	29.5%	31.8%	8.39 (0.00)
US Sample								
Observations	287	308	306	303	307	346	370	
-Equity	63.5%	64.3%	75.5%	64.9%	67.3%	71.3%	67.1%	2.85 (0.00)
-Bonds	29.8%	29.2%	23.3%	25.1%	24.3%	24.2%	26.5%	-3.43 (0.00)

Table 6

Changes in Pension Asset Allocation during the UK *Disclosure* period and the US *Partial Recognition* period

	Obs.	Year 2001	Pre-Adoption Year	t-test 2001 vs. Pre- Adoption
Panel A: Portfolios based on current market values				
<u>UK</u>				
%Bond	154	24.5%	30.4%	-3.26 (0.00)
%Equity	154	66.5%	62.2%	2.25 (0.03)
<u>US</u>				
%Bond	252	32.0%	28.0%	5.14 (0.00)
%Equity	252	60.6%	65.1%	-4.92 (0.00)
Panel B: Portfolios based on index-adjusted market values				
<u>UK</u>				
%Bond	154	22.0%	25.5%	-2.22 (0.03)
%Equity	154	69.1%	66.7%	1.26 (0.21)
<u>US</u>				
%Bond	252	29.0%	24.0%	6.89 (0.00)
%Equity	252	64.1%	71.6%	-7.92 (0.00)

Table 7

Changes in Asset Allocation around the Year of Adopting Full Pension Recognition: Portfolios based on current market values

	Obs.	Year - 2	Year -1	Year 0	Year +1	Year +2	t-test (-1, 0)	t-test (-2, 0)	t-test (-1, +1)	t-test (-2, +2)
UK										
%Bond	216		29.5%	31.7%			-2.26 (0.02)			
%Equity	216		63.1%	61.1%			3.37 (0.00)			
%Bond	165		29.6%	31.7%	32.7%		-2.06 (0.04)		-2.91 (0.00)	
%Equity	165		63.5%	61.4%	59.0%		3.29 (0.00)		5.41 (0.00)	
%Bond	29	28.0%	30.3%	32.4%	35.8%	38.0%	-1.58 (0.12)	-2.01 (0.05)	-3.72 (0.00)	-3.35 (0.00)
%Equity	29	65.7%	61.6%	59.4%	58.3%	55.4%	1.55 (0.13)	2.68 (0.01)	2.24 (0.03)	3.90 (0.00)
US										
%Bond	322		28.5%	28.4%			0.55 (0.58)			
%Equity	322		64.8%	64.2%			2.17 (0.03)			
%Bond	208	28.4%	28.6%	28.5%			0.36 (0.72)	-0.02 (0.99)		
%Equity	208	62.0%	65.2%	64.6%			2.07 (0.04)	-2.33 (0.02)		

Table 7

Changes in Asset Allocation around the Year of Adopting Full Pension Recognition: Portfolios based on index-adjusted values

	Obs.	Year - 2	Year -1	Year 0	Year +1	Year +2	t-test (-1, 0)	t-test (-2, 0)	t-test (-1, +1)	t-test (-2, +2)
<u>UK</u>										
%Bond	216		24.6%	28.4%			-5.16 (0.00)			
%Equity	216		67.6%	63.4%			6.67 (0.00)			
%Bond	165		24.6%	28.1%	31.2%		-4.45 (0.00)		-6.82 (0.00)	
%Equity	165		68.3%	64.1%	60.1%		6.32 (0.00)		9.70 (0.00)	
%Bond	29	21.6%	23.2%	26.6%	31.3%	36.3%	-3.00 (0.01)	-2.70 (0.01)	-6.38 (0.00)	-5.26 (0.00)
%Equity	29	73.2%	68.5%	64.1%	61.3%	56.4%	3.02 (0.01)	3.22 (0.00)	4.66 (0.00)	5.47 (0.00)
<u>US</u>										
%Bond	322		24.4%	26.1%			-7.88 (0.00)			
%Equity	322		71.2%	67.4%			16.6 (0.00)			
%Bond	208	24.3%	24.4%	26.1%			-6.68 (0.00)	-2.55 (0.00)		
%Equity	208	68.3%	71.7%	67.9%			13.33 (0.00)	0.35 (0.73)		

Table 8 - Cross Sectional Analysis of the Change in Pension Assets Allocated in UK Companies to Equity Securities during the Disclosure of Pension Information under *FRS 17* (Panel B - Changes)

Variable	Sign	Model 1	Model 2	Model 3	Model 4
<i>ACTGL1</i>	+	0.12 (1.88)+			
<i>ACTGL2</i>	+		0.08 (5.25)*		
<i>EXPOS1</i>	+			0.03 (2.59)**	
<i>EXPOS2</i>	+				0.02 (1.95)+
<i>FUND</i>	?	0.83 (1.91)+	0.84 (2.11)**	0.69 (1.94)+	0.73 (2.07)**
<i>FUND</i> ²	?	0.31 (1.94)+	0.33 (2.03)**	0.26 (2.02)**	0.27 (2.16)**
<i>HOR</i>	-	-0.10 (-3.04)*	-0.08 (-2.77)*	-0.10 (-3.40)*	-0.10 (-3.20)*
<i>DIVP</i>	+	0.15 (1.31)	0.16 (1.72)+	0.13 (1.22)	0.14 (1.26)
<i>CLOSE</i>	?	0.12 (1.75)+	0.10 (1.14)	0.13 (1.72)+	0.13 (1.75)+
<i>Constant</i>	?	0.00 (0.04)	0.02 (0.54)	0.00 (0.03)	0.00 (0.01)
Observations		141	141	141	141
Adj. R ²		0.16	0.24	0.16	0.16

Table 9 -Cross Sectional Analysis of the Change in Pension Assets Allocated in US Companies to Equity Securities during the Partial Recognition Period under SFAS 87 (Panel B - Changes)

Variable	Sign	Model 1	Model 2	Model 3	Model 4
<i>ACTGL1</i>	+	0.01 (0.74)			
<i>ACTGL2</i>	+		0.01 (2.30)**		
<i>EXPOS1</i>	+			-0.01 (-0.87)	
<i>EXPOS2</i>	+				0.00 (0.87)
<i>HOR</i>	-	-0.12 (-3.30)*	-0.04 (-7.78)*	-0.11 (-2.70)*	-0.12 (-3.25)*
<i>DIVP</i>	+	0.08 (3.39)*	-0.00 (-0.01)	0.06 (1.62)+	0.07 (2.57)**
<i>FAGE</i>	+	0.00 (0.08)	-0.04 (-4.38)*	-0.00 (-0.12)	-0.01 (-0.15)
<i>SIZE</i>	-	-0.03 (-6.29)*	-0.01 (-3.10)*	-0.04 (-2.03)**	-0.03 (-2.76)*
<i>Constant</i>	?	0.00 (0.01)	0.01 (0.64)	0.00 (0.04)	0.00 (0.01)
Observations		215	215	215	215
Adj. R ²		0.08	0.07	0.08	0.08

Table 10 - Cross Sectional Analysis of the Change in Pension Assets Allocated in UK Companies to Equity Securities around the Adoption of *FRS 17, IAS 19* (Panel B - Changes)

Variable	Sign	Model 1	Model 2	Model 3	Model 4
<i>ACTGL1</i>	+	0.05 (2.71)*			
<i>ACTGL2</i>	+		0.01 (0.67)		
<i>EXPOS1</i>	+			0.01 (2.39)**	
<i>EXPOS2</i>	+				0.01 (2.51)**
<i>FUND</i>	?	-0.89 (-4.29)*	0.91 (3.67)*	0.94 (6.83)*	0.94 (6.05)*
<i>FUND</i> ²	?	0.34 (3.89)*	0.35 (3.27)*	0.37 (7.06)*	0.37 (6.39)*
<i>HOR</i>	-	-0.03 (-1.73)+	0.03 (1.72)+	0.03 (1.76)+	0.03 (1.76)+
<i>TAXR</i>	+	0.12 (5.29)*	0.12 (5.38)*	0.12 (5.39)*	0.12 (4.98)*
<i>LEV</i>	+	0.13 (1.87)+	0.13 (2.09)**	0.13 (2.01)**	0.13 (2.03)**
<i>Constant</i>	?	0.01 (0.74)	0.01 (0.64)	0.01 (0.70)	0.01 (0.76)
Observations		148	148	148	148
Adj. R ²		0.14	0.15	0.15	0.15

Table 11 - Cross Sectional Analysis of the Change in Pension Assets Allocated in US Companies to Equity Securities around the Adoption of Full Recognition Accounting (SFAS 158) (Panel B - Changes)

Variable	Sign	Model 1	Model 2	Model 3	Model 4
<i>ACTGL1</i>	+	0.04 (2.78)*			
<i>ACTGL2</i>	+		0.03 (2.07)**		
<i>EXPOS1</i>	+			-0.01 (0.67)	
<i>EXPOS2</i>	+				-0.02 (1.06)
<i>DIVP</i>	+	0.03 (0.78)	-0.02 (-0.76)	0.05 (3.85)*	0.06 (7.49)*
<i>SDCF</i>	+	0.01 (0.12)	0.06 (1.00)	0.02 (3.15)*	0.04 (4.27)*
<i>LEV</i>	+	0.31 (3.51)*	0.18 (1.92)*	0.33 (5.71)*	0.33 (6.37)*
<i>SIZE</i>	-	-0.02 (-1.31)	-0.02 (-1.88)+	-0.02 (-2.14)**	-0.02 (-2.11)**
<i>CLOSE</i>	?	0.01 (2.21)**	0.01 (0.16)	0.01 (3.20)*	0.01 (3.19)*
<i>Constant</i>	?	-0.01 (-7.38)*	-0.01 (-6.56)*	-0.01 (-4.93)*	-0.01 (-4.17)*
Observations		232	232	232	232
Adj. R ²		0.09	0.05	0.08	0.08

Conclusions

- **During the *FRS 17 Disclosure* period UK companies reduced their pension fund exposure to equity securities and at the same time increased their allocation to debt securities.**
- **During the same period US companies maintained a stable asset allocation.**
- **UK companies decreased their allocation to equities during the *FRS 17 / IAS 19 Full Recognition* period.**
- **US companies also decreased their allocation to equities following the adoption of *SFAS 158*.**
- **Cross-sectional analysis reveals that the shift from equity to debt securities is more pronounced in companies with relatively larger pension schemes and larger magnitudes of actuarial gains and losses**