The effect of pension accounting on corporate pension asset allocation

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Abstract

We examine the impact of new pension disclosures and subsequent full pension recognition under FRS 17 and IAS 19 in the United Kingdom and SFAS 158 in the United States on pension asset allocation. These standards require recognition of net pension surplus/deficit on the balance sheet and actuarial gains/losses in other comprehensive income. Therefore, these standards introduce volatility into comprehensive income and balance sheets. We identify a disclosure period during which UK companies disclosed all the required data under FRS 17 in the notes without recognition. We also identify a full recognition period starting one year before until one year after the adoption of FRS 17/IAS 19 (UK) and SFAS 158 (US). We predict and find that UK companies, on average, shifted pension assets from equity to debt securities during both the disclosure and the full recognition periods. We also find that while before the adoption of SFAS 158 US companies maintained a stable allocation to equities and bonds, these companies, on average, shifted funds from equities to bonds around the adoption of SFAS 158. Cross-sectional analysis shows that the shift away from equities is related to changes in funding levels, shorter investment horizons, increased financial leverage, and the expected impact of the new standards on shareholders' equity.

Keywords: Defined Benefit Plans, Pension Asset Allocation, Pension Surplus/ Deficit, FRS 17, IAS 19, SFAS 158.

JEL Codes: G11, G15, G23, G38, M41, M48

1. Introduction

We investigate the effect of new pension disclosures and subsequent recognition requirements of pension surplus/deficit on the allocation of pension assets to equity and debt securities. In November 2000, the Accounting Standards Board (ASB) in the United Kingdom issued Financial Reporting Standard (FRS) No. 17, Retirement Benefits (ASB 2000), which initially had to be adopted in June 2003. In 2002, ASB extended the transitional period of FRS 17 to fiscal years starting on or after January 2005, which coincided with the adoption of International Financial Reporting Standards (IFRS) in Europe. Effectively, UK companies had to adopt the revised International Accounting Standard (IAS) No. 19 (IASB 2004), which is similar to FRS 17. In September 2006, the Financial Accounting Standards Board (FASB) issued SFAS 158 (FASB 2006), which replaced SFAS 87 (FASB 1985) and became effective in December 2006.

Between fiscal 2000 and the adoption of FRS 17/IAS 19, UK companies provided new disclosures on the status of their pension plans. At the adoption of FRS 17/IAS 19, UK companies recognized the pension surplus/deficit on the balance sheet (net of deferred tax); actuarial gains or losses are recognized immediately in other comprehensive income (shareholders' equity). Similarly, SFAS 158 requires full recognition of the pension surplus/deficit on the balance sheet and immediate recognition of actuarial gains/losses and prior service cost in other comprehensive income.

The recognition of net pension surplus/deficit as an asset/liability on the balance sheet and actuarial gains/losses in other comprehensive income under FRS 17/IAS 19 and SFAS 158 introduces volatility to balance sheets of UK and US companies, especially if pension assets are mostly invested in equity securities. In particular, reporting actual returns on pension assets injects volatility into shareholders' equity, while the recognized net pension asset/liability could be a significant portion of a company's book value and market

capitalization.[1]

One way to reduce the volatility of the pension deficit/surplus and the volatility of comprehensive income and shareholders' equity is to match pension assets with pension liabilities, for example, by selecting pension assets whose fair value is positively correlated with the fair value of the pension liability, namely bonds.[2] Alternatively, companies could terminate pension plans (Thomas 1989) or convert defined benefit plans into defined contribution and cash balance plans (D'Souza, Jacob and Lougee 2008; Swinkels 2006). However, these latter actions may incur tax and labor negotiation costs.

We consider one disclosure regime for UK companies, from fiscal 2001 until one year before the adoption of FRS 17/IAS 19, and two full recognition regimes -- one for UK and one for US companies -- from one year before adoption until one year after the adoption of FRS 17/IAS 19 in the United Kingdom and SFAS 158 in the United States. We predict that UK companies with defined benefit pension plans will shift pension assets from equity to debt securities during the disclosure period. This is because of the increased visibility of pension plans due to market-based disclosures and the anticipation of the effect of full pension recognition on the volatility of shareholders' equity and comprehensive income. We also predict that both UK and US companies will shift pension assets from equity to debt securities during the full recognition period due to the recognition of pension surplus/deficit on the balance sheet and the higher anticipated volatility of shareholders' equity and comprehensive income.[3]

[1] At the end of 2001, the combined pension surplus for the FTSE 100 was £5 billion, but by mid July 2002, the net pension was a deficit of £25 billion (Reynolds 2002).

[2] The Committee on Investment of Employee Benefit Assets estimated that switching to fair-value pension accounting would result in approximately $290 billion being shifted from equities to bonds.

[3] In 2001, Boots plc liquidated all its equity holdings in its £2.3 billion pension fund and moved the proceeds into long-dated bonds (Ralfe 2002; McLeish 2001). In the United States, General Motors reduced the share of equities in the pension portfolio from 47% in December 2005 to 38% in December 2006 and to 26% in December 2007.

To test our predictions, we use pension asset allocation data for 1,829 and 2,611 firm-year observations for UK and US companies, respectively, over the period 2000 through 2007. We find that UK companies, on average, shifted funds from equity to debt securities during the FRS 17 disclosure period and that both UK and US companies shifted pension assets from equities to bonds during the full recognition period of FRS 17/IAS 19 and SFAS 158, respectively. This shift is expected to reduce the volatility of shareholders' equity and comprehensive income.

In addition to the effects of changes in disclosure and recognition requirements, contemporaneous changes in funding levels due to minimum funding requirements, shorter investment horizons, changes in plan coverage, and increased financial leverage could trigger similar asset allocation changes. Multivariate cross-sectional analysis reveals that, controlling for other factors that affect asset allocation, the shift from equity to debt securities in UK and US companies is more significant in companies with larger pension plans relative to shareholders' equity. Collectively, the results support the argument that new pension accounting standards in the United Kingdom and the United States affected corporate pension asset allocation, incrementally to other economic factors.

This study contributes to the literature by analyzing how accounting rules affect pension asset allocations in an international setting using both UK and US companies. The evidence in this study illuminates the possible capital market effects of full recognition pension accounting as companies may continue to switch pension assets from equity to debt securities.

The remainder of this study is organized as follows. In section 2, we develop the hypotheses to be tested. Section 3 describes the research design. Sample selection and descriptive statistics are included in Section 4. Section 5 provides the empirical results, while Section 6 provides concluding remarks.

2. Hypotheses

Issued in 2000, FRS 17 required UK companies to disclose the present value of their defined benefit pension obligations and the market value of pension plan assets, as well as actuarial assumptions and details on asset allocation. These new disclosures increased the transparency of the pension plan, thereby facilitating investor, creditor, and employee scrutiny of the financial impact of pension plans. Specifically, underfunded companies would be perceived as riskier because pension deficits are a form of debt. Also, the existence of minimum funding requirements combined with a significant allocation of pension assets to equity securities would require the company to make additional pension contributions if equity values declined. To the extent that asset values are correlated, the sponsoring firm's operating cash flows are likely to be lower when the net pension deficit increases to a level that must be immediately funded due to statutory funding requirements (Bader 1991; Amir and Benartzi 1999). Consequently, the possibility of higher pension contributions at a time when the sponsoring firm's cash flows are relatively low and the uncertainty associated with their timing and magnitude also increases sponsoring companies' perceived risk.

Sponsoring firms might prefer to hedge against potential violations of statutory funding requirements by reducing the volatility of the pension surplus/deficit and improving the matching of pension assets and liabilities (Blake 2001). Better matching is achieved by allocating more pension assets to debt (that is, bonds and other interest bearing securities), instead of equity securities. As the market value of bonds is generally less volatile than that of equities, and since pension liabilities largely depend on the prevailing yield on high quality bonds, such a policy would result in lower volatility of the pension deficit/surplus and a lower probability of violating funding requirements (Harris, Michaelides, Huh and van Bezooyen 2001). In addition, we predict that the anticipated adoption of FRS 17 and the recognition of the full pension liability on subsequent balance sheets would also encourage

shifting pension assets to bonds. This leads to our first hypothesis:

Hypothesis 1: UK companies with defined benefit pension plans will shift pension assets from equity to debt securities during the FRS 17 disclosure period.

FRS 17/IAS 19 in the United Kingdom and SFAS 158 in the United States both require recognition of the net pension deficit/surplus on the balance sheet, recognition of prior service costs in net income and recognition of actuarial gains/losses in other comprehensive income. Therefore, in addition to increasing the amount of balance-sheet debt for underfunded plans, adoption of the new standards in both countries is expected to increase the volatility of total liabilities, shareholders' equity, and comprehensive income for sponsors of defined benefit plans.

Full pension recognition could have contractual implications. For contracts based on balance sheet figures, higher recognized debt increases the likelihood of violating existing debt covenants. Second, higher volatility of shareholders' equity increases the probability of violating equity-based covenants. Third, a recognized pension deficit with a corresponding decrease in distributable retained earnings would decrease the ability to pay dividends. To mitigate the effect of adoption on existing contracts, we expect companies to shift pension assets from equity to debt securities during the adoption of full pension recognition. This argument leads to our second hypothesis:

Hypothesis 2: UK and US companies with defined benefit pension plans will shift pension assets from equity to debt securities during the full recognition period (adoption of FRS 17/IAS 19 in the United Kingdom and SFAS 158 in the United States).

The impact of the new pension standards is expected to be more significant when the pension plan is larger relative to shareholders' equity. For example, Charter plc, a UK-based

engineering company, reported 2003 pension assets with a market value of £462.2 million and shareholders' equity of £24.9 million; Thus a 5.4% decline in the market value of pension assets, holding the pension liability constant, would eliminate its shareholders' equity. Furthermore, a decline in the yield on high-quality corporate bonds could eliminate shareholders' equity, as the pension obligation increases when the discount rate declines. Thus, we would expect companies with larger pension plans relative to shareholders equity to shift more assets from equity to debt securities during the disclosure and full recognition periods.

Companies with larger pension plans will also experience larger actuarial gains/losses, if more pension assets are invested in equity securities. To reduce the volatility effects of actuarial gains/losses on shareholders' equity, they would be motivated to shift pension assets from equity to debt securities.[4] Consequently, we hypothesize that the shift from equity to debt securities will be more significant for companies with larger pension plans relative to shareholders' equity. We would expect this relation for UK companies during both the disclosure and full recognition periods and for US companies during the full recognition period.

Hypothesis 3a: The shift of pension assets from equity to debt securities by UK companies during the disclosure period is positively correlated with the relative size of the pension plan.

Hypothesis 3b: The shift of pension assets from equity to debt securities by UK and US companies during the full recognition period is positively correlated with the relative size of the pension plan.

[4] Shifting to less risky pension assets, however, also implies a lower expected return on pension assets on the income statement (Fernandez 2002).

While this study highlights the asset allocation effects of new pension accounting standards, prior literature identifies three other factors that affect pension asset allocation: funding levels, investment horizon, and offsetting firm risk.[5]

Both UK and US companies were subject to minimum funding requirements before our sample period. These requirements were modified during our sample period 2000 through 2007. For example, the US Pension Protection Act (2006) requires defined benefit pension plans to attain full funding status by increasing pension contributions to the plans. Any shortfalls must be covered within seven years. In the United Kingdom, minimum funding requirements were introduced by the Pensions Act (1995). However, the Pensions Act (2004) replaced these minimum requirements with statutory funding objectives that in essence require each plan to hold sufficient assets to meet its liabilities and set out time limits within which any underfunding must be covered (Webb 2007).[6] These new statutory requirements in both countries are expected to result in higher funding levels.

Prior literature is mixed as to the effect of funding levels on asset allocation. Still, Harrison and Sharpe (1983) suggest that as pension plans become less underfunded, the allocation to equities should decline. Thus, increased funding requirements could trigger a decline in the allocation to equities independent of new accounting standards. Investment maturity could also affect asset allocation. As pension plans become more mature, the investment horizon is shortened, which is expected to trigger a shift of pension assets from equities to bonds. Finally, prior studies document a negative relation between firm risk and the allocation to equities, as companies offset firm risk by using a more conservative pension

[5] Black (1980), Feldstein and Seligman (1981), Tepper (1981), and Harrison and Sharpe (1983), among others.
[6] The UK Pensions Act (2004) also establishes the Pension Protection Fund (PPF), which will compensate members of defined benefit pension plans if after April 2005 the employer becomes insolvent. Similar to the PBGC in the United States, this fund will be funded by levies imposed on defined benefit pension plans. In addition, the act requires plans to appoint "conversant" trustees, imposes stricter reporting requirements, and establishes a new pension regulator with extended powers to investigate and impose sanctions. Finch (2005) argues that the 2004 Pensions Act requires pension trustee boards to take into account the financial strength of the plan sponsor, which is influenced by FRS 17.

asset allocation policy. Therefore, a change in pension asset allocation could be associated with changes in firm risk, independent of new accounting standards. Although our main focus is on the impact of the new accounting standards, we control for these factors in our empirical tests.

3. Empirical design

Pension assets are classified in the notes to the financial statements into "stocks", "bonds," and "other". Stocks and bonds together account for about 90% of total pension funds in our UK and US samples. "Other" includes assets such as mortgage-backed securities, venture capital, private placement, and properties.

To test hypotheses 1 and 2, we analyze pension asset composition over the period 2000 through 2007 for a sample of UK and US companies. Specifically, we test whether UK companies shifted pension funds from equities to bonds during the disclosure period and the full recognition period and whether US companies shifted funds from equities to bonds during the full recognition period. We also examine whether funding levels, investment horizon, and firm risk changed over the sample period.

To test hypotheses 3a and 3b, we construct a model that explains cross-sectional variation in the percentage of pension funds allocated to equity securities ($rEQUITY_{it}$):

$$\begin{aligned} rEQUITY_{it} &= \beta_0 + \beta_1 IMPACT_{it} + \beta_2 FUND_{it} + \beta_3 FUND_{it}^2 + \beta_4 HOR_{it} + \beta_5 LEV_{it} \\ &+ \beta_6 DIVP_{it} + \beta_7 TAXR_{it} + \beta_8 SDCF_{it} + \beta_9 SIZE_{it} + \beta_{10} CLOSE_{it} + \varepsilon_{it} \end{aligned} \quad (1)$$

$rEQUITY_{it}$ is the ratio of pension assets allocated to equity securities divided by total pension assets for firm *i* at the end of fiscal year t. $IMPACT_{it}$ measures the potential impact of the new accounting standards on company *i* in year *t*; we use two measures of the size of the pension plan relative to shareholders' equity:

(i) $EXPOS1_{it}$: The fair value of pension assets deflated by book value of shareholders' equity in year *t*. This variable captures the exposure of shareholders' equity to the volatility in the market value of pension assets.

(ii) $EXPOS2_{it}$: The projected benefit obligation (*PBO*) deflated by book value of shareholders' equity in year *t*. This variable captures the exposure of shareholders' equity to the volatility in discount rates.

Tax and regulatory factors affect asset allocations through funding levels. In general, the tax-deductibility of pension contributions should induce companies to pre-fund their pension plans; companies that are subject to higher tax rates should have greater incentives to pre-fund their plans. Black (1980) and Tepper (1981) argue that, since returns on pension assets are not taxed, these assets should be invested in the most heavily taxed securities, presumably bonds. Their argument suggests no association between funding levels and asset allocations as all companies invest in bonds regardless of funding levels. In contrast, Harrison and Sharpe (1983) argue that the Pension Benefit Guaranty Corporation (PBGC) provides US companies with a put option on extremely underfunded pension obligations. This put option combined with limited tax deductibility on overfunded plans means that funding and asset-allocation decisions are joint and extreme. To maximize tax benefits on the one hand and the value of the PBGC option on the other hand, companies should either overfund the pension plan and allocate all the assets to bonds or underfund and allocate all the assets to equities. Although in practice funding/allocation decisions are rarely extreme, this argument supports a negative relation between funding levels and allocations to equities. However, the value of the PBGC put option in the United States has declined over time and, in particular, since the 1986 Tax Reform Act. Also, an analog to the PBGC did not exist in the United Kingdom until 2005. Therefore, the incentive to allocate pension assets to

equities in cases of extreme underfunding may be of second order importance.

Bader (1991) argues that companies strive to minimize the volatility of future pension contributions. These contributions are fairly predictable for moderate funding levels, less so for more extreme levels. To reduce the volatility of pension contributions, he argues that extremely overfunded and underfunded plans should invest in bonds, while moderately funded plans should increase allocations to equities. His argument suggests an inverted U-shaped relation between funding levels and the allocation to equities.

Based on these arguments, we include both $FUND_{it}$ and $FUND^2_{it}$ to accommodate the possibility of a nonlinear relation between funding levels and allocation to equities.[7] The funding status (*FUND*) is measured as the fair value of pension assets divided by the accumulated benefit obligation (*ABO*).[8]

Investment horizon plays a role in pension asset allocation. While pension obligations to retirees are relatively short-term and are primarily affected by interest rates, obligations to active employees are relatively long-term and are primarily affected by salary increases. Value changes for bonds are more correlated with interest rate changes, and value changes for stocks are more correlated with salary increases. Thus, companies with relatively young (mature) workforces should invest more in stocks (bonds). Consequently, we expect a positive correlation between investment horizon, HOR_{it}, and allocation to equities. HOR_{it} is measured as the natural logarithm of the ratio of *PBO* to current service cost. Overall, an older (younger) workforce should lead to a smaller (larger) ratio of *PBO* to service cost, indicating a shorter (longer) investment horizon.

To mitigate the problem of measurement error in the horizon variable (HOR_{it}), we

[7] Amir and Benartzi (1999) document an inverted-U relation between funding status and the percentage invested in equities.

[8] Since *ABO* is not available for UK companies, we estimate *ABO* based on the formula proposed in Amir and Benartzi (1999): $ABO = PBO / (1+G)^N$, where G is the projected rate of salary increase (collected from financial statements) and N is a measure of investment horizon, equal to the ratio of *PBO* to the current service cost.

include another variable that is associated with investment horizon. This variable, $CLOSE_{it}$, takes into account recent shifts away from defined benefit to defined contribution pension plans and closures of defined benefit plans to new entrants (McSherry 2006). $CLOSE_{it}$ is an indicator variable equal to one if the principal defined benefit plan is closed to new entrants and zero otherwise. As the investment horizon of closed plans is, on average, shorter, we would expect a negative relation between this variable and allocations to equities.

Our model also includes variables that capture the influence of debt contracts and dividend payout policy. Once the pension surplus/deficit is recognized on the balance sheet, the pension asset/liability and corresponding investment portfolio may be affected by certain contractual arrangements. In particular, companies closer to violating debt covenants have stronger motives to improve asset/liability matching in order to reduce the variability of recognized pension deficits, hence the likelihood of debt covenant violation. Better asset/liability matching would also reduce the volatility of shareholders' equity and future pension contributions, which in turn would reduce the volatility of dividends. We would expect companies with tighter debt covenants and higher dividend payout ratios to allocate more of their assets to bonds. To capture these effects, we include financial leverage (LEV_{it}) and the dividend payout ratio ($DIVP_{it}$). We would expect the coefficients on these variables to be negatively associated with the allocation to equity securities. Financial leverage (LEV_{it}) is measured as long term debt divided by the sum of long term debt and market value of equity for firm i in year t. Dividend payout ratio ($DIVP_{it}$) is measured as dividends per share divided by retained earnings per share. If retained earnings are negative, then the variable is measured as the average dividends per share over the current and past two years divided by average retained earnings per share over the current and past two years.[9]

[9] Normally, dividend payout ratio is measured as dividends over net income. However, to avoid excluding companies with negative income, we deflate dividends by retained earnings.

Companies subject to higher tax rates have greater incentives to allocate pension assets to bonds, as bonds are more heavily taxed. Therefore, we include the effective tax rate ($TAXR_{it}$), measured as total tax expense divided by pre-tax income in year t. If current pre-tax income is negative, we use the average tax expense over the current and past two years divided by the average pre-tax income over the current and past two years.

Friedman (1983) and Bodie, Light, Morck, and Taggart (1984) find that companies offset high corporate risk by investing more pension assets in bonds. This policy may reflect management preference to avoid contributions to the pension plan when operating cash flows are low. Therefore, we would expect a negative correlation between the variability of operating cash flows and equity allocation. In addition, we would expect a positive association between firm size and allocation to equities, as larger companies have lower operating risk. The volatility of operating cash flows ($SDCF_{it}$) is measured as the standard deviation of operating cash flows over the current and past four years, deflated by book value of common equity. Firm size ($SIZE_{it}$) is measured as the natural logarithm of market value of equity.

To test our hypotheses, we define two dependent variables: the first is the change in the percentage of assets allocated to equities by UK companies during the disclosure period. The disclosure period is fiscal 2001 to the year before the adoption of FRS 17/IAS 19:

$$rDISCLOSE = rEQUITY \text{ (Year 2001)} - rEQUITY \text{ (Pre-Adoption Year)}.^{10}$$

The second dependent variable is the change in percentage of assets allocated to equities during the full recognition period. For UK (US) companies, this period begins one year before the adoption of FRS 17/IAS 19 (SFAS 158) and ends one year after the adoption:

$$rADOPT = rEQUITY \text{ (Pre-Adoption Year)} - rEQUITY \text{ (Post-Adoption Year)}.$$

[10] Technically, the disclosure period begins in 2000. However, we use 2001 as the starting year because many observations for 2000 are missing.

We estimate Equation (2) for UK companies only. Each independent variable is the difference between the level of the variable at the end of the disclosure period (fiscal 2004) and the level at the beginning of the period (fiscal 2001).

$$rDISCLOSE_i = \beta_0 + \beta_1 \Delta IMPACT_i + \beta_2 \Delta FUND_i + \beta_3 \Delta FUND_i^2 + \beta_4 \Delta HOR_i + \beta_5 \Delta LEV_i + \beta_6 \Delta DIVP_i + \beta_7 \Delta TAXR_i + \beta_8 \Delta SDCF_i + \beta_9 \Delta SIZE_i + \beta_{10} \Delta CLOSE_i + \varepsilon_{it} \quad (2)$$

We estimate Equation (3) for both UK and US companies around the full recognition period. To control for long-term asset allocation trends, we include *rDISCLOSE* to capture asset allocation changes before adoption. For US companies, *rDISCLOSE* is measured as allocation to equities in fiscal 2001 minus the allocation to equities in fiscal 2005. Controlling for prior allocational effects allows us to draw stronger inferences on the incremental effect of accounting standards on pension asset allocation.

$$rADOPT_i = \delta_0 + \delta_1 \Delta IMPACT_i + \delta_2 \Delta FUND_i + \delta_3 \Delta FUND_i^2 + \delta_4 \Delta HOR_i + \delta_5 \Delta LEV_i + \delta_6 \Delta DIVP_i + \delta_7 \Delta TAXR_i + \delta_8 \Delta SDCF_i + \delta_9 \Delta SIZE_i + \delta_{10} \Delta CLOSE_i + \delta_{11} rDISCLOSE_i + \eta_i \quad (3)$$

Each independent variable in Equation (3) is the difference between the level of the variable after adoption and its level before adoption. For UK companies other than early adopters, this normally implies the change between fiscal 2006 and fiscal 2004; for US companies this normally implies the change between fiscal 2007 and fiscal 2005. We use ordinary least squares to estimate the above equations.

4. Sample selection and descriptive statistics

The initial UK sample contains 250 of the 350 FTSE companies that sponsor defined benefit pension plans during 2000 through 2007. We deleted seven companies that elected the "corridor" method allowed under IAS 19. Information on market value of pension assets, actuarial present value of pension liabilities, pension actuarial assumptions, actuarial gains/losses, and details of pension asset allocation are collected from annual financial statements. All other financial data for UK companies are from Datastream.

Data for US companies' pension asset allocations until 2004 are collected from *Pensions and Investments*, a survey of the largest 1,000 pension funds in the United States. Of these, approximately 300 pension funds relate to defined benefit plans of publicly traded firms. Asset allocation data for 2005 through 2007 are collected from notes to the annual financial statements. Financial data for US companies are from Compustat. After removing observations with missing data, the sample consists of 4,440 firm-year observations, of which 1,829 observations are for UK companies and 2,611 observations are for US companies.

Table 1 provides descriptive statistics for our UK and US samples. Over the sample period, both UK and US companies allocate, on average, 62% of their pension assets to equities. The size of the pension plan relative to shareholders' equity is larger in UK than in US firms, as reflected by higher means of *EXPOS1* and *EXPOS2* (significant at the 0.01 level). This difference could lead to more significant allocational effects in the United Kingdom than in the United States. Funding levels (*FUND*) and investment horizon (*HOR*) are larger in UK companies than in US companies (significant at the 0.01 level). Average dividend payout ratios (*DIVP*) and effective tax rates (*TAXR*) are similar across UK and US companies, but median *DIVP* is larger in UK companies (at the 0.01 level), and the median US company has a higher effective tax rate than the median UK company (at the 0.01 level).

US companies are less risky (at the 0.01 level for both means and medians) as reflected by lower volatility of cash flows (*SDCF*) and larger firm size (*SIZE*). However, US companies are more highly leveraged than UK companies (at the 0.01 level). Finally, 47% of UK defined benefit pension plans are closed to new entrants (mean *CLOSE* = 0.47), whereas 12% of US plans are closed to new entrants (significant at the 0.01 level), which could lead to a higher allocation to bonds in UK companies due to shorter investment horizons.[11]

(Table 1 about here)

Most UK companies adopted *IAS* 19 in 2005, the mandatory year of adoption. However, 54 UK companies in our sample early-adopted FRS 17 during 2002 through 2004. Prior literature suggests that the timing of adoption of new accounting standards is affected by the financial statement impact of the new standard and by contracting costs (Amir and Ziv 1997). Using logistic regressions to identify the characteristics of UK companies that elected early adoption of FRS 17, we find (results not tabulated) that early adopters have, on average, smaller (at the 0.05 level) ratios of pension assets to shareholders' equity (*EXPOS1*) and longer (at the 0.05 level) investment horizons (*HOR*). All other variables examined (*rEQUITY*, *FUND*, *LEV*, *SIZE*, *CLOSE*) were not significant (at the 0.10 level) in explaining the adoption decision. These results are consistent with the claim that UK companies that were less affected by FRS 17 were more likely to adopt the standard earlier.

Table 2 provides data on the composition of pension assets for UK companies (top panel), 54 UK early adopters of FRS 17 (middle panel) and US companies (bottom panel). Over 2000 through 2007, UK companies decreased their average allocation to equities by 19.8% and increased their allocation to bonds by 12.7%. UK early adopters of FRS 17 exhibit a similar pattern until 2003, with a sharper decline in the allocation to equities in

[11] All continuous explanatory variables are winsorized at 1% and 99% to mitigate the effect of extreme observations, except $TAXR_{it}$ and $DIVP_{it}$, which are winsorized at 5% and 95% to remove negative values.

2004. During 2000 through 2005, US companies had a relatively stable allocation to equities and bonds, followed by a decline in the allocation to equities during 2005 through 2007.[12]

(Table 2 about here)

Figure 1 depicts the trend of pension asset allocations around the adoption of FRS 17/ IAS 19 in the United Kingdom (Figure 1a), SFAS 158 in the United States (Figure 1b) and early adopters of FRS 17 (Figure 1c). For each company, we identify the adoption year as AY(0) and plot mean percentages of pension assets allocated to equities and bonds around the adoption year. Figure 1a presents information for the entire UK sample between AY(-3) and AY(+2). The figure exhibits a decline in pension funds invested in equities and an increase in the percentage invested in bonds, especially in AY(+1) and AY(+2), consistent with the argument that the new accounting standard caused UK companies to transfer pension assets from equities to bonds.

Figure 1b presents information for US companies between AY(-3) and AY(+1).[13] While there is an apparent decline in pension funds invested in equities and an increase in the percentage invested in bonds after adoption of SFAS 158, these changes appear slight. Figure 1c presents movements in asset allocation for UK early adopters. As in Figure 1a, we observe sharp declines in the allocation to equities around the adoption of the new standard.

(Figure 1 about here)

[12] Asset allocations are influenced by relative changes in market values of stocks and bonds. For example, in 2001 the market value of UK bonds increased by 1%, and the market value of equities decreased by 13%. Thus, a pension portfolio of 75% equities and 25% bonds would become 72.1% equities and 27.9% bonds without rebalancing. Using annual changes in UK and US stocks and bonds indices, we adjusted asset allocations to relative changes in market values of stocks and bonds since 2000. This way, we isolate the effect of corporate rebalancing on asset allocations. We find that the decline in the allocation to stocks and the increase in the allocation to bonds are more transparent in both the UK and the US samples.

[13] AY(+2) is fiscal 2008, and thus data are unavailable at this time.

5. Empirical results

Table 3, Panel A, provides results of analyses of changes in UK firms' pension asset allocations during the FRS 17 disclosure period (Hypothesis 1). The results show that UK companies increased (decreased) their allocation to bonds (equities) during the disclosure period; average allocations to bonds increased by 5.4% (significant at the 0.01 level), while average allocations to equities decreased by 4.3% (significant at the 0.01 level). Similarly, early adopters of FRS 17 increased the average allocation to bonds by 3.4% (significant at the 0.02 level) and decreased the average allocation to equities by 3.6% (significant at the 0.02 level). These results support Hypothesis 1; UK companies decreased their exposure to equities during the disclosure period of FRS 17. For comparison, during 2001 through 2005, the period before adoption of SFAS 158, US companies decreased their average allocation to bonds by 3% and increased the average allocation to equities by 5% (significant at the 0.01 level).

Panel B of Table 3 presents results of analyses of changes in pension asset allocations during the adoption of full pension recognition under IAS 19/FRS 17 in the United Kingdom and SFAS 158 in the United States (Hypothesis 2). The test statistic is based on the difference between *%Equity* (and *%Bond*) in the pre-adoption and the post-adoption years.

On average, UK companies increased their allocations to bonds by 3.7% and decreased their allocations to equities by 4.6% around the adoption of full recognition under FRS 17/ IAS 19 (both changes are significant at the 0.01 level). Early adopters of FRS 17 increased the allocation to bonds by 4.8% and decreased the allocation to equities by 6.6% (both changes are significant at the 0.01 level). US companies also changed their asset allocation around the adoption of SFAS 158, increasing the average allocation to bonds by 2.5% and decreasing the average allocation to equities by 3.9% (both changes are significant at the 0.01 level).

The results in Panel B of Table 3 support Hypothesis 2. In particular, the evidence suggests that both UK and US companies shifted pension assets from equity to debt securities. In addition, the magnitude of this shift is, on average, similar in both countries.[14]

(Table 3 about here)

While the results in Table 3 support Hypotheses 1 and 2, prior literature suggests three alternative reasons for the observed changes in pension asset composition: (1) higher funding requirements, (2) shorter investment horizons, and (3) an increase in overall firm risk. We examine the behaviour of these factors starting three years before adoption of full pension recognition until two years after adoption in the United Kingdom and one year after adoption for US companies. The results are presented in Table 4.

Average funding levels (*FUND*) increased (at the 0.01 level) for both UK and US companies around the adoption of the new standards. These increases could explain the shift from equities to bonds in UK and US companies. Investment horizons, the natural logarithm of the projected benefit obligation over current service cost (*HOR*), increased around the adoption of the new standards in both countries (significant at the 0.01 level), inconsistent with a switch from equities to bonds. We further examined the proportion of companies closing their defined benefit plans to new entrants (*CLOSE*). Closing the fund to new entrants reduces the investment horizon over time and could trigger a shift from equities to

[14] We measured the average funding ratio for each UK firm during the FRS 17 disclosure period and divided the sample into two sub-samples of 107 UK companies with average funding levels above and below the median (not tabulated). We find that UK companies with funding levels below the sample median decreased their average allocation to equities from 67.8% to 63.6% during the disclosure period; companies with funding levels above the sample median decreased their allocation to equities from 65.3% to 60.8%. (Both changes are significant at the 0.01 level.) We repeated this analysis for UK and US companies during the full recognition period. We find that the 90 UK companies with average funding levels below the sample median during that period decreased their allocation to equities from 67.8% to 62.7%, and the 90 companies with average funding levels above the sample median decreased their allocation to equities from 58.9% to 54.6%. (Both changes are significant at the 0.01 level.) Furthermore, the 144 US companies with average funding levels below the sample median decreased their allocation to equities from 64.6% to 60.5% during the SFAS 158 adoption period; the 144 US companies with average funding levels above the sample median decreased their allocation to equities from 64.8% to 61.1%. (Both changes are significant at the 0.01 level.) Thus, the results in Table 3 hold for companies with relatively high and low funding levels.

bonds. As Table 4 shows, the proportion of closed plans increases in the United Kingdom (from 0.51 before adoption to 0.60 after adoption) and in the United States (from 0.24 before adoption to 0.35 after adoption). These increases, which are significant at the 0.01 level, could explain the movement of pension assets from equities to bonds. As for firm risk, we find that mean leverage (*LEV*) decreased over time and mean firm size (*SIZE*) increased over time in both countries. This reduction in firm risk is inconsistent with the switch of pension assets from equities to bonds, and thus a change in risk is not a potential explanation for the shift of pension assets from equities to bonds.

The middle panel of Table 4 presents results for UK early adopters. We find that funding levels and firm risk remained relatively stable from three years before adoption until two years after adoption. Investment horizon increased from the year before adoption until the year after adoption (significant at the 0.09 level), and the proportion of closed plans increased from 0.36 to 0.42 around the adoption of FRS 17 (significant at the 0.08 level). Thus, the only alternative explanation to the switch of pension assets from equities to bonds in UK early adopters is the increase in the proportion of closed plans.

(Table 4 about here)

To examine the effects of new accounting standards, funding levels, investment horizon, and firm risk in a multivariate setting, we first estimate equation (2), in which the dependent variable is the change in the allocation to equities during the disclosure period (*rDISCLOSE*) before the adoption of FRS 17/IAS 19. As Table 5 shows, the coefficients on the impact variables (Δ*EXPOS1* and Δ*EXPOS2*) are positive, as expected, and significant at the 0.05 level. This result, which supports Hypothesis 3a, suggests that UK companies with larger

pension plans relative to shareholders' equity shift more funds from equities to bonds in the disclosure period.[15]

In addition, results in Table 5 show that UK companies that experienced an increase in funding levels over the disclosure period shifted more assets from equities to bonds, as reflected by positive (significant at the 0.10 level) coefficients on *ΔFUND*. In addition, companies that experienced an increase in the investment horizon shifted less assets from equity to debt securities, as reflected by the negative coefficients on *ΔHOR* (significant at the 0.05 level). We also find that companies that experienced an increase in effective tax rates (*ΔTAX*) shifted more pension assets to bonds, as expected, and companies with higher financial leverage (*ΔLEV*) shifted more assets to bonds, possibly to mitigate the effect of recognition on the volatility of shareholders' equity. Furthermore, companies that closed their pension plans to new entrants during the disclosure period shifted more assets from equities to bonds, as reflected by the positive coefficients on *ΔCLOSE* (significant at the 0.01 level). Finally, the coefficients on *ΔDIVP*, *ΔSDCF*, and *ΔSIZE* are not different from zero (at the 0.10 level) suggesting that changes in dividend payout and changes in overall firm risk did not motivate UK companies to shift pension assets away from equities during the disclosure period.

The results in Table 5 suggest that during the disclosure period, UK companies shifted pension assets from equities to bonds because of changes in funding levels, investment horizons, effective tax rates, financial leverage, and plan scope. In particular, companies that closed their pension plans to new entrants shifted more funds from equities to bonds. However, after controlling for these effects, UK companies with larger pension plans relative to shareholders' equity shifted more pension assets from equity to debt securities during the

[15] The Pearson correlation between *ΔEXPOS1* and *ΔEXPOS2* is 0.80 (0.66); between *ΔEXPOS1* and *ΔFUND* 0.20 (0.09), and between *ΔEXPOS2* and *ΔFUND*, -0.19 (-0.15) for UK (US) companies.

FRS 17 disclosure period. We attribute these findings, which support Hypothesis 3a, to the new disclosure requirements of FRS 17. In particular, these new pension disclosures prompted companies with larger pension plans relative to shareholders' equity to reduce the potential effects of volatility in pension asset values and pension liabilities on reported shareholders' equity, as pension plans become more visible and transparent.

(Table 5 about here)

To test Hypothesis 3b, we estimate equation (3), which explains the change in the allocation to equity securities during the full recognition period of FRS 17/IAS 19 in the United Kingdom and SFAS 158 in the United States. Table 6 reports the results. Starting with the UK sample, the coefficients on the main test variables, *ΔEXPOS1* and *ΔEXPOS2*, are positive, as expected, and significant at the 0.05 level. This result, which supports Hypothesis 3b, suggests that UK companies with larger pension plans relative to shareholders' equity shifted more assets from equity to debt securities around the adoption of FRS 17/IAS 19. In addition, the coefficients on *ΔFUND* are negative (significant at the 0.05 level), suggesting that UK companies that experienced a decrease in funding levels shifted more pension assets from equities to bonds. Also, the coefficients on *ΔTAXR* are positive (significant at the 0.01 level), as expected, suggesting that companies with higher effective tax rates shifted more pension assets to bonds. Furthermore, the coefficients on *ΔLEV* are positive (significant at the 0.05 level), as expected, suggesting that companies with higher debt shifted more pension assets to bonds to reduce the effect of full recognition on the volatility of shareholders' equity. The coefficients on *ΔCLOSE* are positive, as expected, and significant at the 0.05 level, consistent with the argument that companies that closed their pension plans to new entrants during the adoption period shifted more funds from equities to bonds. Finally, the positive coefficients on *rDISCLOSE* suggest that companies that shifted

more funds from equities to bonds before adoption continued to shift assets to bonds during the adoption period.

The coefficients on investment horizon (*ΔHOR*), dividend payout (*ΔDIVP*), and firm risk (*ΔSDCF*, *ΔSIZE*) are not significant, at the 0.10 level, in explaining changes in pension asset allocations during the full recognition period of FRS 17/IAS 19. Overall, these findings are consistent with the claim that UK companies with larger pension plans relative to shareholders' equity shifted more pension assets from equity to debt securities during the FRS 17/IAS 19 full recognition period incrementally to the effects of changes in funding levels, effective tax rates, financial leverage and plan coverage.[16]

Table 6 also presents results for estimating equation (3) using US data. The coefficients on the main test variables, *EXPOS1* and *EXPOS2*, are positive and significant at the 0.10 level or better, which supports Hypothesis 3b. This result suggests that, similar to UK companies, US companies with larger pension plans relative to shareholders' equity shifted more assets from equity to debt securities during the SFAS 158 full recognition period. In addition, US companies that pay more dividends shifted more funds to bonds to reduce the effect of the new standard on the stability of dividends, and US companies with higher effective tax rates and larger financial debt shifted more pension assets to bonds.

Unlike the results for UK companies, the coefficients on *ΔFUND*, *ΔCLOSE*, and *rDISCLOSE* are not significant (at the 0.10 level) in explaining the shift of pension assets from equity to debt securities. Similar to the results for UK companies, changes in investment horizons (*ΔHOR*) and changes in overall firm risk (*ΔSDCF*, *ΔSIZE*) are also not significant, at the 0.10 level, in explaining the shift away from equity securities. Overall, our

[16] We also estimated equation (3) for UK early adopters (42 observations with complete data). We find (results not tabulated) positive coefficients on *ΔEXPOS1* and *ΔEXPOS2* (significant at the 0.10 level), as expected, suggesting that early adopters with larger pension plans relative to shareholders' equity shifted more funds from equities to bonds. We also find a positive coefficient on *ΔLEV* (significant at the 0.10 level), suggesting that companies with larger financial leverage shifted more funds to bonds possibly to reduce the likelihood of violating debt-related covenants.

findings are consistent with the argument that US companies shifted pension assets from equities to bonds to reduce the impact of the new standard on the volatility of shareholders' equity.

(Table 6 about here)

To examine the interaction between funding levels and the other regression variables, we partitioned the UK and US samples at the median funding level (as described in note 14) and estimated equations (2) and (3) after excluding $\Delta FUND$ *and* $\Delta FUND^2$ (not tabulated). The results for UK companies are similar to those reported in Tables 5 and 6. In particular, the shift of pension assets from equity to debt securities is associated with $\Delta EXPOS1$ and $\Delta EXPOS2$ (at the 0.05 level) in both sub-samples and in both the disclosure and full recognition periods. Regarding US companies, the coefficients on $\Delta EXPOS1$ and $\Delta EXPOS2$ are positive and significant (at the 0.05 level) only for companies with funding levels *below* the sample median; these coefficients are not reliably different from zero in companies with funding levels above the sample median. Evidently, the shift of pension assets to bonds is particularly relevant for US companies with lower funding levels, because the probability of violating statutory funding requirements is larger.

6. Conclusions

FRS 17 and IAS 19 (Revised) changed accounting and reporting of defined benefit plans in the United Kingdom by initially introducing new market-based pension disclosures (FRS 17) and subsequently requiring full balance sheet recognition of the pension surplus/deficit (IAS 19). In December 2006, the FASB issued SFAS 158, replacing the partial recognition method of SFAS 87 with full balance sheet recognition of defined benefit post-retirement plans. These standards require that actuarial gains/losses be recognized in other comprehensive income. We investigate whether the pension disclosures required by FRS 17

and the recognition requirements of IAS 19 and SFAS 158 affect the pension asset allocations of UK and US companies.

We identify a disclosure period during which UK companies disclosed the required data under FRS 17 in the notes to the financial statements without recognizing the pension surplus/deficit on the balance sheet. In addition, we identify a full recognition period around the adoption of FRS 17/IAS 19 in the United Kingdom and SFAS 158 in the United States. We predict a shift from equity to debt securities by UK companies during the disclosure period due to the higher visibility of pensions in the United Kingdom and the anticipation of full recognition and a similar shift during the full recognition period, around the adoption of FRS 17/IAS 19 in the United Kingdom and SFAS 158 in the United States.

We find that during the FRS 17 disclosure period UK companies reduced their pension fund exposure to equity securities and increased their allocations to debt securities. We also find that UK companies decreased their allocations to equities during the FRS 17/IAS 19 full recognition period. Similarly, US companies decreased their allocations 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 pension plans that are larger relative to shareholders' equity.

In our analysis, we also considered alternative explanations to the shift of pension funds from equities to bonds. We find that the shift from equity to debt securities during the UK disclosure period is positively associated with increases in funding levels, effective tax rates, and financial leverage and negatively associated with increases in investment horizons. In particular, UK companies that closed their pension plans to new entrants shifted more pension assets from equities to bonds, as the average age of plan participants increases and the investment horizon is shortened. Increases in effective tax rates and financial leverage also explain the shift of pension assets from equities to bonds in UK and US companies

during the full recognition period. However, changes in funding levels and plan coverage are associated with shifts in pension assets in the United Kingdom but not in the United States. Nevertheless, the potential impact of the new pension accounting standards on the volatility of shareholders' equity incrementally explains the cross-sectional variation in the shift away from equities in both the United Kingdom and the United States around the adoption of the new pension accounting standards.

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Figure 1
Pension Asset Allocation around the Adoption of Full Pension Recognition*
(FRS 17/IAS 19 in the United Kingdom; SFAS 158 in the United States)

Figure 1a: UK

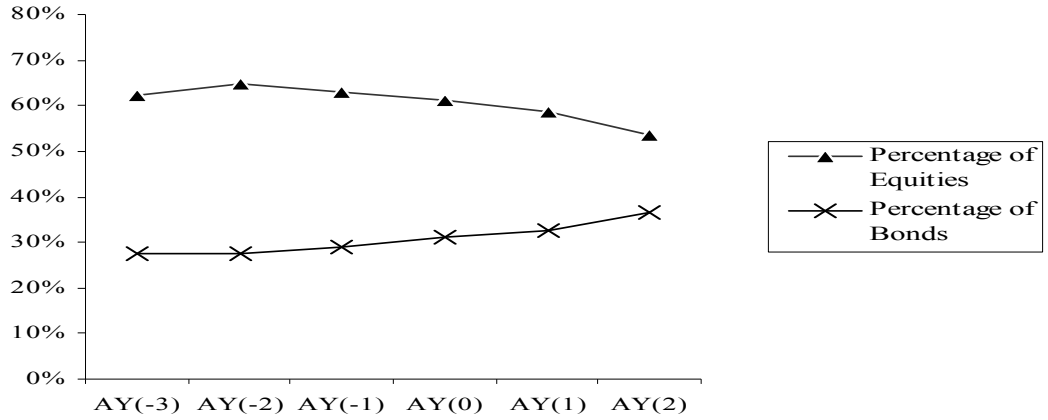


Figure 1b: US

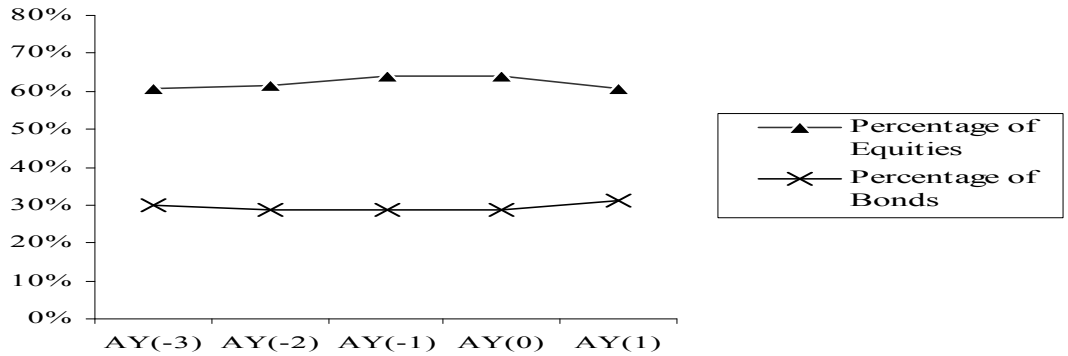
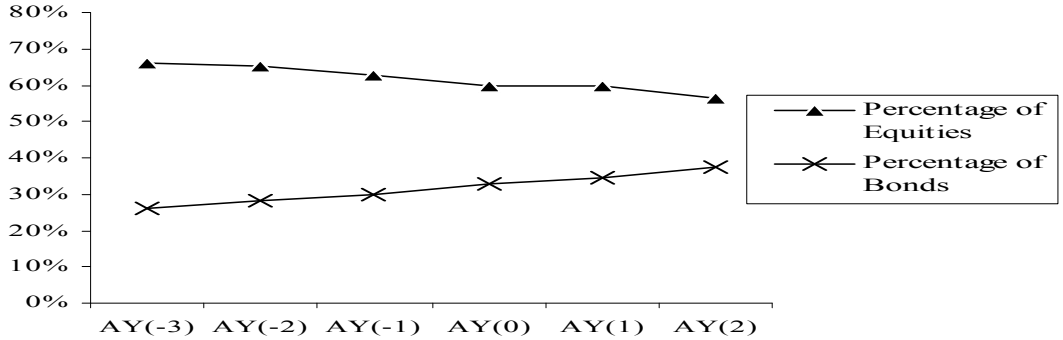


Figure 1c: UK Early Adopters



*Note: All figures present average pension asset allocation around the adoption of full pension recognition. AY(0) is the year of adoption (2006 for US companies and 2005 for most UK companies). Figure 1a presents allocation for the UK sample. Figure 1b presents information for the US sample. Figure 1c presents information for UK early adopters of FRS 17 (fiscal years 2002-2004).

Table 1
Descriptive Statistics for UK and US Companies over 2001-2007*

	UK Sample			US Sample			Means	Medians
Variable	**Mean**	**Median**	**STD**	**Mean**	**Median**	**STD**	***t*-test (p-val.)**	***W*-test (p-val.)**
rEQUITY	0.62	0.64	0.17	0.62	0.64	0.14	0.28 (0.78)	1.28 (0.20)
EXPOS1	1.06	0.50	1.42	0.80	0.46	0.92	6.29 (0.00)	0.52 (0.60)
EXPOS2	1.23	0.61	1.66	0.89	0.50	1.03	7.59 (0.00)	2.44 (0.01)
FUND	0.99	0.99	0.18	0.97	0.95	0.19	3.61 (0.00)	6.35 (0.00)
HOR	3.81	3.76	0.51	3.72	3.70	0.46	5.54 (0.00)	4.82 (0.00)
LEV	0.22	0.21	0.17	0.27	0.23	0.20	-8.17 (0.00)	-6.74 (0.00)
DIVP	0.09	0.09	0.12	0.09	0.06	0.11	0.30 (0.77)	3.45 (0.00)
TAXR	0.31	0.30	0.11	0.32	0.34	0.10	-1.45 (0.18)	-11.65 (0.00)
SDCF	0.15	0.05	0.24	0.09	0.05	0.11	8.88 (0.00)	1.04 (0.30)
SIZE	7.98	7.72	1.26	8.96	8.95	1.52	-20.61 (0.00)	-21.20 (0.00)
CLOSE	0.47	0.00	0.50	0.12	0.00	0.33	26.54 (0.00)	24.27 (0.00)

*Note: The table presents descriptive statistics for samples of UK (1,829 firm/year observations) and US (2,611 firm/year observations) companies with defined benefit pension plans for which financial and pension asset allocation data are available during 2001 through 2007. Tests (and *p*-values) of differences in means (*t*-test) and medians (Wilcoxon test) are provided. ***rEQUITY*** is the ratio of pension assets allocated to equity securities divided by total pension assets at fiscal year end. ***EXPOS1*** is the fair value of pension assets deflated by book value of shareholders' equity at fiscal year end. ***EXPOS2*** is projected benefit obligation (*PBO*) deflated by book value of shareholders' equity at fiscal year end. ***FUND*** is the funding ratio, measured as the fair value of pension assets divided by the accumulated benefit obligation (*ABO*). For UK firms, we approximate *ABO* as $ABO=PBO/(1+G)^N$, where *G* is the projected rate of salary increase and *N* is a measure of investment horizon, equal to the ratio of *PBO* to current service cost. ***HOR*** denotes the investment horizon, measured as the natural logarithm of the ratio of *PBO* to current service cost. ***LEV*** is financial leverage, measured as long term debt divided by the sum of long term debt and market value of equity. ***DIVP*** is dividend payout ratio, measured as dividends per share divided by retained earnings per share. If retained earnings are negative, we use the average dividends over the current and past two years divided by average retained earnings over the current and past two years. ***TAXR*** is the effective tax rate, measured as total tax expense divided by pre-tax income. If current pre-tax income is negative, then the average tax expense over the current and past two years divided by the average pre-tax income over the current and past two years. ***SDCF*** is the standard deviation of operating cash flows over the current and past four years, deflated by book value of common equity. ***SIZE*** is the natural logarithm of market value of equity. ***CLOSE*** is an indicator variable equal to one if the principal defined benefit plan is closed to new entrants and zero otherwise.

Table 2
Composition of Pension Assets by Country, Year, and Portfolio Type*

Asset Category	2000	2001	2002	2003	2004	2005	2006	2007
UK Sample								
Observations	144	254	243	249	251	239	232	217
-Equity	74.4%	66.5%	64.6%	63.1%	62.2%	61.5%	60.0%	54.6%
-Bonds	22.2%	24.5%	26.7%	28.2%	29.7%	31.4%	31.5%	34.9%
-Others	3.4%	9.0%	8.7%	8.7%	8.1%	7.1%	8.5%	10.5%
UK Early Adopters								
Observations	21	38	54	54	53	49	47	42
-Equity	70.0%	65.6%	63.3%	62.8%	59.5%	57.3%	54.7%	50.2%
-Bonds	20.8%	28.1%	29.9%	31.1%	32.9%	36.1%	36.7%	37.5%
-Others	9.2%	6.3%	6.8%	6.1%	7.6%	6.6%	8.6%	12.3%
US Sample								
Observations	340	308	306	303	304	344	368	338
-Equity	63.5%	60.8%	60.0%	58.0%	61.1%	64.4%	63.9%	60.8%
-Bonds	29.8%	32.2%	32.1%	30.0%	28.4%	28.6%	28.9%	31.2%
-Others	6.7%	7.0%	7.9%	12.0%	10.5%	7.0%	7.2%	8.0%

*Note: The table provides information on pension asset allocation as reported by UK and US companies. The samples contain US and UK companies with defined benefit pension plans for which pension asset allocation data are available during 2000 through 2007. Most UK companies (top panel) adopted full pension recognition (IAS 19) in 2005. UK early adopters (middle panel) adopted FRS 17 in 2002 through 2004. US companies (bottom panel) adopted SFAS 158 in 2006.

Table 3
Univariate Tests of Changes in Pension Asset Allocation*

Panel A – Asset allocation changes before adoption

	Obs.	2001	AY(-1)	t-test 2001 minus AY (-1)
UK (entire sample)				
%Bond	214	24.5%	29.9%	**-3.27 (0.00)**
%Equity	214	66.5%	62.2%	**2.51 (0.01)**
UK Early Adopters				
%Bond	48	28.1%	31.5%	**-2.42(0.02)**
%Equity	48	65.6%	62.0%	**2.59(0.02)**
US				
%Bond	252	32.0%	28.0%	**5.14 (0.00)**
%Equity	252	60.6%	65.1%	**-4.92 (0.00)**

Panel B – Asset allocation changes around adoption

	Obs.	AY (-1)	AY (0)	AY (+1)	t-test (-1, +1)
UK (entire sample)					
%Bond	180	28.9%	31.3%	32.6%	**-4.08 (0.00)**
%Equity	180	63.3%	61.0%	58.7%	**5.95 (0.00)**
UK Early Adopters					
%Bond	54	29.8%	33.0%	34.6%	**-3.66 (0.00)**
%Equity	54	62.9%	59.6%	56.3%	**3.65 (0.00)**
US					
%Bond	288	28.6%	28.5%	31.1%	**-4.52 (0.00)**
%Equity	288	64.7%	64.3%	60.8%	**7.37 (0.00)**

***Notes:**

1. Panel A presents percentage of assets allocated to equities and bonds in fiscal 2001 and in the pre-adoption year, AY(-1). The adoption year, AY(0) is 2005 for most UK companies that adopted IAS 19 and 2002 through 2004 for UK early adopters of FRS 17, and 2006 for US companies that adopted SFAS 158. The t-tests (and corresponding p-values) are for the difference between allocations in 2001 and those in the pre-adoption year.

2. Panel B presents percentage of assets allocated to equities and bonds around the adoption of full recognition, AY(0). The t-tests (and corresponding p-values) are for the difference between allocations in the pre-adoption year, AY(-1), and allocations in the post-adoption year, AY(+1).

Table 4
Mean variables around the Adoption of Full Recognition Pension Accounting*

Variables	AY (-3)	AY (-2)	AY (-1)	AY (0)	AY (+1)	AY (+2)	t-test (-1, +1)
UK Full Sample							
FUND	0.90	0.94	0.94	0.96	1.14	1.11	**3.18 (0.00)**
HOR	3.60	3.67	3.77	3.92	4.00	4.01	**3.88 (0.00)**
CLOSE	0.47	0.48	0.51	0.59	0.60	0.60	**3.00 (0.00)**
SDCF	0.16	0.16	0.28	0.32	0.21	0.22	-0.98 (0.33)
LEV	0.23	0.25	0.24	0.23	0.22	0.22	**-2.35 (0.02)**
SIZE	7.77	7.81	7.96	8.06	8.27	8.50	**9.76 (0.00)**
UK Early Adopters							
FUND	1.14	1.05	0.97	0.97	0.99	1.03	1.03 (0.31)
HOR	3.84	3.76	3.83	4.02	4.05	4.09	**1.73 (0.09)**
CLOSE	0.21	0.34	0.36	0.40	0.42	0.55	**1.78 (0.08)**
SDCF	0.21	0.29	0.23	0.45	0.47	0.49	1.42 (0.17)
LEV	0.16	0.18	0.23	0.23	0.25	0.23	0.49 (0.63)
SIZE	8.24	8.19	8.17	8.14	8.29	8.43	0.63 (0.54)
US Full Sample							
FUND	0.93	0.95	0.95	1.07	1.12	NA	**4.71 (0.00)**
HOR	3.74	3.73	3.76	3.81	3.86	NA	**1.80 (0.07)**
CLOSE	0.06	0.11	0.24	0.26	0.35	NA	**3.14 (0.00)**
SDCF	0.10	0.11	0.17	0.13	0.18	NA	0.27 (0.79)
LEV	0.28	0.25	0.25	0.24	0.24	NA	**-1.89 (0.06)**
SIZE	9.03	9.19	9.09	9.24	9.25	NA	**5.26 (0.00)**

*Note: The table presents mean variables around the adoption of full recognition pension accounting. The adoption year, denoted AY(0), for most UK companies is 2005, 2002 through 2004 for UK early adopters of FRS 17, and 2006 for US companies. We report *t*-tests (and *p*-values) of differences between the variable in the post-adoption year, AY(+1), and the pre-adoption year, AY(-1). Variables are defined in Table 1. Data for US companies for year AY(+2) (fiscal 2008) are unavailable.

Table 5
Cross Sectional Analysis of Changes in Pension Assets Allocated to Equity Securities in UK Companies during the Disclosure Period under FRS 17*

Variable	Sign	Model 1	Model 2
Δ***EXPOS1***	+	**0.04**	
		(2.09)**	
Δ***EXPOS2***	+		**0.03**
			(1.94)**
Δ***FUND***	?	**0.18**	**0.21**
		(1.81)+	**(1.65)+**
Δ***FUND²***	?	0.05	0.06
		(0.64)	(0.70)
Δ***HOR***	-	**-0.14**	**-0.13**
		(-2.22)**	**(-2.09)****
Δ***LEV***	+	**0.26**	**0.26**
		(9.50)*	**(9.82)***
Δ***DIVP***	+	0.04	0.04
		(0.42**)**	**(**0.44**)**
Δ***TAXR***	+	**0.16**	**0.15**
		(4.31)*	**(5.12)***
Δ***SDCF***	+	0.01	0.00
		(0.06**)**	**(**0.01**)**
Δ***SIZE***	-	0.02	0.02
		(1.09)	(1.08)
Δ***CLOSE***	+	**0.10**	**0.10**
		(**13.87**)*	(**14.20**)*
Constant	?	0.04	0.04
		(1.36**)**	**(**1.31**)**
Observations		156	156
Adj. R^2		0.19	0.19

*Notes:

1. The table presents results for estimating Equation (2) for a sample of UK companies with defined benefit pension plans and for which financial and pension asset allocation data are available. The dependent variable is *rDISCLOSE*, which is the change in the percentage of assets allocated to equities from 2001 until one year before adoption of full recognition (2005 for most UK companies that adopted IAS 19, 2002 through 2004 for UK early adopters of FRS 17), *rDISCLOSE* = *rEQUITY* (Year 2001) - *rEQUITY* (Pre-Adoption Year), where *rEQUITY* is the ratio of pension assets allocated to equity securities divided by total pension assets.

2. See Table 1 for variable definitions. All independent variables are measured as the difference between the pre-adoption year and fiscal 2001. The model is:

$$rDISCLOSE_{it} = \beta_0 + \beta_1 \Delta IMPACT_{it} + \beta_2 \Delta FUND_{it} + \beta_3 \Delta FUND_{it}^2 + \beta_4 \Delta HOR_{it} + \beta_5 \Delta LEV_{it} + \beta_6 \Delta DIVP_{it} + \beta_7 \Delta TAXR_{it} + \beta_8 \Delta SDCF_{it} + \beta_9 \Delta SIZE_{it} + \beta_{10} \Delta CLOSE_{it} + \varepsilon_{it} \quad (2)$$

3. *, **, + indicate significance at the 0.01, 0.05, and 0.10 levels, respectively.

Table 6
Cross Sectional Analysis of the Change in Pension Assets Allocated to Equity Securities - around the Adoption of FRS 17/IAS 19 in the United Kingdom and SFAS 158 in the United States*

		UK Sample		US Sample	
Variable	**Sign**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
Δ***EXPOS1***	+	**0.01**		**0.02**	
		(2.60)**		**(1.83)**+	
Δ***EXPOS2***	+		**0.01**		**0.01**
			(2.09)**		**(2.79)***
Δ***FUND***	?	**-0.76**	**-0.74**	-0.12	-0.14
		(-2.02)**	**(-2.47)****	**(**-0.60)	(-0.67)
Δ***FUND²***	?	0.30	0.29	0.05	0.06
		(1.05)	**(**1.05)	**(**0.71)	(0.79)
Δ***HOR***	-	-0.02	-0.02	-0.04	-0.04
		(-0.97)	**(**-0.95)	**(**-1.62)	(-1.56)
Δ***LEV***	+	**0.10**	**0.10**	**0.04**	**0.04**
		(1.80)+	**(1.77)**+	**(2.53)****	**(2.52)****
Δ***DIVP***	+	-0.16	-0.16	**0.05**	**0.06**
		(-0.39)	(-0.39)	**(2.76)****	**(2.78)***
Δ***TAXR***	+	**0.13**	**0.13**	**0.14**	**0.14**
		(4.76)*	**(4.49)***	**(2.45)****	**(2.36)****
Δ***SDCF***	+	0.01	0.01	0.12	0.10
		(0.13)	**(**0.19)	**(**1.41)	(1.22)
Δ***SIZE***	-	0.03	0.03	-0.00	-0.00
		(1.33)	**(**1.27)	(-0.01**)**	(-0.10)
Δ***CLOSE***	+	**0.01**	**0.01**	-0.01	-0.01
		(2.44)**	**(2.58)****	(-0.66**)**	(-0.63)
rDISCLOSE	+	**0.09**	**0.09**	0.03	0.04
		(3.57)*	**(3.64)***	(0.65)	**(**0.71)
Constant	?	0.02	0.02	**0.04**	**0.04**
		(1.02)	(1.10)	**(3.18)***	**(3.09)***
Observations		137	137	184	184
Adj. R^2		0.18	0.18	0.11	0.11

*Notes:

1. The table presents results for estimating Equation (3) using a sample of UK and US companies with defined benefit pension plans and for which financial and pension asset allocation data are available. The dependent variable is *rADOPT*, which is the change in the percentage of assets allocated to equity securities from one year before adoption until one year after adoption of full pension recognition (2005 for most UK companies that adopted IAS 19, 2002 through 2004 for UK early adopters of FRS 17, 2006 for US companies). *rADOPT* = *rEQUITY* (Pre-Adoption Year) - *rEQUITY* (Post-Adoption Year), where *rEQUITY* is the ratio of pension assets allocated to equity securities divided by total pension assets.

2. See Table 1 for variable definitions. All independent variables in Equation (3) are measured as the difference between the post-adoption and the pre-adoption year. The model is:

$$rADOPT_i = \delta_0 + \delta_1 \Delta IMPACT_i + \delta_2 \Delta FUND_i + \delta_3 \Delta FUND_i^2 + \delta_4 \Delta HOR_i + \delta_5 \Delta LEV_i + \delta_6 \Delta DIVP_i + \delta_7 \Delta TAXR_i + \delta_8 \Delta SDCF_i + \delta_9 \Delta SIZE_i + \delta_{10} \Delta CLOSE_i + \delta_{11} rDISCLOSE_i + \eta_i \quad (3)$$

3. *, **, + indicate significance at the 0.01, 0.05, and 0.10 levels, respectively.