The economic consequences of accounting standards: Evidence from risk-taking in pension plans

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Abstract

Pension experts have long conjectured that pension accounting rules encourage firms to invest pension assets in risky asset classes (Zion and Carcache 2003, Gold 2005). The recent passage of IAS 19 *Employee Benefits (Revised)* ("IAS 19R") marks a fundamental shift in pension accounting on the income statement, by removing the use of the expected rate of return (ERR) on plan assets to determine a "smoothed" pension expense. We exploit the quasi-experimental setting created by this shift in a difference-in-differences research design. We demonstrate that a sample of Canadian firms affected by IAS 19R reduces risk-taking in pension investments post-IAS 19R, both over time, and compared to a control sample of U.S. firms unaffected by IAS 19R. Within Canadian firms, we also find that firms expected to be relatively more impacted – namely those with economically substantial plans, for which ERR assumptions have a larger impact on the income statement – engage in more risk-reduction post-IAS 19R. Accounting regimes relying on expected returns to calculate pension expense allow sponsors to recognize in income the benefits of higher risk (via a higher ERR, which reduces pension expense) while not recognizing the costs (of higher volatility in actual returns). We provide evidence that such accounting regimes could tilt plan sponsors towards more risk-taking in pension investment. Our results also suggest that an ERR-based expense smoothing regime – the norm under current U.S. GAAP – could be a driver of pension asset allocation.

Keywords: Pension accounting, pension smoothing, pension asset allocation, IAS 19

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I. INTRODUCTION

Accounting standards govern the measurement, recognition, and presentation of accrual accounting assets, liabilities, and income, and do not have direct effects on cash flows. However, accounting standards can alter firms' incentives to engage in transactions or alter the parameters of those transactions, thereby indirectly affecting underlying cash flows. One area of accounting with enormous potential for such 'real' effects is the accounting for defined-benefit pension plans, especially given how economically substantial these plans are on corporate financial statements, and how important they are as a source of retirement income for beneficiaries. [1] Defined-benefit (DB) pensions promise a certain, "defined" benefit to employees when they retire, and the company sponsoring the plan (the "plan sponsor") becomes responsible for ensuring that sufficient assets are set aside in a trust to pay those benefits as they fall due. In this study, we examine the real effects of one of the most controversial aspects of pension accounting – the smoothing of pension expense on the income statement.

Although pension assets and liabilities are now marked-to-market on corporate balance sheets (since SFAS 158 under US GAAP and IAS 19 under IFRS), pension expense on the income statement still does not reflect the entire change in these assets and liabilities over the course of the year, but is instead smoothed. This means that the expense is shielded from two key sources of change in pension assets and liabilities. First,

[1] Defined benefit pension plans in the U.S. are economically important. While 26% of U.S. firms on Compustat have defined benefit plans in fiscal year 2013, the aggregate market capitalization for these firms comprises 62% of the aggregate market capitalization of all firms on Compustat with nonzero sales and total assets. In 2013, the aggregate dollar amount of defined benefit pension obligations (pension assets) is $2.3 trillion ($2.1 trillion). The pension obligations (pension assets) represent on average 13.8% (11.7%) of the total assets of sponsoring companies. Furthermore, for the 300 firms with the largest pension liabilities, the pension obligations (pension assets) represent on average 27.6% (23.9%) of total assets. From an employee perspective, forty million private sector employees and retirees rely on one of the 26,000 defined-benefit plans sponsored by the Pension Benefit Guaranty Corporation (PBGC) for retirement income.

changes in pension liabilities arising from differences between actual and expected discount rates, salary growth rates, mortality rates, etc., are not reflected in current pension expense but passed through other comprehensive income. Second, pension expense is offset not by actual returns but by *expected* returns on pension assets, estimated as the expected rate of return (ERR) on pension assets multiplied by the fair value of those assets. [2]

The use of expected rather than actual returns has some key consequences. On one hand, it allows plan sponsors to recognize in net income the benefits of investing in equities versus bonds (or any higher-risk versus lower-risk asset class), as the ERR is higher by the equity risk premium, reducing pension expense and thus boosting net income. On the other hand, the use of expected returns shields net income from the costs of investing in those equities, as the higher expected volatility in actual returns is not reflected in pension expense. Therefore, pension accounting on the income statement reflects the benefits of equity investing (or risk-taking, more generally) while not fully reflecting its costs. This asymmetry in the accounting regime could incentivize plan sponsors to engage in more risk-taking than they otherwise would in the absence of such a smoothing mechanism. Investigating whether the ERR-based expense smoothing regime leads plan sponsors to increase portfolio investments in risky assets is the objective of this study.

This prediction, while intuitive, is remarkably difficult to test empirically, as ERR-based smoothing applies across U.S. GAAP, U.K. GAAP, and IFRS, leaving no

[2] Management is charged with developing the ERR assumption every year, based on long-term expectations of capital market performance and the firm's targeted asset classes. Prior studies suggest that firms increase asset allocations to equity securities to justify higher ERR assumptions (Bergstresser, Desai, and Rauh 2006 and Chuk 2013.)

readily identifiable control sample of firms unaffected by such a regime. Furthermore, for affected firms alone, describing the asset allocations that sponsors would have chosen in the absence of any accounting-induced incentives is conceptually difficult. As a result, testing any real effects of ERR-based expense smoothing would involve a mandated shift away from such a regime; observing the consequences of such a shift for pension investment strategies could allow us to infer whether expense smoothing induces specific investment behaviors. The passage of *IAS 19R*, a revision of *IAS 19 Employee Benefits*, effective for fiscal years starting from Jan 1, 2013, provides a natural quasi-experiment that can be used to answer this question.

IAS 19R, amongst other provisions, mandates a fundamental change in the way in which pension expense is determined. First, it eliminates the ERR as a separate assumption determined by managerial judgment; managers no longer need to determine a long-term ERR assumption. Second, it effectively replaces the ERR with the discount rate assumption, which has historically been determined as the yield on a portfolio of high-quality corporate bonds whose coupons and maturities match the expected benefit payments of the plan. Whereas pension expense was previously offset by the *ERR*fair value of plan assets*, it is now offset by the *discount rate*fair value of plan assets* after IAS 19R. Hence, by eliminating the ERR, IAS 19R no longer allows income statement recognition of the benefits of investing in risky assets that have high expected returns without recognition of the costs. If such asymmetric recognition of costs and benefits previously encouraged plan sponsors to invest more in risky assets, this leads us to the

prediction that the IAS 19R shift away from ERR-based smoothing will result in plan sponsors reducing allocations to risky assets. [3]

To examine the research question, we adopt a difference-in-differences research design where we compare shifts in asset allocation between the pre- and post-IAS 19R periods for Canadian firms, to a matched control sample of U.S. firms. Canada adopted IFRS as the dominant accounting standard starting in 2011, resulting in Canadian firms being affected by IAS 19R, whereas U.S. firms in comparison are unaffected. We choose Canada as our setting for several reasons. First, Canada's institutions are very similar to the U.S. in terms of reporting environment and enforcement mechanisms, allowing for easier comparisons to and generalization to the U.S. (Burnett, Gordon, Jorgensen, and Linthicum 2013). Second, Canada offers an important advantage over another potential setting: the United Kingdom. U.K. plans have been in a steady trend of de-risking asset allocations over the 2004-2014 period (Prudential Insurance 2012, Mercer 2014), making it difficult to disentangle IAS 19R effects from longer, more secular trends over time.[4] In contrast, Canadian plans have been slow to engage in de-risking practices (Financier

[3] One potential concern with the shift offered by IAS 19R is that it simply replaces ERR-based smoothing with discount rate-based smoothing. The ERR is a long-term expectation, which typically does not change very frequently, thus leading to the smoothing effect. The discount rate, on the other hand, is a point-in-time rate determined using the yields of high-quality corporate bonds as of the fiscal year-end date. It is therefore not smooth by definition and does fluctuate considerably from year to year, due to changes in prevailing bond yields as well as changes in the duration of each pension plan.

[4] A comparative study of U.K. and U.S. pension plans by Prudential Insurance (2012) concludes that in 2006-2011, the U.S. lagged significantly behind the U.K. in pension de-risking activity. In this period, they report that U.K. plans engaged in four times as many pension risk transfer actions (lump-sum transfers, buy-outs, buy-ins, etc.) as U.S. plans. The study points out two main factors driving increased de-risking activity in the U.K. First, U.K. plans were subject to tightened funding requirements in 2004, which allowed only three to five years to fill funding gaps. While U.S. plans were subject to similar requirements via the Pension Protection Act (2006), funding relief enacted twice after the financial crisis has delayed full implementation of the Act to 2015. Second and perhaps more important, U.K. plans have a heightened awareness of longevity risk – i.e., the fact that pension liabilities will increase as life expectancies rise - compared to U.S. plans. This is because U.K. plans are required to incorporate up-to-date longevity assumptions while projecting pension liabilities, whereas many U.S. plans are still projecting liabilities based on obsolete longevity assumptions developed using data from the 1980s-1990s. Pension de-risking activities are however slowly becoming more common in the U.S.

Worldwide 2013, Law Times 2013, European Pensions Magazine 2015).[5] Finally, European plans differ significantly from North American plans in terms of funding and investment regulation, again making comparisons difficult.

We run tests on 125 Canadian pension sponsors for the last fiscal year pre-IAS 19R and the first fiscal year post-IAS 19R, matched to U.S. sponsors using propensity-score matching. We first examine the response to IAS 19R within Canadian firms alone. We find that mean and median equity investment by Canadian plan sponsors exhibits a significant downward shift post-IAS 19R. Multivariate analysis controlling comprehensively for determinants of asset allocation finds that Canadian plan sponsors reduce equity allocations significantly following IAS 19R. Cross-sectionally, we expect the Canadian firms that will be particularly impacted by the change to be those with relatively strong incentives in the pre-IAS 19R period to boost the ERR (and increase risky asset allocations commensurately) so as to affect reported net income. Firms with economically substantial pension plans are expected to have such stronger incentives, as any given increase in the ERR translates into a larger overall boost to reported net income for these firms. Consistently, we find in cross-sectional tests that the decrease in equity allocations post-IAS 19R is significantly more pronounced for Canadian firms whose ERR assumptions have a relatively large impact on the income statement, i.e. whose pension plans are large relative to operating income. This evidence on Canadian firms

[5] For example, the Law Times (2013) commented that "Many of the more innovative measures to remove or reduce the risks associated with employer pension plans have been relative slow to take off in Canada". Potential reasons for this include (i) the U.K. and U.S. have larger and more sophisticated insurance and banking markets, which have given rise to more readily available and diverse financial products with which to manage pension risk; (ii) specific permissions are required in each case from Canadian pensions regulators to implement risk-transfer strategies such as lump-sum transfers, buy-outs or buy-ins.

alone suggests that these firms respond in a manner consistent with IAS 19R reducing the accounting-based incentive to invest in higher-risk assets.

We then compare the asset allocation behavior of Canadian plan sponsors to that of a control group of U.S. plan sponsors, chosen to be similar to the Canadian firms along observable firm and plan characteristics. Replicating the above tests on the U.S. sample alone, we find no significant shifts in asset allocation within U.S. sponsors, as we would expect in a sample unaffected by IAS 19R. We then test the IAS 19R effects more rigorously with a difference-in-difference (DD) specification, where we examine how equity allocations of Canadian firms shift post-IAS 19R, *relative to* equity allocations of unaffected U.S. firms over the same period. This model documents that Canadian firms affected by IAS 19R, on average, reduce allocations to equity significantly more than similar U.S. firms that differ primarily in that they are unaffected by IAS 19R. Further tests confirm that the DD results are driven by Canadian plan sponsors with economically substantial plans.

Overall, these results provide evidence that Canadian firms respond to IAS 19R in a manner consistent with its reducing their incentive to invest in equities. This in turn suggests that ERR-based expense smoothing induced real effects on investment behavior, by encouraging plan sponsors to engage in more risk-taking than they might otherwise have. We stress here that our tests only predict and find evidence consistent with IAS 19R bringing about a *decrease* in risky asset allocation. Whether this decreased risk moves asset allocations towards (or away from) an optimal level of risk-taking, while an interesting and important question, is beyond the scope of our tests.

Our study makes several contributions. First, we provide some of the first empirical evidence on the economic consequences of the ERR-based expense smoothing regime in pension accounting. Though smoothing mechanisms are one of the most controversial aspects of pension accounting, smoothing still prevails on the income statement under U.S. GAAP, and it does offer some advantages in terms of reporting quality. For instance, Hann, Heflin, and Subramanyam (2006) document that when compared to a hypothetical researcher-constructed fair-value model, the extant smoothing model provides pension numbers that have higher value relevance and credit relevance. However, smoothing could also induce unintended economic consequences on managerial behavior. We document one such important consequence of using the ERR – on asset allocation.[6] Understanding the economic consequences of the current pension accounting regime is important because the pros and cons of pension expense smoothing have long been debated in the U.S., which still relies on an ERR-based model for pension expense and has indefinitely delayed plans to eliminate the ERR. [7] Our findings that ERR-based smoothing creates incentives to hold more risky investments can contribute to explaining the continuing preponderance of pension investments in equities in the U.S.

Second, by demonstrating that the accounting regime can be a driver of pension investment decisions, we contribute to the multi-disciplinary literature on the

[6] Our work also complements research in the public (governmental) plan arena, that documents another unintended consequence of using the ERR but in a different context – as the discount rate for valuing plan liabilities, per the Governmental Accounting Standards Board's rules. Andonov, Bauers, and Cremer (2013) find that U.S. public plans, which alone have this accounting feature, invest in risky assets to a significantly greater extent compared to a control sample comprised of U.S. corporate plans as well as public and corporate plans across Canada and Europe. They attribute this finding to the fact that U.S. public plans have an added incentive to invest in risky assets because by so doing, they can assume a higher ERR, and so discount the plan's projected benefit outflows at a higher rate, which then lowers the estimated plan liability and improves reported funding status.

[7] Published minutes of FASB deliberations describe the use of expected rather than actual returns as one of the "compromises" made in pension accounting to reduce earnings volatility (http://www.fasb.org/resources/ccurl/898/695/11-10-05_pensions.pdf).

determinants of pension asset allocation. Over the years, many theories of pension investment have been proposed: the put option theory that Pension Benefit Guaranty Corporation (PBGC) insurance encourages plan sponsors to engage in excessive risk-taking as they approach distress (Sharpe 1976), the tax arbitrage theory which predicts that the tax-sheltered nature of pensions should induce tax-paying firms to invest pension assets in bonds (Black 1980, Tepper 1981), and the theory that incentives to avoid contribution volatility will lead very underfunded and very overfunded plans to invest more in bonds (Bader 1991, Amir and Benartzi 1999). Many of these theories, however, have received mixed empirical support. Rauh (2009) also points out that substantial variation in asset allocation still remains unexplained, implying that there exist other factors that drive asset allocation choices. We propose and provide empirical support for another factor that contributes to higher investments in equities: the smoothing mechanisms in pension accounting rules.

Finally, we contribute to the literature on the "real effects" of accounting standards, which postulates that the way in which accountants measure and report economic transactions can impact firms' operating and financing decisions (Kanodia 2006). The empirical evidence on real effects has so far spanned a wide spectrum of accounting areas.[8] The pensions area has some prominent examples of accounting rules

[8] For example, Horwitz and Kolodny (1980) find that firms reduce R&D spending after SFAS 2 required R&D to be expensed. Imhoff and Thomas (1988) find a substitution from capital leases to operating leases after SFAS 13 required capital leases to be recognized on the balance sheet. Bens and Monahan (2008) show that accounting rules requiring consolidation of variable interest entities reduce firms' willingness to sponsor these entities. Choudhary, Rajgopal, and Venkatachalam (2008) find that firms accelerate the vesting of employee stock options to avoid recognizing unvested option grants at fair value after SFAS 123R. Graham, Hanlon, and Shevlin (2011) show that the desire to reduce accounting income tax expense (as opposed to simply reduce cash taxes paid) affects firms' decisions on where to locate foreign operations and whether to repatriate foreign earnings; Chen, Tan, and Wang (2013) show that fair value measurement affects managers' decisions on hedging risk. Graham, Harvey and Rajgopal (2005) provide extensive survey evidence to the effect that managers take real actions to meet earnings goals.

inducing real effects – e.g., Mittelstaedt, Nichols, and Regier (1995) find evidence consistent with the introduction of SFAS 106 - which required recognition of other post-employment benefits - reducing employers' willingness to provide these benefits in the first place. Similar effects have been purported to arise from changes in pension accounting rules that have brought pension assets and liabilities fully on to corporate balance sheets.[9]

Section II describes the accounting regime shift under IAS 19R and develops hypotheses. Section III describes the sample selection and research design. Section IV presents the empirical results. Section V provides additional discussion, and Section VI concludes.

II. BACKGROUND AND HYPOTHESES

Pension accounting regimes under US GAAP and (pre-IAS 19R) IFRS

US GAAP and IFRS in the pre-IAS 19R regime are broadly consistent in pension accounting rules, with some differences in the details. Under the FASB's SFAS 158, pension accounting on the balance sheet is fully marked-to-market, i.e., plan sponsors are required to recognize the net funded status - the plan projected benefit obligations (PBO) less the fair value of plan assets - on the balance sheet, with overfunded (underfunded) plans reflected as a net asset (liability). However, under both SFAS 158 and IAS 19 (which was the IFRS standard prior to IAS 19R), effects of marking pension plan assets and liabilities to market are not fully recognized in current net income, and the income statement does not articulate to the balance sheet. That is, all changes in PBO and fair value of plan assets over the fiscal period do not flow through the income statement.

[9] Kiosse and Peasnell (2011) review the academic evidence on the extent to which changes in pension accounting rules have affected pension provision.

Instead, pension expense for a period is composed of the plan's service cost and interest cost offset by an *expected return* on plan assets, as opposed to the actual return earned by assets during that period. The fact that pension expense reflects an expected return on plan assets, derived from a long-term estimate of expected rate of return (ERR) multiplied by the fair value of plan assets, introduces an element of smoothing into the determination of pension expense, by shielding the income statement from year-to-year fluctuations in actual returns, which could deviate substantially from the ERR in any given period.

Under both SFAS 158 and IAS 19, differences between expected and actual returns are recognized in other comprehensive income (OCI) in each period. These amounts, which are recognized in OCI but unrecognized in net income, accumulate in a pool that also includes differences between actuals and estimates of other actuarial assumptions, which could potentially move in offsetting directions. If this pool of accumulated unrecognized gains and losses exceeds a threshold or "corridor" (currently 10% of the larger of the PBO and fair value of plan assets), U.S. GAAP requires it to be amortized into net income (or "recycled") over the remaining average expected service life of beneficiaries. As a result, the recycling and eventual recognition of *actual* return in net income happens only at a "glacial" pace (Picconi, 2006) for U.S. companies. IAS 19 takes an even more extreme position on these actuarial gains and losses, by requiring their recognition only in OCI, with no requirements to be subsequently recycled through net income - thereby shielding net income permanently from actual returns. Appendix A provides a comprehensive explanation of pension accounting under IFRS (in the pre-IAS 19R regime) and current U.S. GAAP.

The implications of expense smoothing for risk-taking in pension investment

The use of a long-term ERR as opposed to the actual return on plan assets is a fundamental feature of extant accounting regimes for pensions – both current U.S. GAAP and the former IFRS regime. ERRs are intended to be estimates of the long-term earning potential of the assets in the pension trust, with "long-term" typically understood to be at least ten years (Zion and Carcache 2002). As a result, these rates do not fluctuate in the short-term, resulting in an expected return component of pension expense that is very smooth. Actual returns, on the other hand, are not smooth, and could fluctuate significantly from year to year, especially if plans are heavily invested in equities or other high-risk asset classes. The use of an expected rather than actual return, therefore, shields net income from the period-to-period volatility caused by capital market movements.

Investing in equities versus bonds (or more broadly, in higher-risk versus lower-risk assets) brings both risks and rewards. The benefit of investing in equities is that they are expected to yield higher returns over the long-term, which in turn reduces the cash that plan sponsors are required to contribute to plans, allowing sponsors to provide benefits more cheaply and efficiently. The cost of investing in equities is that returns are more volatile from period to period, and sponsors must bear the burden of that volatility, which could move plans from being well-funded in one period to substantially underfunded in a subsequent period, necessitating unpredictable cash contributions.

The extant accounting regime for pensions that we describe above, however, does not reflect these costs and benefits symmetrically. By basing pension expense on an expected return, the accounting regime allows plan sponsors to recognize the benefits of investing in equities (or higher-risk assets), because the expected risk premium on

equities gets reflected in the correspondingly higher ERR that sponsors will choose. However, the fact that actual returns are only reflected in net income much later (that too, at a very slow pace) or not at all implies that the income statement is, at least for the foreseeable future, shielded from any correspondingly greater volatility of investing in those higher-risk assets. The accounting regime, therefore, recognizes the costs and benefits of risk-taking in an asymmetric fashion – it recognizes the expected benefits of risk-taking in income, while shielding it from the costs.

If income statement considerations affect asset allocation strategies even to some extent, then we predict that this accounting regime could induce plan sponsors to engage in more risk-taking in pension investments than they would otherwise have undertaken in in the absence of a smoothing regime. This argument has long been advanced by pension experts such as Zion and Carcache (2003, 2005). Gold (2005) notes that pension assets are invested much more in equities than is predicted by modern financial theory, and posits that the accounting regime may drive this behavior, as "*corporate financial officers enjoy the benefit of the equity premium while avoiding much of the concomitant risk*". While we cannot hypothesize whether equity allocations under the extant accounting regime were "too" high, this argument echoes ours to the extent to which it predicts that the accounting regime provides an added incentive to invest in higher-risk assets.

The accounting regime shift under IAS 19R

IAS 19 Employee Benefits (Revised) or "IAS 19R" supersedes the original IAS 19, which was broadly consistent with SFAS 158 in the U.S., as discussed above. IAS 19R, issued on June 16, 2011 and effective for fiscal years beginning January 1, 2013 and after, brings about a fundamental shift in the determination of pension expense, by removing

the concept of smoothing through the ERR. Pension expense previously consisted of service cost and interest cost, offset by the expected return on plan assets, estimated as the *ERR*fair value of plan assets*. IAS 19R replaces this with the service cost and a net "finance cost". This finance cost is composed of the *discount rate** (*PBO – fair value of plan assets*). As the *discount rate* PBO* is equivalent to the interest cost, pension expense effectively becomes service cost + interest cost - *discount rate*fair value of plan assets*. The *discount rate*fair value of plan assets* component replaces the *ERR*fair value of plan assets* component from the pre-IAS 19R regime. Appendix B illustrates the determination of pension expense pre- and post-IAS 19R.

IAS 19R eliminates the concept of a long-term ERR on plan assets as a separate assumption, and instead effectively requires plan sponsors to use the discount rate used in determining the PBO as the ERR. Whereas the ERR is determined by the expected riskiness of the pension assets, the discount rate does not depend on asset allocation but is intended to primarily reflect the time value of money. Per existing guidelines, the discount rate should be based on the yields of high-quality corporate bonds (typically, rated AA or higher) of similar maturity as the cash outflows of the pension obligation. IAS 19R did not change the definition of the discount rate. [10]

Implications of the IAS 19R shift for risk-taking in pension investment

[10] The Board's rationale for effectively replacing the ERR with the discount rate is that a net defined benefit liability (PBO – fair value of plan assets) is equivalent to a financing amount owed by the plan sponsor to the plan or its beneficiaries. The economic cost of that financing is the finance cost, calculated as above (hence the name). Similarly, a net defined-benefit asset is an amount owed by the plan to the plan sponsor, and the sponsor should account for the present value of economic benefits that it expects to receive from the plan in the form of reduced future contributions. Therefore, the net finance cost yields an expense for an underfunded plan, and income for overfunded plans. Stated differently, the interest cost (as previously defined) reflects the cost that arises from the passage of time. Therefore, it should be matched on the income statement by that part of the change in plan assets that also arises from the passage of time. IAS 19R also stipulates that all differences between actual plan returns and the *discount rate*fair value of plan assets* should be immediately recognized in OCI as a "remeasurement".

The effective substitution of the ERR for the prevailing yield on high-quality corporate bonds of similar duration as pension outflows has two related consequences for plan sponsors. First, they can no longer build in the expected risk premium on equities (or any asset class that is higher-risk, higher-return than high-quality corporate bonds) into the ERR, and thus are unable to anticipate or recognize immediately in net income the expected rewards to risk-seeking investment strategies. Second, while the ERR was a smooth, long-term estimate that changed only infrequently, the discount rate is derived from spot rates at a particular moment in time, resulting in more volatility than previously - although this volatility is still unrelated to volatility in actual plan returns, and instead reflects macroeconomic factors that cause fluctuation in high-quality bond yields.

Therefore, whereas the former smoothing-based accounting regime recognized the expected benefits to risk-taking in income while shielding it from any correspondingly greater volatility, the new accounting regime under IAS 19R removes this particular asymmetry, by ensuring that the benefits to risk-taking are no longer reflected in net income. To the extent to which boosting net income through higher ERRs was a driver of plan sponsors' investment decisions, the income statement benefits available under the smoothing regime could have encouraged a higher level of risk-taking than what plan sponsors would otherwise have engaged in. If this is indeed the case, we should expect to see risk-taking in pension investments decrease after the implementation of IAS 19R.

Several commenters to the IAS 19R Exposure Draft make related predictions. For example, the Actuarial Profession of the UK predicts that the new regime may lead to "*different behaviors – e.g., better-matched investment strategies, as the accounting no*

longer has an in-built bias towards equity over bond investment" (The Actuarial Profession of the U.K., 2010). The American Academy of Actuaries posits that the new regime "*may allow plan sponsors to base decisions about asset allocation purely on economic and risk management grounds, without adversely affecting P&L. In fact, removing the immediate benefit of risk-taking from the income statement may reduce the willingness of plan sponsors to take that risk.*" (American Academy of Actuaries, 2010).

While these commenters imply that asset allocations will become "better" after IAS 19R (e.g., go from "excessively" high to a more optimal level of risk-taking), we stress here that we do not make or test any predictions on optimality. Our objective, more simply, is to test whether the smoothing-based accounting regime tilted plan sponsors towards more risk-taking. This implies in turn that the removal of smoothing leads to a *decrease* in risk-taking, without normative judgments on how optimal either the old (pre-IAS 19R) or new (post-IAS 19R) levels of risk-taking are.

Hypotheses

From the arguments developed above, we expect IAS 19R to lead to a reduction in risk-taking in asset allocations for affected plan sponsors. This is our main prediction, embodied in Hypothesis 1:

Hypothesis 1 (H1)*: Firms affected by IAS 19R will reduce risk-taking in pension asset allocations following the adoption of IAS 19R.*

There are reasons to believe that our results might not support H1. First, our prediction hinges on the assumption that ERRs have to be closely aligned with actual asset allocation. If managers have the ability to choose high ERRs without actually investing in risky assets prior to IAS 19R, then the fact that the accounting regime no

longer allows the use of an ERR need not lead to any re-alignments in asset allocation. Prior literature documents some mixed evidence on the extent to which ERRs are tied to asset allocations. For instance, Amir and Benartzi (1988) document with data from 1989-1994 that the ERR and asset allocation are only "weakly" correlated. However, more recent work by Bergstresser, Desai, and Rauh (2006) shows not only that managers boost ERRs opportunistically but also that they increase equity allocations to rationalize the higher ERRs, suggesting that managers are not entirely free to assume ERRs that are not supported by actual asset allocations. Similarly, Chuk (2013) shows that firms increase equity allocations to justify high ERRs after asset allocations were required to be disclosed in financial statements for the first time. This again suggests that ERRs have to be supported by actual allocations at least to some degree.

Second, our prediction relies on the assumption that prior to IAS 19R, managers believe external financial statement users do not adjust pension expense to account for the asymmetric recognition of the benefits of high-risk pension assets without corresponding recognition of the costs (i.e., higher volatility of returns). However, if managers believe that reported net income does not matter, i.e., that financial statement users can and do "unravel" ERR-based pension accounting and replace expected with actual returns (the fact that the difference between expected and actual returns is recognized and disclosed in OCI makes this possible conceptually), then an ERR-based accounting regime would not drive managerial behavior in any particular direction. If managers believe that financial statement users internalize both costs and benefits of a riskier asset allocation strategy, then they have no clear accounting-induced incentive to adopt such a riskier strategy in the pre-IAS 19R regime. Again, prior evidence on

investors' ability to "see through" pension accounting rules is quite mixed, leaving this an open issue. For example, a stream of research documents on one hand that capital markets perceived pension obligations as economic liabilities of the firm even when accounting rules did not require their recognition on-balance sheet (Dhaliwal 1986, Landsman 1986, Gopalakrishnan and Sugrue 1994). On the other hand, Picconi (2006) finds that equity analysts – widely believed to be sophisticated users of financial statements – routinely fail to understand the implications of disclosed pension numbers for future earnings. [11]

Third, we might not observe an immediate response to IAS 19R because asset allocations take time to adjust. Plan sponsors typically do not change asset allocation policies very frequently. Especially given that IAS 19R removes from net income the benefits of higher-risk investments (as opposed to exposing net income to the costs of higher-risk investments), its immediate impact might not be stark enough to justify the transaction costs of re-allocating investments. For all these reasons, whether firms indeed reduce investments in risky pension assets after IAS 19R is an empirical question.

Because our prediction in H1 is an empirical question, if we are to observe the predicted effects at all, we are more likely observe them for plan sponsors that were more affected by the risk-taking incentives embedded in the pre-IAS 19R regime. Our baseline expectation in H1 relies on the assumption that income statement considerations affected

[11] Notwithstanding investors' perceptions, managers could view reported income as important if (reported, or unadjusted) net income is used as an input to contracting, e.g., compensation contracting decisions (Comprix and Muller 2006). Anecdotal evidence also suggests that managers view the income statement benefits as a key advantage of pension risk-taking: many corporations and industry groups responded to the IAS 19R exposure draft arguing that equity investing strategies would become less attractive if there were no income statement benefits from those strategies. For example, the Canadian Bankers Association (2010), an industry group comprised of commercial banks operating in Canada, argues that the new approach "*provides less incentive to hold an appropriate mix of higher yielding assets as net income would not benefit from the expectation of higher returns on these investments*".

asset allocation strategies; therefore, the pre-IAS 19R regime should have particularly affected asset allocation strategies for those plan sponsors for whom those income statement considerations were particularly strong. As pension expense is offset by *ERR*fair value of plan assets*, any given increase in ERR translates into a particularly large boost to reported net income under IAS 19 for firms for which pension plan size is large relative to operating income (Bergstresser, Desai, and Rauh 2006). As a result, we expect the accounting-based incentives to boost ERRs embedded in IAS 19 to be stronger, and to have resulted in particularly risky asset allocations for such sponsors.[12] The removal of these accounting-based incentives could in turn lead to larger drops in pension risk for these sponsors. We test this expectation as Hypothesis 2:

Hypothesis 2 (H2)*: The reduction in risk-taking through pension asset allocations resulting from IAS 19R will be more pronounced for firms whose pension plans are large relative to income.*

III. SAMPLE, DATA, AND RESEARCH DESIGN

Selecting the sample of Canadian firms affected by IAS 19R

The Canadian Accounting Standards Board (CASB) required all publicly accountable enterprises to adopt IFRS for fiscal years beginning Jan 1, 2011 and after. As of Jan 1, 2011, the original IAS 19 was already effective. Two years later, IAS 19R

[12] To see the difference, consider two hypothetical plan sponsors with income before pension expense of $100. Sponsor A has pension assets with fair value of $5000, whereas Sponsor B has pension assets with fair value of $50. An increase in equity allocations that will increase the ERR by 1% translates into a $5000 * 1% = $50 decrease in pension expense for Sponsor A, and a corresponding $50 increase in reported income, which is a 50% increase in income. The same proportional increase in equity allocations that will increase the ERR by 1% for Sponsor B only translates into a miniscule $50 * 1% = $0.5 increase in reported income. Therefore, holding all other incentives constant, Sponsor A is more likely than Sponsor B to increase equity allocations to boost reported net income in the pre-IAS 19R regime.

became effective for fiscal years beginning Jan 1, 2013 and after. Thus, Canadian firms report under the original IAS 19 in our pre-period and under IAS 19R in our post-period.

Table 1 outlines the sample selection process. We start by identifying all Canadian firms with DB pension plans that are represented in Compustat North America for the last fiscal period pre-IAS 19R and the first fiscal period of IAS 19R implementation. We obtain annual report filings for these firms from Canada's on-line repository of public company filings, SEDAR (supplemented by company websites), giving us an initial sample of 170 firms. While the CASB mandated IFRS starting in 2011, the provincial securities regulators, who have authority over the application of accounting standards, allowed (i) Canadian companies cross-listed in the U.S. to choose either U.S. GAAP or IFRS, and (ii) other firms to petition for special permission to use U.S. GAAP without cross-listing (Burnett et al. 2013). As a result, some Canadian firms (27 in total) use U.S. GAAP for the post-IFRS period. As these firms are presumably unaffected by IAS 19R, we exclude them from the treatment sample.[13] We further remove two Canadian firms using IFRS that had voluntarily eliminated the use of the ERR prior to IAS 19R. These two firms use actual returns in the computation of pension expense. As these firms are shifting from the actual rate of return to the discount rate, the same prediction on risk-reduction does not necessarily apply.

We hand-collect from Canadian annual reports a number of pension variables such as detailed pension asset allocations, ERRs, and discount rates, for the two-year time

[13] Canadian firms opting to use U.S. GAAP are another potential control sample, offering the advantage of an entirely within-Canada research design. We decide not to use this sample as it is so small that testing power is low, and because it is highly self-selected. Burnett et al. (2013) document that out of all Canadian firms on Compustat, 7% chose U.S. GAAP while the rest chose IFRS. However, their further analysis shows that practically all firms voluntarily choosing U.S. GAAP over IFRS in 2011 were firms cross-listed in the U.S. As cross-listed firms differ widely from domestic-only listed firms in many fundamental and reporting characteristics, the disadvantages of this potential control group could outweigh the advantages.

period extending from the last fiscal period pre-adoption of IAS 19R to the first fiscal period post-adoption. We lose 10 firms due to missing data for these and other control variables. Finally, plan sponsors have shown an increasing trend over time of disclosing asset categories with opaque descriptors. These include descriptions of the legal structure of the investment that are uninformative about its risk-return profile, e.g., "mutual funds", "registered investment companies", or "common and collective trusts", or simply categories labeled "Other assets" (Anantharaman and Chuk 2014). As the risk/return profile of these investments cannot be assessed, we exclude firms that disclose more than 20% of plan assets as being invested in opaque categories with unknown risk characteristics (3 firms). This leaves us with 125 Canadian firms (250 firm-years) in the "treatment" sample. We convert all numbers from CAD to USD using the exchange rate at the fiscal year-end.

Selecting the matched control sample of U.S. firms

To make reliable inferences about the effects of IAS 19R and separate these effects out from other macroeconomic or over-time influences, we choose a control sample of U.S. pension sponsors that are presumably unaffected by IAS 19R. We rely on U.S. firms for the control sample due to their geographic proximity and similarity in financial reporting. We identify a control sample of U.S. listed firms with a propensity-score-matching (PSM) procedure. We run the following logit model of differences in plan and sponsor characteristics across U.S. and Canadian pension plan sponsors:

$$CANADA = \beta_0 + \beta_1 SIZE + \beta_2 LEVERAGE + \beta_3 SDCF + \beta_4 NOL + \beta_5 DIVIDENDS + \beta_6 PBO + \beta_7 FVPA + \beta_8 FUNDING + \beta_9 FUNDING^2 + \varepsilon$$

CANADA is an indicator variable set to one for Canadian firms, and to zero for U.S. firms. We include in the model a number of variables that reflect plan characteristics – the size of the pension (measured by the pension liability PBO, and the fair value of plan assets FVPA), the plan's funding ratio (FUNDING, measured as FVPA / PBO), and also include the square of the funding ratio, to accommodate the possibility of a nonlinear relation between funding ratios and asset allocation. We also include in the model a number of plan sponsor characteristics that have been shown to affect pension funding and investing behavior – firm size (the log of market value of equity, SIZE), leverage (long-term debt divided by the sum of long-term debt and market capitalization, LEVERAGE), operating risk (measured using the five-year standard deviation of the ratio of operating cash flows to book value of equity, SDCF), an indicator variable set to one if the firm has net operating loss carryforwards (NOL), and dividend-paying status (dividends scaled by total assets, DIVIDENDS). In the next sub-section, we discuss the motivation for including these variables, which are controls in our main multivariate tests.

We estimate this model using (i) all Canadian firms with sufficient data for the explanatory variables and (ii) the universe of all U.S. pension sponsors with sufficient data on Compustat for both pre- and post-IAS 19R periods. For each of these firms, we only estimate the model on the last fiscal period pre-IAS 19R, because we want to match treatment firms to control firms using pre-treatment characteristics. We then match, without replacement, each Canada firm to a U.S. firm that has the closest predicted value from the model, but within a maximum distance of 3%. With this caliper distance, we match all but three of the Canadian firms to similar U.S. firms, using pre-IAS 19R data.

For each U.S. firm chosen as a match, we hand-collect from pension footnotes the detailed pension asset allocations and assumptions for the last fiscal period that would have been pre-IAS 19R, and the first fiscal period to which IAS 19R would have applied, had the firm been subject to IAS 19R. We then examine the hand-collected data to check whether (i) asset allocations are available for both periods, (ii) whether opaque assets with unknown risk characteristics are less than 20% of all plan assets in each of the two periods. If these criteria are not met, we discard the match and pick the next best match that meets these criteria.

We then bring in the post-IAS 19R observations for these matched U.S. firms to compose a time-series of observations that includes both pre- and post-IAS 19R periods for the control sample as well (250 U.S. firm-years matched to 250 Canadian firm-years, for a total sample of 500 firm-years). In our multivariate analyses of the effects of IAS 19R, we continue to include many explanatory variables from the PSM model as controls, to control for any remaining characteristic imbalance across the treatment and control groups, following Lawrence, Minutti-Meza, and Zhang (2011).

Collecting and defining asset allocation categories

Both IAS 19R and U.S. GAAP require plan sponsors to disaggregate the fair value of plan assets into classes that distinguish the nature and risks of those assets. For instance, sponsors are expected to disaggregate the fair value of plan assets into categories such as cash and cash equivalents, equity instruments, debt instruments, real estate, derivatives, investment funds, asset-backed securities, and structured debt. The FASB specifically notes that this list of categories is only an example and is not intended

to be all-inclusive; each plan sponsor should consider whether further disaggregation of asset categories is required.

As the nature and complexity of investments varies widely across plan sponsors, as does the extent to which sponsors choose to disaggregate asset categories in their disclosure and the specific labels they use to describe their investments, asset allocation disclosures vary widely in both number of categories and their descriptors. While Compustat collects asset allocation data, it only provides four variables encompassing the broad categories of "Equity" (PNATE), "Debt" (PNATD), "Real estate" (PNATR) and "All Other" (PNATO). Compustat aggregates asset allocation disclosures that are more detailed into these categories; the aggregation rules are not clearly specified, and the resulting data contain many classification errors (Anantharaman and Chuk 2014). For example, Anantharaman and Chuk (2014) document that after 2009 Compustat codes private equity as "Equity" for some firms but as "All Other" for some other firms.

Compustat data is hence of limited use for our purpose, leading us to hand-collect the detailed asset allocation data from pension footnotes for both Canadian and U.S. plan sponsors. Two research assistants independently coded every asset category and the fair value of assets in that category; any differences in the data were subsequently investigated and reconciled by the authors. To make the data feasible for analysis, we then aggregate the resulting list of categories into the broad categories of equities (%EQUITIES), fixed income (%FIXED INCOME), cash and cash equivalents (%CASH), real estate (%REAL ESTATE), alternative assets (%ALTERNATIVE ASSETS), deposits

and receivables (%DEPOSITS AND RECEIVABLES), and opaque assets with unknown risk characteristics (%OPAQUE).[14]

Specifications to test the consequences of IAS 19R

We test our hypotheses by first examining the Canadian sample alone. As an initial test of H1, we examine whether Canadian plan sponsors reduce equity allocations following IAS 19R (i.e., over time). We employ the following specification:

$$\%EQUITIES = \beta_0 + \beta_1 POST + \Sigma Controls + \varepsilon \quad \text{(Equation 1)}$$

As we include a number of controls for cross-sectional determinants of asset allocations, the coefficient on the POST indicator provides an estimate of the effect of IAS 19R, after controlling for other known determinants. However, this within-Canada, over-time analysis suffers from a reduced ability to cleanly separate the overall effects of IAS 19R from the effects of macroeconomic or other time trends, as it lacks a control group of unaffected firms.

We overcome this limitation in two ways. First, we analyze differences *within* the sample of Canadian firms in their response to IAS 19R. Here, we identify the effects of IAS 19R more specifically by separating Canadian firms out into those expected to be relatively *less* affected versus relatively *more* affected by the specific accounting change it introduces. We identify firms likely to be more or less affected using the ratio of fair

[14] Examples of asset categories that we aggregate into each broad category are as follows: "Equity" includes categories such as "common stock", "corporate stock", "equity mutual funds", "domestic equities", "international equities", "large cap equities", "mid cap equities", and "small cap equities"; "Fixed Income" includes categories such as "government bonds", "corporate bonds", "bond mutual funds" "debt instruments", and "inflation protected bonds"; "Cash and cash equivalents" includes categories such as "money market funds" and "short-term investments"; "Real Estate" includes categories such as "property", "real estate partnerships", "real estate funds", and other real assets such as commodities (we pool such real assets into the real estate category because real assets are too small a category on their own); "Alternative Assets" include "hedge funds", "limited partnerships", and "venture capital funds"; "Deposits and Receivables" include "accounts receivable" and "refundable tax deposits". Each of the authors independently aggregated the asset categories, and differences were then discussed and reconciled.

value of plan assets to firm operating income, and alternatively the ratio of PBO to operating income, and employ the following specifications:

$$\%EQUITIES = \beta_0 + \beta_1 POST + \beta_2 HIGH\_FVPA + \beta_3 POST*HIGH\_FVPA + \Sigma Controls + \varepsilon$$

(Equation 2A)

$$\%EQUITIES = \beta_0 + \beta_1 POST + \beta_2 HIGH\_PBO + \beta_3 POST*HIGH\_PBO + \Sigma Controls + \varepsilon$$

(Equation 2B)

HIGH_FVPA (HIGH_PBO) is a firm-level indicator that identifies firms with a higher-than-median ratio of fair value of plan assets/firm operating income (PBO/firm operating income) in the year immediately before IAS 19R.

Second, we identify the overall effect of IAS 19R more rigorously with a difference-in-differences (DD) specification. This specification compares pre- and post-IAS 19R shifts in asset allocation of Canadian firms affected by IAS 19R, to shifts over the same points in time in asset allocations of matched U.S. control firms. We implement this test with the following specification, with CANADA being a firm-level indicator that identifies Canadian firms:

$$\%EQUITIES = \beta_0 + \beta_1 POST + \beta_2 CANADA + \beta_3 POST*CANADA + \Sigma Controls + \varepsilon$$

(Equation 3)

Our control variables are motivated by prior research (Black 1980; Tepper 1981; Amir, Guan, and Oswald 2010; Chuk 2013). We control for plan sponsor size (SIZE) as larger sponsors could have wider investment opportunities. Firms with tighter debt covenants have stronger incentives to minimize volatility in plan returns and consequently in funded status, so as to avoid breaching covenants, leading to the inclusion of leverage (LEVERAGE) as a control variable. Similarly, firms with a tradition of paying dividends have stronger incentives to minimize plan return volatility,

in order to manage the volatility in cash contributions required into their plans, leading to dividend-paying status (DIVIDENDS) as a control. Firms with high inherent volatility of operating cash flows would also have an incentive to minimize volatility in plan returns (and consequently in required contributions), necessitating the inclusion of cash flow volatility (SDCF) as a control. Black (1980) and Tepper (1981) argue that tax-paying firms have an incentive to borrow on the corporate balance sheet, fund their plans and invest plan assets in the most highly taxed securities - bonds. Companies that do this can maximize shareholder value by then deducting interest off the corporate tax return but accruing interest tax-free on the bonds held inside the pension trust. This "tax arbitrage" argument suggests that high tax-paying firms invest more in bonds. We incorporate an indicator variable set to one if the firm has net operating loss carryforwards (NOL) to capture the firm's tax-paying status.

Amongst plan-level characteristics, we control for funding ratio (FUNDING) and the square thereof ($FUNDING^2$), following prior literature showing that very overfunded and very underfunded plans – in an attempt to minimize contribution volatility – are more likely to invest in bonds, while moderately funded plans increase equity investments to earn their way out of underfunding (Bader 1991, Amir and Benartzi 1999). We also control for plan horizon (HORIZON, the natural logarithm of PBO/service cost), as longer-horizon plans (with younger beneficiaries) should invest more in equities, because equities offer a more effective hedge against salary increases, which plans with younger beneficiaries are more concerned about. Finally, not all plan sponsors rebalance asset allocations exactly to target period-by-period; therefore, equity investments can grow as a proportion of total plan assets in years when equity markets perform well. Hence, we

control for returns to the S&P Global Broad Market Index for equities (MARKET RETURNS), to capture the broad-based performance of global equity markets, which pension plans typically invest in. We cluster standard errors at the firm level.

IV. DESCRIPTIVE STATISTICS AND EMPIRICAL RESULTS

Descriptive statistics of model variables for the Canadian sample

Table 2 describes model variables, with Panel A (Panel B) describing the Canada sample pre- (post-) IAS 19R. Canadian plans in the pre-IAS 19R period were invested in equities as the largest category on average, with the proportion of plan assets invested in equities having an interquartile range of 47.7-62.5%, with a mean (median) of 54.7% (56%). Both mean and median equity investment show a marked downward shift in the post-IAS 19R period, to 50.9% and 53% respectively. Interestingly, almost the entire distribution of equity investment shifts downward – the 5th percentile of equity investment shifts from 34% to 23.1%, a 32% reduction, and the 25th percentile shifts from 47.7% to 40.7%, a 15% reduction. These decreases are striking, particularly given that pension asset allocations tend to be sticky and only change slowly over a period of time.

The mean (median) investment in fixed income securities (%FIXED INCOME) drops marginally from 39.5% (39%) to 38.9% (38%), but the upper end of the distribution mirrors the shifts in the lower end of the %EQUITIES distribution – the 75th percentile of %FIXED INCOME rises from 44.7% to 47.2%, and the 95th percentile from 58.5% to 67%. The average proportion of assets in cash and cash equivalents also shifts upward, from 2.1% to 3.2%. Investments in real estate, alternative assets, deposits and receivables, and other opaque categories remain small on average. Firms have a mean

(median) ERR of 6.10% (6.25%) pre-IAS 19R. The discount rate (DISC RATE), which starts out at 4.54% (4.50%), drops to 4.21% (4.25%) after IAS 19R.

The market value of firm equity starts out at $7.7bn ($1.5bn) in the pre-period, and remains at about $8.3bn ($1.9bn) in the post-period. Similarly, the size of plans in terms of fair value of plan assets, which is $1.3bn ($125m) in the pre-period, remains steady at $1.4bn ($119m) in the post-period. Funding ratios, however, improve considerably, from 80.6% (80.2%) to 90.7% (92.5%). Other fundamentals such as leverage, dividends, cash flow volatility, tax-paying status, and plan horizon do not exhibit any noteworthy trends between pre- and post-IAS 19R periods.

Descriptive statistics of model variables for the U.S. sample

Panel C (Panel D) of Table 2 describes the U.S. sample pre- (post-) IAS 19R. %EQUITY has an interquartile range of 41.2%-61.2% in the pre-period, with a mean (median) of 50.2% (55.8%). The mean and median equity investment in the post-IAS 19R period hold steady at 50.8% (56%). Similarly, %FIXED INCOME starts out at 38.7% (35.4%) and remains very similar at 38.4% (34.2%). The proportions of cash and cash equivalents, real estate, alternative assets, deposits and receivables, and opaque assets all remain steady between the two periods. Overall, asset allocation in U.S. plans exhibits no noticeable movement between the pre- and post-IAS 19R periods, adding confidence that U.S. plans are an appropriate control sample.

ERRs in the U.S., interestingly, are at least 100 basis points higher than in Canada during the pre-period, at 7.19% (7.47%); these assumptions shift slightly to 6.97% (7.21%) in the post-period. Discount rates, which are based on high-quality corporate bonds rates, mirror Canadian rates, at 4.59% (4.6%) in the pre-period and 4.14% (4.06%)

in the post-period. As the PSM procedure identifies matching firms based on pre-treatment characteristics, the U.S. firms are broadly similar to Canadian firms in firm and plan size, funding status, and many fundamentals in the pre-IAS 19R period. Untabulated t-tests comparing means of model variables across U.S. and Canadian plans show no significant differences except on SDCF, which is different at the p=0.09 level. U.S. plan funding status improves markedly over the two periods, similar to Canadian plans.

Univariate correlations

Table 3 displays univariate correlations between model variables, with Panel A (B) representing the Canadian (U.S.) sample. In correlations for the Canadian sample, smaller firms invest in more equities. For the U.S. sample, firms with lower cash flow volatility tend to invest more in equities, as expected. In both samples, plans with greater equity allocation also tend to have higher ERRs. This correlation confirms that in spite of any ERR manipulation that might exist, ERR assumptions on average are linked to underlying asset allocations. Higher equity market returns associate strongly with improved funding in both samples. In Spearman correlations for the U.S. sample, discount rates associate negatively with pension funding, suggesting that firms with poor funding choose higher discount rates in an effort to improve reported funding status (e.g., Amir and Gordon 1996, Asthana 1999).

Examining the IAS 19R response within the Canadian sample

We first examine the 250 firm-years belonging to the Canada sample. Table 4, Panel A presents results of Equation (1) for the Canada sample. The coefficient on POST is negative and strongly significant at the <0.01 level, consistent with Canadian firms reducing equity allocations in the wake of IAS 19R. The coefficient of -0.064 on POST

implies that after IAS 19R, firms reduced their equity allocation by an average of 6.4%, after controlling for other determinants of asset allocation. This reduction is equivalent to 6.4% / 11.16% = 0.6 standard deviations of %EQUITIES, and to 6.4% / 14.8% = 0.4 of one interquartile shift of %EQUITIES, an economically significant shift. Amongst control variables, equity market returns are strongly positively associated with equity investment, as expected if there is some inertia in rebalancing portfolios to target allocations each period (Rauh 2009).

For comparison, we replicate Equation (1) with the U.S. sample and tabulate results in Panel B. In contrast to the Canadian sample, the coefficient on POST is insignificant and very small in magnitude. This indicates no discernible shift in equity investment post-IAS 19R for U.S. firms, as we would expect for a sample that is presumably unaffected by IAS 19R. The fact that equity investment goes down only for Canadian plans and not for U.S. plans suggests that the downward shift amongst Canadian plans is not purely an artifact of global macroeconomic trends or market movements affecting plans around the world. Another striking difference between Panel A and B is in the R-squared – 10.8% for the Canadian sample while only 6.6% for the U.S. sample. In untabulated tests, we rerun Equation (1) for each sample but without the POST dummy. While we continue to obtain an almost identical R-squared of 6.6% for the U.S. sample, the R-squared for the Canadian sample drops substantially to 7.04%. This provides further evidence that the POST indicator adds significant explanatory power to explaining Canadian asset allocations within the time period we examine.

The results in Table 4 show that Canadian firms reduce equity allocations post-IAS 19R, consistent with H1. However, we cannot conclusively attribute the coefficient

on POST to IAS 19R alone, as opposed to macroeconomic or other factors within Canada that could have shifted contemporaneously to induce asset allocation changes. To identify more specifically the effects of IAS 19R, we present in Table 5 tests of Equation (2), comparing changes in asset allocation across Canadian firms that are expected to be more affected by IAS 19R's accounting change, and other Canadian firms for whom the IAS 19R effect may not be as marked.

In Panel A (B), we tabulate results of Eq (2A), partitioning the Canadian sample (U.S. sample) on HIGH_FVPA. In Panel C (D), we tabulate results of Eq (2B), partitioning the Canadian sample (U.S. sample) on HIGH_PBO. Firms whose ERR assumptions have an economically substantial impact on the income statement (HIGH_FVPA = 1, or HIGH_PBO = 1) should potentially be more affected by the IAS 19R change.

For the Canadian sample, POST continues to remains negative and significant, consistent with Table 4, when partitioning on both HIGH_FVPA and HIGH_PBO. While the basic effects of HIGH_FVPA and HIGH_PBO are insignificant, the coefficients on the HIGH_FVPA*POST interaction (Panel A) and the HIGH_PBO*POST interaction (Panel C) are negative and significant at <0.05 level, indicating that Canadian firms tend to reduce equity allocations post-IAS 19R more when ERR assumptions have an economically significant impact on the income statement. Panels A and C hence show strong evidence consistent with H2. In contrast, Panels B and D on the U.S. sample show insignificant coefficients on POST, HIGH_FVPA*POST, and HIGH_PBO*POST, as would be expected in a sample not affected by IAS 19R.

The Table 5 results show that the reduction in equity allocation is predictably stronger for firms expected to experience a stronger impact from IAS 19R. Next, we turn to differences-in-differences tests comparing Canadian firms to a control sample unaffected by IAS 19R, to more rigorously identify the effect of the accounting change.

Difference-in-differences tests of the effect of IAS 19R

Table 6 presents results of the DD specification with Canadian and U.S. firms, pre- and post-IAS 19R. Panel A presents estimations of Equation (3). As shown, the main coefficient of interest POST*CANADA, is negative and significant at the <0.01 level. This indicates that Canadian firms, on average, reduce equity allocations post-IAS 19R more than U.S. firms, which are unaffected by IAS 19R, providing more direct evidence consistent with H1 that IAS 19R engenders risk reduction in affected firms. The effect of IAS 19R in this comparison is also economically significant. The coefficient of -0.041 on POST*CANADA implies that treatment firms reduce equity allocations by 4.1% more than control firms, after controlling for other determinants of asset allocation. This incremental reduction for Canadian firms is equivalent to a shift of 4.1% / 11.16% = 0.4 standard deviations of %EQUITIES.

Amongst control variables, the negative coefficient on FUNDING along with the positive coefficient on $FUNDING^2$ indicates that plans tend to invest less in equities as funding status improves; this continues until plans become very well funded, at which point they invest more in equities compared to moderately funded plans, consistent with prior risk-management findings. MARKET RETURNS is positive and significant as expected, albeit only at the 15% level. Other controls are insignificant, potentially

reflecting the fact that Canadian and U.S. firms are closely matched (or balanced) along these metrics, via the PSM procedure.

In Panel B, we present results of a modified version of Eq (3), run as a fully interacted or "stacked" model – i.e., where not only CANADA but also all control variables are interacted with the POST indicator. While the Panel A specification constrains coefficients on control variables to be identical pre- and post-IAS 19R, the stacked model allows these coefficients to also vary. As IAS 19R reduces the importance of accounting-based asset allocation incentives, the relative importance of the other drivers of asset allocation could shift as a result, necessitating a fully interacted model. Similarly, in Panel C we run another fully interacted version of Eq (3) where we interact all control variables with the CANADA indicator. This model allows for the possibility that the drivers of asset allocation could vary in importance across U.S. and Canada.[15] Panel D presents results of a model that interacts all variables with both POST and CANADA indicators. Across all panels, the POST*CANADA interaction remains negative and significant at <0.05 level or lower, consistent with H1.

In Table 7 we present results of running Eq (3) separately within subsamples created by partitioning on HIGH_FVPA and HIGH_PBO. Panel A (B) tabulates the DD results within the subsample of firms with HIGH_FVPA = 1 (HIGH_FVPA = 0). As shown, the POST*CANADA coefficient is negative and strongly significant in Panel A and insignificant in Panel B. Similarly, the POST*CANADA interaction is negative and significant in Panel C (HIGH_PBO=1) and insignificant in Panel D (HIGH_PBO=0). The

[15] For instance, in the U.S., the existence of PBGC insurance under a flat-rate model (where insurance premia do not vary with the asset allocation profile of plans) provides strong risk-shifting incentives for poorly funded plans to invest more in high-risk asset classes (Sharpe 1976). On the other hand, Canadian plans outside the province of Ontario are not covered by pension benefits insurance, making such risk-shifting incentives potentially less important.

fact that the DD results of Table 6 are driven by firms with economically substantial pension plans, for which ERR assumptions have a strong impact on the income statement, further reinforces our inference that the observed effects are attributable to IAS 19R.

V. ADDITIONAL DISCUSSION

The effect of IAS 19R on discount rate assumptions

While IAS 19R eliminates the ERR as an additional assumption requiring managerial judgment, it increases the role of the discount rate in pension accounting on the income statement, by effectively replacing ERRs with discount rates to give the new formulation of pension expense as *service cost + discount rate*(PBO – fair value of plan assets),* or *service cost + interest cost – discount rate*fair value of plan assets*. As the discount rate assumption takes on added importance post-IAS 19R, one potential way to minimize pension expense (which could have increased post-IAS 19R, as discount rates are usually lower than ERRs) is to strategically manage discount rates. The new offset to pension service costs and interest costs, *discount rate*fair value of plan assets,* can now be maximized by inflating discount rates.

However, the discount rate affects each component of pension expense differently, giving rise to potentially offsetting incentives for manipulation. For example, it enters the service cost through the denominator, which also gives firms looking to minimize pension expense the incentive to inflate discount rates, but enters interest cost through the numerator, giving firms the offsetting incentive to deflate discount rates. Furthermore, IAS 19R requires sponsors to disclose plan duration for the first time. As duration is a key economic determinant of discount rates, requiring disclosure of durations could reduce the discretion that plans have to manipulate the discount rate in any given

direction. Finally, the heightened importance of discount rates in pension accounting could also lead to greater scrutiny of these rates by auditors, reducing opportunities for manipulation. As the overall effect of IAS 19R on discount rates is complex and driven by many different effects, we do not explicitly offer or test hypotheses on how IAS 19R affects discount rates.

The scope and limitations of the IAS 19R quasi-experiment

We note that IAS 19R does not replace the earlier pension smoothing regime with one where pension expense is based on actual returns to plan assets. Such a shift would expose net income to both costs and benefits of risk-taking in pension investment, rather than just the benefits. Instead, the IAS 19R shift has a somewhat different effect – it *removes* from net income both costs and benefits of risk-taking in pension investment, by mandating that the ERR be equal to the discount rate, which is completely divorced from the actual asset allocation of the plan. Our prediction that an ERR-based smoothing regime leads to higher risk-taking, however, hinges crucially on the point that such a regime recognizes the costs and benefits of risk-taking *asymmetrically*. As IAS 19R removes this asymmetry, we expect risk-taking to be lower after IAS 19R.

The IAS 19R shift has other consequences for the relevance and reliability of pension accounting numbers. While it reduces sponsors' ability to boost net income by raising ERRs, thus improving reliability, it could make pension expense less relevant, because the underlying economic profile of assets – represented by the asset allocation strategy – is not reflected in pension expense anymore.[16] Even though these are important

[16] It also creates a situation where two plans with similar funding but different investment profiles – e.g., one plan 100% invested in bonds but the other 100% invested in equities – have the same finance charge in net income. While removing management judgment from ERRs could improve comparability in one sense, the fact that unlike events and transactions (in this case, unlike investment strategies) are presented

issues, neither the theoretical correctness of using the discount rate as the ERR nor its effect on relevance, reliability, representational faithfulness or comparability are the focus of this study.

VI. CONCLUSION

IAS 19 Employee Benefits (Revised) brings about a fundamental change in determination of pension expense on corporate income statements, doing away with the expected rate of return (ERR) on pension assets, and requiring plan sponsors to effectively replace it with the discount rate. This change removes plan sponsors' erstwhile ability to recognize in income the benefits of risk-taking in pension investments (via a higher ERR) while not recognizing the costs (of higher volatility in actual return). We predict, and find, for a sample of Canadian firms applying IAS 19R, that risk-taking in pension investment goes down after IAS 19R implementation, suggesting that the earlier ERR-based accounting regime encouraged more risk-taking in pension investments than sponsors might have undertaken in the absence of such a regime.

The ERR-based expensing regime removed by IAS 19R is still the norm for U.S. GAAP, and the IFRS shift therefore has the potential to inform debate on likely consequences of mandating similar changes in the U.S. Our results must however be generalized to the U.S. context with caution, as there are differences between the two countries in economic and cultural factors and in pension regulation. For example, U.S. pensions are insured by the PBGC, creating the potential for excessive risk-taking in pension funding and investment, whereas Canada lacks a federal pensions guarantor (but has a Pension Benefits Guarantee Fund for only the province of Ontario). These

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identically in net income could distort genuine comparability. The IASB Framework states specifically that "*the need for comparability should not be confused with mere uniformity*".

differences notwithstanding, Canada and the U.S. are very similar in their capital markets, reporting, and enforcement environment, allowing some generalization.[17]

While we demonstrate one economic consequence of IAS 19R, we are unable to comment on whether this consequence – the move away from equities – is ultimately to the benefit of plan sponsors or beneficiaries. Pension sponsors' erstwhile preference for equities has been justified on the basis that equities outperform bonds over the long term, allowing benefits to be provided more cheaply. Any move away from equities could result in plans requiring more cash contributions on an ongoing basis. If plan sponsors respond by increasing cash contributions and investing this cash in lower-risk, fixed-income instruments that match benefit payments, this could result in greater benefit security for retirees. From the sponsor's perspective, though, it reduces cash available to invest in other, positive-NPV projects. On the other hand, if more sponsors decide to freeze their plans as a result of their becoming too expensive to maintain, this outcome erodes benefit security for retirees. Commenting on these consequences is outside the scope of our study, but the importance of these issues to academics, regulators, and retirees makes them a promising and worthwhile area for future research.

[17] To the extent we can expect U.S. plan sponsors to react similarly when faced with the removal of pension expense smoothing, there could even be consequences for equity markets faced with widespread unwinding of equity positions by one of its most significant groups of institutional investors.

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Appendix A: Summary of the accounting options available in IFRS under pre-IAS 19R pension accounting

Pension accounting under IFRS in the pre-IAS 19R period was broadly similar to U.S. GAAP, but with more choices available to plan sponsors on how to report actuarial gains and losses. Appendix A summarizes the three reporting options available in the pre-IAS 19R regime, which we label Options 1, 2, and 3 (Frost, Gordon, and Sun (2011) provide a detailed explanation of these alternatives). Option 1 is most similar to current U.S. GAAP, in that the balance sheet reflects the full funded status whereas the income statement reflects a smoothed pension expense derived through an ERR, with differences between actual and expected return (along with other actuarial gains/losses) recognized in OCI. This option differs from U.S. GAAP only in that accumulated unrecognized actuarial gains/losses do not eventually have to be amortized through net income.

Option 2 also reflects a smoothed pension expense through an ERR on plan assets, but differs from Option 1 with respect to the balance sheet, which only recognizes a smoothed number that equals the excess (deficit) of cumulative cash contributions relative to cumulative pension expense as an accrued pension asset (liability), rather than the true funding status. Under this option, unrecognized actuarial gains/losses remain entirely off-balance sheet unless they exceed a threshold, or "corridor", defined as 10% of the greater of the plan's projected benefit obligation (PBO) or fair value of plan assets, in which case they are amortized through net income. This option most closely resembles the accounting regime that existed in the U.S. prior to SFAS 158. Under both options 1 and 2, pension expense incorporates the long-term ERR rather than actual returns.

Option 3 is similar to Option 1, except that pension expense reflects the actual return rather than expected return. Therefore, pension expense is not smoothed with

respect to changes in the fair value of plan assets. Other actuarial gains/losses, arising due to differences between actuals and estimates of other assumptions (discount rate, salary growth rate, etc.) are still passed through OCI, leaving some element of smoothing in pension expense. The balance sheet reflects the full funded status.

	IFRS GAAP in the pre-IAS 19R period (based on IAS 19, revised December 2004)			Current U.S. GAAP (applicable for fiscal years ending after December 15, 2006)
	Option 1	Option 2	Option 3	
Defining feature of each option	Recognize all actuarial gains / losses as they occur, in each period, through OCI.	Recognize some actuarial gains / losses through the Income Statement. The two options differ in that:		Recognize all actuarial gains / losses as they occur, in each period, through OCI.
		Recognize actuarial gains / losses in the Income Statement only when they exceed 10% of the larger of PBO and fair value of plan assets, by amortizing over remaining expected service life of beneficiaries.	Recognize actual return on plan assets each period through the Income Statement. All other actuarial gains /losses (arising from differences between actuals and estimates of other assumptions – discount rate, mortality rates, etc.) recognized in each period through OCI.	When accumulated actuarial gains/losses recognized through OCI exceed 10% of the larger of PBO and fair value of plan assets, recognize in the Income Statement (or 'recycle' to net income) by amortizing over the remaining expected service life of beneficiaries.
What does it imply for the balance sheet?	Balance sheet reflects the true funded status of	Balance sheet does not reflect the true funded	Balance sheet reflects the true funded status of	Balance sheet reflects the true funded status of

	the plan.	status of the plan, because accumulated unrecognized actuarial gains /losses are off the books.	the plan.	the plan.
What does it imply for the income statement?	Income statement only reflects smoothed pension expense. Pension expense calculation requires expected rate of return on plan assets.	Income statement only reflects smoothed pension expense. Pension expense calculation requires expected rate of return on plan assets.	Income statement is "unsmoothed" with respect to actual returns on plan assets. Pension expense calculation does not require expected rate of return on plan assets. However, other actuarial gains/losses are still recognized through OCI, so there is some element of smoothing in the income statement.	Income statement only reflects smoothed pension expense. Pension expense calculation requires expected rate of return on plan assets.

IAS 19R eliminates the ability of plan sponsors to choose from the three options on how to treat actuarial gains and losses. It requires plan sponsors to recognize all actuarial gains/losses through OCI in the period in which they occur, effectively requiring the recognition of the full funded status on the balance sheet. Therefore, Option 2 and 3 are no longer available, and Option 1 becomes the norm.

Appendix B: Determination of pension expense before and after IAS 19R

	Pension expense under IAS 19	**Pension expense under IAS 19R**
Basic components of pension expense: recognized in net income	Service cost +Interest cost -Expected return on plan assets *Which translates into:* Service cost +Discount rate*PBO -Expected rate of return*Fair value of plan assets	Service cost +/- Net finance expense/income *Which translates into:* Service cost +Discount rate*(PBO-Fair value of plan assets) *Which translates into:* Service cost +Discount rate*PBO -Discount rate*Fair value of plan assets Note that for net finance expense/income, discount rate is determined at the start of the reporting period, as well as the opening PBO and fair value of plan assets, but after taking into account actual contributions and benefits paid during the reporting period.
Other components of pension expense: recognized in net income	+/- Vested prior service costs +/- Amortization of unvested prior service costs +/- Amortization of actuarial gains/losses using corridor approach (Option 2 firms only)	+/- Vested prior service costs +/- Unvested prior service costs
Components recognized in OCI	Current period actuarial gains/losses (Option 1 & 3 only)	Current period actuarial gains/losses

Appendix C
Description of Variables

CANADA	An indicator variable set equal to one for Canadian firms, and set equal to zero for US firms.
POST	For Canadian firms, POST is an indicator variable set equal to one in years after the firm adopts IAS19 Revised, and set equal to zero in years before the firm adopts IAS19 Revised. For US firms, POST is an indicator variable set equal to one in fiscal years beginning on or after 1/1/13, and zero for fiscal years beginning before 1/1/13.
%EQUITIES	The percentage of pension assets invested in equity securities.
%FIXED INCOME	The percentage of pension assets invested in fixed income securities.
%REAL ESTATE	The percentage of pension assets invested in real estate.
%CASH	The percentage of pension assets invested in cash and cash equivalents.
%ALTERNATIVE ASSETS	The percentage of pension assets invested in alternative assets, such as hedge funds, venture capital, and private equity.
%DEPOSITS AND RECEIVABLES	The percentage of pension assets invested in deposits and receivables, such as refundable tax deposits and tax receivables from governmental tax agencies.
%OPAQUE	The percentage of pension assets invested in securities and investments with unknown risk characteristics, such as mutual funds, registered investment companies, common and collective trusts, or categories simply labeled as "other assets."
ERR	The expected rate of return on pension plan assets.
DISC RATE	The discount rate used to compute pension expense.
SIZE	The natural log of market capitalization.
LEVERAGE	Financial leverage, measured as long-term debt, divided by the sum of long-term debt and market capitalization of equity.
DIVIDENDS	Dividends divided by total assets.
SDCF	Operating risk, measured as the standard deviation of the ratio of operation cash flows to book value of equity for 5 years, ending in the current year.
NOL	An indicator variable set equal to one for firms with a tax loss carryforward, and zero otherwise.
FUNDING	Funding ratio, measured as the fair value of pension plan assets, divided by the projected benefit obligation.
$FUNDING^2$	Funding ratio squared.
HORIZON	Investment horizon, measured as the natural log of the ratio of PBO to current service cost. If PBO and/or current service cost is zero, we set the investment horizon to missing.
MARKET RETURNS	12-month returns to the S&P Global Broad Market Index for global equities (obtained from the S&P website: http://us.spindices.com/indices/equity/sp-global-bmi-us-dollar).
FVPA	The fair value of pension plan assets.
PBO	The projected benefit obligation.
MVE	Market capitalization.
HIGH PBO	An indicator variable set equal to one for firms with a high ratio of PBO to operating income in the year immediately before IAS19 Revised, where a high ratio of PBO to operating income is defined as a ratio of PBO to operating income above the median ratio of PBO to operating income. If operating income is negative, we use the average operating income in the past three years ending in the current year. If the three-year average operating income is negative, this variable is undefined. We define the median ratio of PBO to operating income separately for Canadian and US firms.
HIGH FVPA	An indicator variable set equal to one for firms with a high ratio of FVPA to operating income in the year immediately before IAS19 Revised, where a high ratio of FVPA to operating income is defined as a ratio of FVPA to operating income above the median ratio of FVPA to operating income. If operating income is negative, we use the average operating income in the past three years ending in the current year. If the three-year average operating income is negative, this variable is undefined. We define the median ratio of FVPA to operating income separately for Canadian and US firms.

Table 1
Sample Selection

	# Observations
Canadian firms on Compustat North America that sponsor a defined benefit pension plan with data available for the last fiscal year before IAS19 Revised and for the first fiscal year after IAS19 Revised	179
Less: Canadian firms with no annual report on SEDAR or firm website	(9)
Less: Canadian firms using US GAAP	(27)
Less: Canadian firms using IFRS that immediately recognize actual returns in net income	(2)
Less: Canadian firms without data available for asset allocations and/or control variables	(10)
Less: Canadian firms with more than 20% invested in "%OPAQUE" assets	(3)
Less: Canadian firms for which US matches cannot be found using Propensity Score Matching	(3)
Number of Canadian firms in treatment sample	125
+ US firms (control sample) matched by Propensity Score Matching	125
Number of firms in combined Canadian (treatment) and US (control) sample	250
× 2 years (one year before IAS19 Revised and one year after IAS19 Revised)	× 2
Number of firm-years in combined Canadian (treatment) and US (control) sample	500

Table 2
Descriptive Statistics

Panel A: Canada Sample - Pre Period

	P5	P25	P50	P75	P95	Mean	Std
%EQUITIES	34.00%	47.70%	56.00%	62.50%	73.00%	54.66%	11.16%
%FIXED INCOME	24.30%	33.00%	39.00%	44.70%	58.50%	39.50%	11.53%
%CASH	0.00%	0.00%	0.00%	2.00%	7.42%	2.12%	5.49%
%REAL ESTATE	0.00%	0.00%	0.00%	0.00%	7.31%	1.28%	3.40%
%ALTERNATIVE ASSETS	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.39%
%DEPOSITS AND RECEIVABLES	0.00%	0.00%	0.00%	0.00%	0.00%	0.08%	0.45%
%OPAQUE	0.00%	0.00%	0.00%	3.00%	13.00%	2.30%	4.25%
ERR	4.00%	5.75%	6.25%	6.75%	7.03%	6.10%	0.88%
DISCOUNT RATE	3.70%	4.25%	4.50%	4.90%	5.25%	4.54%	0.46%
LEVERAGE	0.052	0.171	0.266	0.432	0.793	0.319	0.211
DIVIDENDS	0.000	0.003	0.011	0.033	0.077	0.023	0.029
SDCF	0.027	0.050	0.094	0.188	0.472	0.181	0.391
NOL	0.000	0.000	0.000	1.000	1.000	0.448	0.499
FUNDING	0.564	0.721	0.802	0.872	1.029	0.806	0.160
$FUNDING^2$	0.318	0.520	0.643	0.760	1.058	0.675	0.295
HORIZON	2.786	3.413	3.778	4.344	6.573	4.104	1.456
MARKET RETURNS	0.125	0.145	0.145	0.145	0.218	0.148	0.023
FVPA ($millions)	5.70	40	125	868	6,371	1,326	3,080
PBO ($millions)	13.78	51	164	1,172	6,652	1,516	3,377
MVE ($millions)	57.25	477	1,490	7,770	33,943	7,706	15,504
FVPA (logged)	15.56	17.52	18.64	20.58	22.58	19.02	2.21
PBO (logged)	16.44	17.74	18.92	20.88	22.62	19.26	2.14
MVE (logged)	17.86	19.98	21.12	22.77	24.25	21.19	1.96

Panel B: Canada Sample - Post Period

	P5	P25	P50	P75	P95	Mean	Std
%EQUITIES	23.11%	40.70%	53.00%	61.26%	74.30%	50.86%	15.17%
%FIXED INCOME	12.70%	31.00%	38.00%	47.20%	67.00%	38.86%	15.01%
%CASH	0.00%	0.00%	0.60%	3.00%	15.20%	3.16%	7.00%
%REAL ESTATE	0.00%	0.00%	0.00%	0.00%	11.84%	1.55%	3.91%
%ALTERNATIVE ASSETS	0.00%	0.00%	0.00%	0.00%	4.00%	0.64%	2.53%
%DEPOSITS AND RECEIVABLES	0.00%	0.00%	0.00%	0.00%	0.00%	0.27%	1.58%
%OPAQUE	0.00%	0.00%	0.00%	4.00%	19.30%	3.18%	6.34%
DISCOUNT RATE	3.59%	3.92%	4.25%	4.46%	4.80%	4.21%	0.35%
LEVERAGE	0.011	0.142	0.249	0.404	0.688	0.290	0.204
DIVIDENDS	0.000	0.004	0.014	0.031	0.070	0.023	0.028
SDCF	0.024	0.056	0.086	0.176	0.481	0.182	0.396
NOL	0.000	0.000	0.000	1.000	1.000	0.448	0.499
FUNDING	0.614	0.840	0.925	1.001	1.085	0.907	0.166
$FUNDING^2$	0.377	0.705	0.856	1.003	1.177	0.851	0.306
HORIZON	2.521	3.296	3.626	4.156	6.940	3.965	1.549
MARKET RETURNS	0.049	0.221	0.221	0.221	0.221	0.197	0.054
FVPA ($millions)	6.15	41	119	975	6,712	1,408	3,168
PBO ($millions)	12.09	45	139	1,025	7,094	1,481	3,284
MVE ($millions)	57.89	534	1,882	8,481	36,431	8,299	16,404
FVPA (logged)	15.63	17.52	18.59	20.70	22.63	19.04	2.23
PBO (logged)	16.31	17.61	18.75	20.75	22.68	19.17	2.16
MVE (logged)	17.87	20.10	21.36	22.86	24.32	21.32	1.94

Notes: All variables are defined in Appendix C.

Table 2 (Continued)
Descriptive Statistics

Panel C: USA Sample - Pre Period

	P5	P25	P50	P75	P95	Mean	Std
%EQUITIES	13.20%	41.21%	55.79%	61.23%	69.44%	50.21%	16.92%
%FIXED INCOME	17.67%	29.85%	35.42%	44.23%	69.21%	38.69%	15.15%
%CASH	0.00%	0.00%	1.44%	3.61%	15.59%	4.04%	7.18%
%REAL ESTATE	0.00%	0.00%	0.00%	3.51%	9.48%	2.05%	3.75%
%ALTERNATIVE ASSETS	0.00%	0.00%	0.00%	0.01%	15.79%	2.45%	5.37%
%DEPOSITS AND RECEIVABLES	0.00%	0.00%	0.00%	0.00%	0.11%	0.39%	2.20%
%OPAQUE	0.00%	0.00%	0.00%	0.11%	6.56%	1.00%	2.83%
ERR	5.75%	6.75%	7.47%	7.75%	8.03%	7.19%	0.79%
DISCOUNT RATE	3.85%	4.28%	4.60%	4.90%	5.18%	4.59%	0.42%
LEVERAGE	0.000	0.165	0.296	0.444	0.686	0.310	0.200
DIVIDENDS	0.000	0.000	0.007	0.018	0.054	0.016	0.029
SDCF	0.019	0.047	0.082	0.181	1.340	0.291	0.657
NOL	0.000	0.000	0.000	1.000	1.000	0.448	0.499
FUNDING	0.538	0.690	0.765	0.865	1.109	0.788	0.167
$FUNDING^2$	0.289	0.477	0.584	0.748	1.230	0.649	0.294
HORIZON	2.827	3.385	3.928	4.942	6.246	4.233	1.202
MARKET RETURNS	0.125	0.145	0.145	0.145	0.159	0.145	0.016
FVPA ($millions)	7.43	58	201	553	5,375	1,322	3,451
PBO ($millions)	9.81	80	248	765	6,590	1,544	3,782
MVE ($millions)	96.51	375	1,249	3,895	39,393	8,403	20,190
FVPA (logged)	15.82	17.87	19.12	20.13	22.41	19.11	1.96
PBO (logged)	16.10	18.20	19.33	20.46	22.61	19.36	1.94
MVE (logged)	18.39	19.74	20.95	22.08	24.40	21.13	1.87

Panel D: USA Sample - Post Period

	P5	P25	P50	P75	P95	Mean	Std
%EQUITIES	14.46%	42.44%	56.00%	64.29%	72.00%	50.82%	18.11%
%FIXED INCOME	16.80%	28.06%	34.22%	47.27%	72.15%	38.36%	16.26%
%CASH	0.00%	0.00%	1.68%	3.77%	10.73%	3.52%	6.46%
%REAL ESTATE	0.00%	0.00%	0.00%	3.77%	9.41%	1.96%	3.80%
%ALTERNATIVE ASSETS	0.00%	0.00%	0.00%	1.41%	15.00%	2.59%	5.40%
%DEPOSITS AND RECEIVABLES	0.00%	0.00%	0.00%	0.00%	0.17%	0.41%	2.13%
%OPAQUE	0.00%	0.00%	0.00%	0.04%	6.18%	1.07%	3.18%
ERR	5.25%	6.50%	7.21%	7.50%	8.00%	6.97%	0.92%
DISCOUNT RATE	3.55%	3.91%	4.06%	4.35%	4.81%	4.14%	0.40%
LEVERAGE	0.000	0.125	0.258	0.386	0.631	0.278	0.194
DIVIDENDS	0.000	0.001	0.007	0.020	0.050	0.015	0.025
SDCF	0.017	0.047	0.072	0.141	0.870	0.201	0.415
NOL	0.000	0.000	0.000	1.000	1.000	0.440	0.498
FUNDING	0.676	0.800	0.888	1.000	1.253	0.915	0.186
$FUNDING^2$	0.456	0.640	0.788	1.000	1.570	0.872	0.386
HORIZON	2.688	3.254	3.834	4.808	6.239	4.141	1.253
MARKET RETURNS	0.079	0.221	0.221	0.221	0.221	0.203	0.043
FVPA ($millions)	9.26	60	214	662	5,651	1,402	3,569
PBO ($millions)	8.85	71	226	769	6,164	1,481	3,636
MVE ($millions)	108.20	504	1,542	6,096	43,594	10,079	21,633
FVPA (logged)	16.04	17.90	19.18	20.31	22.46	19.22	1.94
PBO (logged)	16.00	18.07	19.24	20.46	22.54	19.32	1.94
MVE (logged)	18.50	20.04	21.16	22.53	24.50	21.40	1.87

Notes: All variables are defined in Appendix C.

Table 3
Correlation Matrix

Panel A: Canada

	%EQUITIES	ERR	DISC RATE	SIZE	LEVERAGE	DIVIDENDS	SDCF	NOL	FUNDING	FUNDING^2	HORIZON	MARKET RETURNS
%EQUITIES		0.1264	0.0937	-0.1092 *	0.0146	0.1242 **	-0.0027	-0.0862	0.0691	0.1282 **	0.0094	0.0390
ERR	0.1521 *		0.1675 *	0.1840 **	-0.2183 **	0.0669	0.0438	-0.1218	-0.0604	-0.0849	0.0464	-0.0222
DISC RATE	-0.0315	0.1162		0.1974 ***	-0.1408 **	0.0612	-0.1745 ***	0.0683	0.0999	0.0454	0.0137	-0.3780 ***
SIZE	-0.1201 *	0.1365	0.1421 **		-0.3424 ***	-0.0248	-0.0460	0.0456	0.0191	-0.0254	-0.2089 ***	0.0129
LEVERAGE	0.0065	-0.1924 **	-0.0189	-0.2397 ***		-0.2316	0.2580	0.0527	0.0515	0.0629	0.0401	0.0677
DIVIDENDS	0.1000	0.1224	-0.0218	0.0972	-0.1758 ***		0.0104	-0.0594	-0.1091 *	-0.1024 *	-0.0258	0.0097
SDCF	-0.0795	-0.0333	0.1066 *	-0.0402	0.1899 ***	-0.1395 **		-0.1147 *	-0.2053 ***	-0.1572 **	0.0212	0.0245
NOL	-0.0924	-0.0684	0.0681	0.0367	0.0636	-0.0816	-0.0012		-0.0564	-0.0575	0.0704	0.0824
FUNDING	-0.0705	-0.0642	0.0323	0.0899	-0.0078	-0.1492 **	0.0493	-0.0994		0.9407 ***	0.0561	0.1592 **
FUNDING^2	-0.0709	-0.0643	0.0321	0.0900	-0.0082	-0.1492 **	0.0487	-0.0993	1.0000		0.0743	0.1559 **
HORIZON	-0.1125	0.1098	0.0422	-0.1042 *	0.0376	-0.0523	0.0309	0.0847	0.0020	0.0016		-0.0865
MARKET RETURNS	-0.0497	0.0165	-0.4512 ***	0.0469	0.0532	0.0590	0.0032	0.0682	0.2597 ***	0.2599 ***	-0.0954	

Notes: All variables are defined in Appendix C.

*, **, *** indicate significance at $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively.

Pearson correlation coefficients appear above the diagonal, and Spearman correlation coefficients appear below the diagonal.

Table 3 (Continued)
Correlation Matrix

Panel B: USA

	%EQUITIES	ERR	DISC RATE	SIZE	LEVERAGE	DIVIDENDS	SDCF	NOL	FUNDING	FUNDING^2	HORIZON	MARKET RETURNS
%EQUITIES		0.3666 ***	-0.0095	-0.0367	0.0091	0.1250 **	-0.0527	-0.1274 **	0.0773	0.1020 *	-0.1817 ***	0.0342
ERR	0.3369 ***		0.1589 **	0.0502	0.1308 ***	-0.0893	-0.0321	-0.1135 *	-0.0548	-0.0308	-0.0712	-0.1359 **
DISC RATE	-0.0288	0.1804 ***		-0.0402	0.0205	-0.0140	0.0259	0.0740	-0.0977	-0.0888	-0.0805	-0.5490 ***
SIZE	-0.0855	-0.0047	-0.0217		-0.1281 **	0.0051	-0.0604	0.1121 *	0.0219	0.0020	-0.0657	0.0406
LEVERAGE	-0.0268	0.0744	0.0391	-0.1181 *		-0.2752 ***	0.2804 ***	-0.1198 *	-0.0009	0.0455	0.0479	0.0087
DIVIDENDS	0.0975	0.1242 *	0.0280	0.2387 ***	-0.3286 ***		-0.0385	-0.0280	-0.0194	-0.0354	-0.1989 ***	0.0656
SDCF	-0.1749 ***	-0.0740	0.0235	-0.0476	0.2438 ***	-0.2578 ***		0.1374 **	-0.0873	-0.0788	0.1354 **	0.0101
NOL	-0.1349 **	-0.0856	0.0595	0.1116 *	-0.1303 **	-0.0345	0.1584 **		-0.2458 ***	-0.2375 ***	0.1501 **	-0.0258
FUNDING	0.0641	-0.0804	-0.1548 **	0.0169	-0.0507	0.0463	-0.1650 ***	-0.2174 ***		0.9717 ***	-0.1452 **	0.3048 ***
FUNDING^2	0.0641	-0.0804	-0.1548 **	0.0169	-0.0507	0.0462	-0.1649 ***	-0.2174 ***	1.0000 ***		-0.1633 ***	0.2745 ***
HORIZON	-0.2374 ***	-0.0909	-0.0236	-0.0366	0.0897	-0.1421 **	0.2236 ***	0.1682 ***	-0.1121 *	-0.1122 *		-0.0559
MARKET RETURNS	0.0499	-0.1327 **	-0.5979 ***	0.0625	0.0307	0.0481	-0.0401	-0.0399	0.3269 ***	0.3269 ***	-0.0747	

Notes: All variables are defined in Appendix C.
*, **, *** indicate significance at $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively.
Pearson correlation coefficients appear above the diagonal, and Spearman correlation coefficients appear below the diagonal.

Table 4
Regression of %EQUITIES on POST and Other Determinants of Asset Allocation

$$\%EQUITIES = \beta 0 + \beta 1\ POST + \sum CONTROLS \qquad Eq\ (1)$$

	Panel A: Canada				Panel B: USA			
	Predicted Sign	Estimate	T-Stat	P-Value	Predicted Sign	Estimate	T-Stat	P-Value
Intercept		0.698	4.430	<.0001		0.798	3.740	0.0003
POST	−	-0.064	-3.450	0.0004 ***		0.003	0.130	0.894
SIZE		-0.006	-1.010	0.316		-0.003	-0.340	0.735
LEVERAGE	−	-0.012	-0.200	0.421	−	0.015	0.220	0.586
DIVIDENDS	−	0.551	2.070	0.980	−	0.590	1.270	0.896
SDCF	−	-0.002	-0.070	0.473	−	-0.008	-0.460	0.322
NOL	+	-0.021	-0.920	0.821	+	-0.032	-0.920	0.821
FUNDING		-0.238	-1.590	0.114		-0.376	-1.330	0.187
$FUNDING^2$		0.166	3.070	0.003 ***		0.200	1.720	0.088 *
HORIZON	+	-0.001	-0.210	0.584	+	-0.019	-1.520	0.935
MARKET RETURNS	+	0.405	1.760	0.041 **	+	0.053	0.140	0.443
N		250				250		
R^2		10.83%				6.62%		

Notes: All variables are defined in Appendix C. Standard errors are clustered by firm.
*, **, *** indicate significance at $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively.
Reported p-values are one-tailed when there are predicted signs.

In Panel A, we predict that POST < 0.
In Panel B, we predict that POST is not different from zero, as U.S. firms are not affected by IAS 19R.

Table 5
Regression of %EQUITIES on POST, HIGH FVPA (Fair Value of Plan Assets), and Determinants of Asset Allocation

$$\%EQUITIES = \beta 0 + \beta 1\ POST + \beta 2\ HIGH\ FVPA + \beta 3\ HIGH\ FVPA * POST + \sum CONTROLS \qquad Eq\ (2A)$$

	Panel A: Canada				Panel B: USA			
	Predicted Sign	Estimate	T-Stat	P-Value	Predicted Sign	Estimate	T-Stat	P-Value
Intercept		0.656	4.150	<.0001		0.796	3.280	0.001
POST	−	-0.048	-2.620	0.005 ***		0.006	0.180	0.858
HIGH FVPA		-0.028	-1.280	0.203		-0.020	-0.560	0.578
POST * HIGH FVPA	−	-0.035	-2.060	0.021 ***		0.000	0.020	0.988
SIZE		-0.007	-1.230	0.221		-0.003	-0.330	0.739
LEVERAGE	−	0.018	0.300	0.619	−	0.007	0.090	0.537
DIVIDENDS	−	0.538	2.090	0.981	−	0.618	1.210	0.886
SDCF	−	-0.007	-0.200	0.421	−	0.003	0.150	0.558
NOL	+	-0.012	-0.530	0.703	+	-0.034	-0.910	0.818
FUNDING		-0.144	-1.020	0.310		-0.340	-1.180	0.241
$FUNDING^2$		0.137	2.940	0.004 ***		0.189	1.610	0.110
HORIZON	+	0.001	0.170	0.433	+	-0.018	-1.340	0.908
MARKET RETURNS	+	0.475	2.130	0.018 **	+	-0.014	-0.040	0.515
N		242				242		
R^2		14.56%				7.18%		

Notes: All variables are defined in Appendix C. Standard errors are clustered by firm.
*, **, *** indicate significance at $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively.
Reported p-values are one-tailed when there are predicted signs.

In Panel A, we predict that POST < 0 and POST * HIGH FVPA < 0.
In Panel B, we predict that POST and POST * HIGH FVPA are not different from zero, as U.S. firms are not affected by IAS 19R

Table 5 (Continued)
Regression of %EQUITIES on POST, HIGH PBO, and Determinants of Asset Allocation

%EQUITIES = β0 + β1 POST + β2 HIGH PBO + β3 HIGH PBO * POST + ∑ CONTROLS Eq (2B)

	Panel C: Canada				Panel D: USA			
	Predicted Sign	Estimate	T-Stat	P-Value	Predicted Sign	Estimate	T-Stat	P-Value
Intercept		0.659	4.170	<.0001		0.807	3.200	0.002
POST	−	-0.048	-2.750	0.004 ***		0.006	0.190	0.847
HIGH PBO		-0.030	-1.320	0.191		-0.022	-0.630	0.532
POST * HIGH PBO	−	-0.035	-2.010	0.023 **		0.000	0.020	0.986
SIZE		-0.007	-1.240	0.217		-0.003	-0.360	0.716
LEVERAGE	−	0.025	0.430	0.667	−	0.007	0.100	0.538
DIVIDENDS	−	0.566	2.180	0.985	−	0.623	1.210	0.886
SDCF	−	-0.011	-0.300	0.383	−	0.003	0.130	0.552
NOL	+	-0.013	-0.610	0.729	+	-0.036	-0.970	0.834
FUNDING		-0.154	-1.110	0.270		-0.348	-1.210	0.227
$FUNDING^2$		0.139	3.010	0.003 ***		0.188	1.590	0.114
HORIZON	+	0.001	0.220	0.414	+	-0.017	-1.310	0.904
MARKET RETURNS	+	0.492	2.210	0.014 **	+	0.010	0.030	0.489
N		242				242		
R^2		14.66%				7.26%		

Notes: All variables are defined in Appendix C. Standard errors are clustered by firm.
*, **, *** indicate significance at $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively.
Reported p-values are one-tailed when there are predicted signs.

In Panel C, we predict that POST < 0 and POST * HIGH PBO < 0.
In Panel D, we predict that POST and POST * HIGH PBO are not different from zero, as U.S. firms are not affected by IAS 19R.

Table 6
Difference-In-Difference Regressions of %EQUITIES Using Canadian and US Firms

%EQUITIES = β0 + β1 POST + β2 CANADA + β3 POST * CANADA + ∑ CONTROLS Eq (3)

		Panel A: Diff-In-Diff			Panel B: Diff-In-Diff with POST * Controls			Panel C: Diff-In-Diff with CANADA * Controls			Panel D: Diff-In-Diff with POST * Controls, CANADA * Controls		
	Predicted Sign	Estimate	T-Stat	P-value	Estimate	T-Stat	P-value	Estimate	T-Stat	P-value	Estimate	T-Stat	P-value
Intercept		0.718	5.480	<.0001	0.729	4.830	<.0001	0.737	3.610	0.0004	0.763	3.430	0.001
POST		-0.013	-0.760	0.450	-0.057	-0.340	0.736	0.002	0.060	0.949	-0.087	-0.530	0.599
CANADA		0.039	2.090	0.038 **	0.041	2.200	0.028 **	0.020	0.080	0.936	0.022	0.090	0.929
POST * CANADA	−	-0.041	-3.020	0.001 ***	-0.045	-3.210	0.001 ***	-0.065	-2.060	0.020 ***	-0.074	-2.320	0.011 ***
SIZE		-0.004	-0.910	0.366	-0.002	-0.360	0.721	-0.003	-0.350	0.724	-0.001	-0.150	0.883
LEVERAGE	−	0.009	0.200	0.579	-0.015	-0.320	0.377	0.025	0.360	0.642	0.006	0.090	0.534
DIVIDENDS	−	0.603	2.250	0.987	0.805	3.490	0.9997	0.624	1.430	0.923	1.024	2.640	0.996
SDCF	−	-0.012	-0.730	0.232	-0.005	-0.340	0.368	-0.013	-0.720	0.237	-0.008	-0.340	0.365
NOL	+	-0.025	-1.310	0.904	-0.031	-1.580	0.943	-0.030	-0.890	0.812	-0.033	-0.960	0.832
FUNDING		-0.317	-2.270	0.024 **	-0.338	-1.340	0.182	-0.267	-1.130	0.260	-0.198	-0.600	0.550
$FUNDING^2$		0.190	3.440	0.001 ***	0.187	1.510	0.132	0.150	1.550	0.122	0.097	0.570	0.566
HORIZON	+	-0.008	-1.210	0.886	0.0003	0.040	0.484	-0.017	-1.540	0.937	-0.009	-0.820	0.792
MARKET RETURNS	+	0.257	1.280	0.101	-0.287	-0.710	0.760	0.046	0.130	0.450	-0.744	-1.340	0.910
POST * SIZE					-0.005	-1.530	0.128				-0.005	-1.470	0.144
POST * LEVERAGE					0.040	0.870	0.386				0.033	0.710	0.478
POST * DIVIDENDS					-0.264	-3.430	0.001 ***				-0.314	-5.240	<.0001 ***
POST * SDCF					-0.001	-0.040	0.969				-0.002	-0.070	0.948
POST * NOL					0.009	0.570	0.572				0.007	0.450	0.653
POST * FUNDING					0.185	0.590	0.555				0.204	0.670	0.505
POST * $FUNDING^2$					-0.061	-0.380	0.706				-0.053	-0.330	0.743
POST * HORIZON					-0.015	-2.680	0.008 ***				-0.016	-3.090	0.002 ***
POST * MARKET RETURNS					0.603	1.230	0.220				0.802	1.540	0.125
CANADA * SIZE								-0.004	-0.390	0.699	-0.002	-0.160	0.874
CANADA * LEVERAGE								-0.043	-0.490	0.627	-0.041	-0.460	0.649
CANADA * DIVIDENDS								-0.092	-0.240	0.808	-0.373	-1.040	0.299
CANADA * SDCF								0.011	0.420	0.678	0.011	0.430	0.667
CANADA * NOL								0.012	0.290	0.774	0.009	0.210	0.833
CANADA * FUNDING								-0.042	-0.150	0.880	-0.168	-0.610	0.544
CANADA * FUNDING2								0.049	0.380	0.706	0.111	0.840	0.403
CANADA * HORIZON								0.013	1.230	0.220	0.015	1.390	0.165
CANADA * MARKET RETURNS								0.347	0.800	0.424	0.451	1.040	0.300
N		500			500			500			500		
R^2		7.76%			9.32%			8.60%			10.56%		

Notes: All variables are defined in Appendix C. Standard errors are clustered by firm.
*, **, *** indicate significance at p < 0.10, p < 0.05, and p <0.01, respectively.
Reported p-values are one-tailed when there are predicted signs.

In Panels A to D, we predict that POST * CANADA < 0.

Table 7
Difference-In-Difference Regressions of %EQUITIES Using Canadian and US Firms, Partitioned by HIGH FVPA

%EQUITIES = β0 + β1 POST + β2 CANADA + β3 POST * CANADA + ∑ CONTROLS Eq (3)

	Panel A: High FVPA / Operating Income				Panel B: Low FVPA / Operating Income			
	Predicted Sign	Estimate	T-Stat	P-Value	Predicted Sign	Estimate	T-Stat	P-Value
Intercept		1.078	5.710	<.0001		0.275	1.200	0.233
POST		-0.001	-0.080	0.937		-0.036	-1.240	0.219
CANADA		0.053	1.950	0.054 *		0.033	1.180	0.242
POST * CANADA	−	-0.057	-3.280	0.001 ***		-0.008	-0.390	0.697
SIZE		-0.024	-3.360	0.001 ***		0.014	1.770	0.080 *
LEVERAGE	−	-0.040	-0.680	0.250	−	0.069	0.900	0.815
DIVIDENDS	−	0.501	2.090	0.981	−	0.726	1.330	0.907
SDCF	−	-0.013	-0.640	0.262	−	-0.007	-0.220	0.415
NOL	+	0.004	0.130	0.450	+	-0.043	-1.480	0.929
FUNDING		-0.197	-1.090	0.279		-0.360	-1.350	0.179
$FUNDING^2$		0.118	1.780	0.078 *		0.233	2.040	0.044 **
HORIZON	+	-0.010	-1.290	0.900	+	-0.005	-0.350	0.637
MARKET RETURNS	+	0.162	0.630	0.264	+	0.461	1.470	0.072 *
N		244				240		
R^2		15.16%				11.66%		

Notes: All variables are defined in Appendix C. Standard errors are clustered by firm.
*, **, *** indicate significance at $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively.
Reported p-values are one-tailed when there are predicted signs.

In Panel A, we predict that POST * CANADA < 0.
In Panel B, we predict that POST * CANADA is not different from zero, as we expect the effects of IAS 19R to be concentrated in firms with economically substantial plans for which ERR assumptions have a strong impact on the income statement.

Table 7 (Continued)
Difference-In-Difference Regressions of %EQUITIES Using Canadian and US Firms, Partitioned by HIGH PBO

$$\%EQUITIES = \beta 0 + \beta 1\ POST + \beta 2\ CANADA + \beta 3\ POST * CANADA + \sum CONTROLS \qquad Eq\ (3)$$

	Panel C: High PBO / Operating Income				Panel D: Low PBO / Operating Income			
	Predicted Sign	Estimate	T-Stat	P-Value	Predicted Sign	Estimate	T-Stat	P-Value
Intercept		1.158	6.020	<.0001		0.190	0.850	0.399
POST		-0.008	-0.380	0.706		-0.030	-1.180	0.240
CANADA		0.053	1.810	0.072 *		0.033	1.200	0.231
POST * CANADA	−	-0.055	-3.140	0.001 ***		-0.011	-0.530	0.599
SIZE		-0.028	-3.790	0.0002 ***		0.018	2.260	0.025 **
LEVERAGE	−	-0.042	-0.710	0.240	−	0.099	1.230	0.890
DIVIDENDS	−	0.449	1.870	0.968	−	0.857	1.570	0.941
SDCF	−	-0.014	-0.650	0.258	−	-0.017	-0.540	0.296
NOL	+	0.006	0.230	0.409	+	-0.047	-1.640	0.948
FUNDING		-0.224	-1.270	0.205		-0.351	-1.370	0.172
$FUNDING^2$		0.142	2.890	0.005 ***		0.208	1.910	0.059 *
HORIZON	+	-0.010	-1.340	0.909	+	-0.001	-0.100	0.540
MARKET RETURNS	+	0.245	0.860	0.196	+	0.462	1.760	0.040 **
N		242				242		
R^2		17.61%				12.43%		

Notes: All variables are defined in Appendix C. Standard errors are clustered by firm.
*, **, *** indicate significance at $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively.
Reported p-values are one-tailed when there are predicted signs.

In Panel C, we predict that POST * CANADA < 0.
In Panel D, we predict that POST * CANADA is not different from zero, as we expect the effects of IAS 19R to be concentrated in firms with economically substantial plans for which ERR assumptions have a strong impact on the income statement.