

An Examination of the Cost of Capital Implications of FIN 46

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ABSTRACT: This study examines whether the adoption in 2003 of FASB Interpretation No. 46/R (FIN 46), *Consolidation of Variable Interest Entities—An Interpretation of ARB No. 51*, changed the cost of capital for affected firms. Using comparative analysis on a broad sample of 11,719 firm-quarter observations for 1,389 firms during the period 1998 through 2005, we find evidence that FIN 46 significantly increased the cost of equity capital for firms with affected variable interest entities (VIEs), an increase of approximately 50 basis points relative to firms reporting no material effect from the standard. Further, firms consolidating these formerly off-balance sheet structures experienced the largest increase. Taken together, these results suggest that FIN 46 reduced the opportunity for firms to use off-balance sheet structures to artificially reduce their cost of capital, a matter of regulatory concern.

Keywords: *cost of capital; off-balance sheet; special purpose vehicle; variable interest entity; FIN 46.*

Data Availability: *All data are available from public sources.*

I. INTRODUCTION

In response to Enron and similar accounting scandals, the FASB issued in January 2003, and revised in December 2003, Interpretation 46, *Consolidation of Variable Interest Entities—An Interpretation of ARB No. 51*, FIN 46 and FIN 46R, respectively (hereafter referred to

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collectively as FIN 46). Effectively, FIN 46 changed reporting for many off-balance sheet activities, termed variable interest entities (VIEs) under the new standard.¹ Although it increased transparency, FIN 46 was potentially costly to firms, conveying new risks to market participants that could affect the cost of capital. The prior literature regarding the economic impact of this type of mandatory change is mixed (e.g., [Khurana 1991](#); [Chen et al. 2010](#)). In recent research, FIN 46 is shown to have real effects on investment activity and product-market competition (e.g., [Bens and Monahan 2008](#)) that are theoretically linked to firms' cost of capital. The purpose of this paper is to directly examine the FIN 46 cost of capital impact given the current regulatory and academic debate.

Examining disclosures in annual filings, we identify a sample of 244 firms with off-balance sheet structures impacted by FIN 46 and a control sample of 1,145 firms disclosing no material effect from the standard. Examining 11,719 firm-quarter observations over the period 1998 to 2005, we provide evidence that FIN 46 significantly increased the cost of equity capital for firms with affected VIEs, producing an average increase of approximately 50 basis points relative to the control sample. Further, firms that consolidated these formerly off-balance sheet structures experienced the largest increase following adoption.

Firms have long used off-balance sheet entities to obtain financing and avoid reporting debt on their balance sheets.^{2,3} Advocates argue that these structures benefit investors by allowing management to access additional sources of financing, reduce risk, and lower firms' cost of capital. Critics, however, charge that these arrangements are mainly driven by accounting, not economic considerations and any reduction in the cost of capital is artificial ([Reason 2002](#)). Recent corporate scandals likewise suggest these entities can be used opportunistically by firm managers, with sponsoring firm investors remaining generally unaware of underlying risks.

The stated purpose of FIN 46 was to "achieve more consistent application of consolidation policies . . . [and] provide more complete information about the resources, obligations, risks, and opportunities of the consolidated enterprise" ([FASB 2003](#), 4). Proponents of FIN 46 argued that gains in investor confidence counteracted any additional cost. Conversely, critics argued FIN 46 conveyed new, unsubstantiated risks to market participants and the complexity and opaqueness of FIN 46 offset any informational gains.⁴

Theoretically, in a frictionless market, FIN 46 should not affect firms' cost of capital as long as, upon adoption, investors perceive no change in expected cash flow and risk posture. In fact, increased transparency may lower firms' cost of capital (e.g., [Botosan and Plumlee 2002](#)). Departing from the theory of frictionless markets, other evidence suggests costs to investors could increase under a mandated standard such as FIN 46 (for instance, see evidence in [Khurana \[1991\]](#) regarding SFAS 94).

¹ FIN 46 introduced the term "variable interest entities" to distinguish those entities from other off-balance sheet activities not subject to FIN 46. In this paper, we use the term VIE when discussing off-balance sheet activities subject to FIN 46 and we use the broader term "special purpose vehicles" (SPVs) otherwise.

² Besides their reporting advantages, these entities often isolated risk, in part because they were considered "bankruptcy remote" as the assets of the off-balance sheet entity were protected from bankruptcy proceedings if the sponsor declared bankruptcy. This isolation often allowed firms to obtain lower cost financing ([Reason 2003](#)).

³ Structures involving off-balance sheet financing include various operating leases or operating guarantees; sale and leaseback transactions; real estate investment trust financing; public or private joint ventures; research and development partnerships; sale of receivables with recourse; and bank financial instruments such as guarantees, letters of credit, and loan commitments ([Mills and Newberry 2005](#)).

⁴ The ongoing debate regarding proper accounting for off-balance sheet structures provides evidence of the continuing interest in and complexity of this issue. Most recently, SFAS 166, *Accounting for Transfers of Financial Assets—An Amendment of FASB Statement No. 140*, and SFAS 167, *Amendments to FASB Interpretation No. 46(R)*, alter accounting treatment for these structures.

The *Wall Street Journal* (2003) noted FIN 46 could require firms to consolidate as much as \$500 billion in assets and liabilities, and some financial analysts warned these changes could “affect almost every line in the financial statements” (Credit Suisse 2003, 1), thereby potentially affecting loan covenants, credit ratings, and regulatory capital requirements. Practitioners further noted FIN 46 was “likely to raise the cost of capital and otherwise create additional costs for companies that may flow through to shareholders” (KPMG 2003, 6).

In short, firms that consolidated and/or disclosed VIEs potentially incurred costs associated with increased estimation risk, significant restructuring and/or adoption costs, and more reported leverage than before. Further, firms avoiding consolidation of VIEs upon adoption of the standard often incurred additional costs to restructure or divest their VIEs, and financial institutions that arranged/held VIEs often sought to avoid FIN 46 requirements.⁵ FIN 46 adoption could affect future cash flows by constraining debt contracting options and forcing firms to incur additional costs, thereby raising investor concern about firms’ information risk.⁶ Each of these can increase the cost of capital.

Given the arguments, the economic impact of FIN 46 on investors’ perceptions and firms’ cost of capital is an empirical question. Taken together, the theory and potential economic effects lead to the following question: Did FIN 46 influence firms’ cost of capital? In other words, prior to the implementation of FIN 46, were investors bearing the cost of hidden risk through overpriced equities? We find, relative to a control group of firms disclosing no material effect from FIN 46, affected firms experienced an increased cost of equity following adoption of the standard, with firms consolidating VIEs generally experiencing the greatest impact.

Our study contributes to the literature on the cost of capital implications of financial disclosure, the impact of mandated accounting change, and the use of SPVs. Although prior theoretical and empirical research (e.g., Healy and Palepu 2001; Barth and Schipper 2008) suggests increased disclosure lowers firms’ costs of capital, we present a context where increased disclosure results in higher cost of equity capital, similar to Ashbaugh-Skaife et al. (2009). Our findings are also consistent with Lambert et al.’s (2007) argument that mandated disclosures affect firms differentially, depending on the ramifications for future cash flows. It may also be argued that the pre-FIN 46 reporting paradigm enabled some firms to reduce their cost of capital and FIN 46 rectified this understatement.⁷ Finally, we provide new evidence on the consequences of SPV use. Feng et al. (2009) document prevalent use of those activities and link their use to earnings management; we show the implications for the cost of capital, which may be of concern to both managers and regulators. Furthermore, our findings may inform the ongoing discussion of regulatory issues related to off-balance sheet structures.⁸

Section II next provides background on FIN 46 and develops hypotheses. Section III describes our sample. Section IV describes our research design. Section V describes the results and section VI concludes.

⁵ Bens and Monahan (2008) present evidence that the volume of asset-backed commercial paper (ABCP) began to decline when FIN 46 was first proposed, and this decline is primarily attributable to a reduction in North American banks’ sponsorship of ABCP. They also demonstrate North American banks entered into “costly” restructuring arrangements to avoid consolidation of their conduits according to the new accounting standards, suggesting FIN 46 appears to have real effects on investment activity and product-market competition that are theoretically linked to firms’ cost of capital.

⁶ By “information risk,” we mean the likelihood that firm-specific information that is pertinent to investor pricing decisions is of poor quality (Francis et al. 2005b, 29).

⁷ We thank an anonymous reviewer for illustrating this point with the Enron case. It is plausible that FIN 46 requirements would have affected Enron’s disclosures. Perhaps it would have increased Enron’s cost of capital in the short term (i.e., lowered its stock price), but this could have had the longer-term impact of decreasing the cost of capital by avoiding a financial collapse.

⁸ For example, consider the recent issuance of SFAS 166, *Accounting for Transfers of Financial Assets—An Amendment of FASB Statement No. 140*, SFAS No. 167, *Amendments to FASB Interpretation No. 46(R)*, and the in-process joint project of the IASB and FASB, *Consolidation: Policy and Procedures*.

II. BACKGROUND AND DEVELOPMENT OF HYPOTHESES

FASB Interpretation Number 46 (FIN 46)

FIN 46 defined “variable interest entities” as thinly capitalized entities with equity interests insufficient to finance the operations of the entity and not possessing the usual relationship between ownership, control, and risk.⁹ The Interpretation established a new consolidation model based on sharing of economic risk that applied to a wide array of previously unconsolidated entities (PricewaterhouseCoopers 2004). Under this new model, the firm exposed to the majority of expected losses or residual rewards is deemed the primary beneficiary and must consolidate the entity, regardless of equity ownership (FASB 2003, ¶14). FIN 46 also established new disclosure requirements for all owners of significant variable interest in VIEs, including primary beneficiaries (FASB 2003).¹⁰ The standard, however, did not apply to all firms or even all SPVs. Among others, it specifically excluded qualifying special purpose entities (QSPEs) subject to the reporting requirements of FAS 140 (FASB 2003, ¶4).¹¹

Impact of FIN 46 on Cost of Capital (H1)

For firms with SPVs, FIN 46 could result in no change, a decrease, or an increase in the firm’s cost of capital. Theoretical and empirical support exists for each of these outcomes. Theoretically, in perfect and frictionless markets, a mandated accounting change will have no effect on the cost of capital unless the change shifts a firm’s risk profile and expected cash flows. Proponents of this “no effect” outcome argue that informed investors were aware of SPVs prior to adoption of FIN 46.¹² Further, some prior research suggests that the market can see through the structure of off-balance sheet items and price associated risk efficiently (Bauman 2003; Jin et al. 2006). Thus, it is possible that firms with SPVs experienced no change in cost of capital post-FIN 46.

In contrast, increased transparency required by FIN 46 may *decrease* firms’ cost of capital following adoption. Increased transparency afforded by increased disclosure could decrease the adverse selection problem and improve liquidity, thereby lowering cost of equity through greater demand for a firm’s securities and/or reduced transaction costs (Amihud and Mendelson 1986; Diamond and Verrecchia 1991; Easley and O’Hara 2004). Further, the estimation risk literature predicts disclosure leads to increased transparency, generating lower cost of equity (e.g., Barry and

⁹ Specifically, these are structures in which “the total equity investment at risk is not sufficient to permit the entity to finance its activities without additional subordinated financial support” (FASB 2003, ¶5a); at-risk equity holders do not have the usual rights and obligations of shareholders (e.g., voting rights, obligations to absorb losses, and right to receive residual returns) (FASB 2003, ¶5b); or “the voting rights of some investors are not proportional to their obligations to absorb the expected losses of the entity, their rights to receive the expected residual returns, or both” (FASB 2003, ¶5c).

¹⁰ Primary beneficiaries are required to disclose the nature, purpose, size, and activities of VIEs and information about assets pledged as collateral for the VIE’s obligations. All other firms with significant interests in VIEs are also required to disclose the nature, purpose, size, and activities of the VIEs, the nature of their involvement with the VIE, and their maximum exposure to loss.

¹¹ QSPEs were granted this scope exception largely because of the passive, pass-through structure mandated by FAS 140. However, as the credit crisis unfolded through 2007 and 2008, many of these structures began to require active management, in particular through restructuring of associated loans. In discussing the subsequent removal of the QSPE exception, FASB Chairman Herz noted in 2008, “QSPEs were originally intended as passive entities but morphed into something different. Unfortunately, it seems that some folks used Qs like a punchbowl to get off-balance sheet treatment while spiking the punch. That has led us to conclude that now it’s time to take away the punchbowl” (Herz 2008, 11). As the credit crisis revealed, the scope exception granted to QSPEs proved to be an important issue. For instance, Blundell-Wignall et al. (2009) estimated over \$3 trillion in QSPEs remained off-balance for the 19 U.S. Supervisory Capital Assessment Program (SCAP) banks at the end of 2008.

¹² Certain structures had standard disclosure (e.g., synthetic leases reported as operating leases) and firms must list subsidiaries, including many SPVs, in Exhibit 21 of the SEC 10-K.

Brown 1985; Lambert et al. 2007; Barth and Schipper 2008).¹³ Several empirical studies likewise link expanded disclosure policy to lower cost of equity capital (Botosan 1997; Botosan and Plumlee 2002; Francis et al. 2005a).

Finally, FIN 46 could potentially *increase* firms' costs of capital through the direct and indirect effects described in Lambert et al. (2007). They show higher quality disclosures directly affect the firm's assessed covariances with other firms' cash flows and corresponding cost of capital. Further, these effects can either increase or decrease costs of capital, depending on the expected value of the firm's future cash flows and the covariance of those cash flows with the sum of all cash flows in the market.

A change in disclosure requirements can also indirectly affect the cost of capital by changing a firm's real decisions. Some firms that are the primary beneficiaries of VIEs under FIN 46 incurred significant FIN 46 implementation costs and other firms chose to incur costs to dispose of, restructure, or terminate VIEs to avoid consolidation (KPMG 2003; Credit Suisse 2003). Such restructuring charges may represent continuing costs because one solution to preserve off-balance sheet treatment was to shift VIE consolidation to a third party, with corresponding, ongoing costs for such services (Bens and Monahan 2008). Consolidating off-balance sheet structures also affected financial ratios, thereby constraining debt capacity and in some cases triggering renegotiation of debt covenants (Credit Suisse 2003). Thus, FIN 46 could change management decisions and affect future cash flows by restricting future contracting and financing options. In similar circumstances in connection with changes required by SFAS 94,¹⁴ Khurana (1991) argues that consolidation of non-homogeneous subsidiaries could interfere with the ability of the firm to raise debt capital in the future and also reduce firms' opportunity sets for accounting, financing, production, and investment decisions. Similarly, Livdan et al. (2009) show that financing constraints inhibit firms' ability to smooth dividend streams when faced with aggregate shocks. We therefore test the following hypothesis:

H1: Firms with VIEs experienced a change in cost of capital after FIN 46 compared to firms not materially affected by the standard.

Differential Impact of Consolidating or Divesting VIEs on Cost of Capital (H2)

We next analyze whether actions that firms took with respect to their VIEs could differentially affect cost of capital post-FIN 46. FIN 46 generally requires the primary beneficiary of the VIE to consolidate the previously off-balance sheet entity; however, some firms responded by divesting, restructuring, or otherwise terminating relationships with those structures. By keeping VIEs off-balance sheet, firms could preserve greater financial flexibility and avoid violating debt covenants, thereby limiting the impact of FIN 46. For example, Bens and Monahan (2008) show that banks generally sought to avoid consolidation of asset-backed commercial paper conduits by reducing the number of new commercial paper SPVs and by restructuring existing VIEs so that separate entities held the residual interests. Such actions prevented an adverse impact on accounting ratios and credit ratings post-FIN 46. Importantly, those firms that take actions to preserve off-book treatment of their VIEs imply there is some economic advantage to keeping these structures off-book. However, any restructuring required to retain this off-book treatment may be costly, reducing the benefits associated with the VIE in question. Conversely,

¹³ In our context, "estimation risk" is investor uncertainty about the parameters of the cash-flow-generating process (e.g., Lewellen and Shanken 2002). This uncertainty is closely related to information risk, which is the quality of firm-specific information pertinent to investor pricing decisions (e.g., Francis et al. 2005b).

¹⁴ SFAS 94 (*Consolidation of All Majority-Owned Subsidiaries: An Amendment of ARB No. 51 with Related Amendments of APB Opinion No. 18 and ARB No. 43*) concerns the consolidation of non-homogenous subsidiaries, while SPEs often involve activities central to the operations of the parent firm (Maines et al. 2003). Thus, although the impact of these two standards is not expected to be identical, evidence from the impact of SFAS 94 should be generally informative about the market treatment of off-balance sheet structures.

firms that consolidated VIEs following FIN 46 presumably did so because the VIEs are economically profitable for the firm, despite any corresponding increase in reported liabilities and associated effects.

The preceding considerations suggest two potential effects on the cost of capital: (1) an indirect effect that these economically necessary VIEs have on future cash flows, and (2) a direct effect due to increased disclosure required by FIN 46, including the potentially greater transparency afforded by consolidation. Regardless of FIN 46's impact on firms' cost of capital, we expect the impact to vary across firms consolidating VIEs compared to those that otherwise kept those structures off their books.

Barth et al. (2003) show that recognized and disclosed amounts contribute to different levels of price informativeness, which may affect estimation risk. Consolidation may also constrain future financing and contracting ability (Khurana 1991) and ability to smooth cash flows (Livdan et al. 2009). We therefore expect that FIN 46 affects the cost of capital for consolidating firms differently than for firms that did not consolidate, suggesting our second hypothesis:

H2: FIN 46 affected the cost of capital differently for firms that consolidated information pertaining to VIEs compared to firms that divested or restructured VIEs.

III. SAMPLE SELECTION AND DESCRIPTION

Identifying Firms With and Without VIEs

We gathered our sample from disclosures made within firms' annual filings using procedures similar to, but broader in scope than Zechman (2010). Given the relative lack of disclosure about VIEs prior to adoption of FIN 46, we also restricted our hand-gathered sample using the procedures of Feng et al. (2009).

First, we identified firms specifically making disclosure(s) related to FIN 46. To gather data on such firms, we used 10-K Wizard to search annual reports filed in 2004, primarily for the fiscal year ending 2003.¹⁵ We searched for all occurrences of "FIN 46" and "variable interest entity/entities" in these filings. This process produced 551 FIN 46 mandated disclosures from 352 firms. We classified these disclosures by whether the firm reported the VIE on a consolidated basis after FIN 46 adoption and by the purpose of each VIE. Table 1 provides a breakdown of this group, and sample disclosures are provided in Appendix A. As part of this data gathering procedure, we also identified 1,753 firms that reported "no material effect" or "no effect" from FIN 46 or FIN 46(R), but provided no further details about associated VIEs.¹⁶

¹⁵ Since FIN 46 was adopted in January 2003, the first 10-K reports referencing FIN 46 were filed with the SEC in early 2003. FIN 46 was subsequently superseded by FIN 46(R), which was issued in December 2003. FIN 46(R) changed a number of requirements but did not alter the basic thrust of FIN 46. Although our primary sample of interest is composed of firms that adopted FIN 46/FIN 46(R) for fiscal years ending in 2003, FIN 46(R) allowed staggered effective dates; as a result, not all public firms had adopted the new provisions for VIEs for the fiscal year ending in 2003. Specifically, while firms had to adopt either FIN 46 or FIN 46(R) for the first reporting period ending after December 15, 2003, some entities have year-ends earlier than December 15. Further, if firms applied FIN 46 for fiscal years ending in 2003, they had an extended deadline to apply FIN 46(R) in the first reporting period ending after March 15, 2004. Small business issuers had a further extended deadline to apply FIN 46(R) in periods ending after December 15, 2004.

¹⁶ While it is not possible to know with certainty why firms would disclose no material effect from a recent standard, professional guidance provides two possibilities. Given the staggered adoption dates of FIN 46 and FIN 46(R) (see footnote 15), it is possible that firms had not fully adopted the standard; in fact, some indicate this is the case. For standards issued but not yet adopted, SAB 74 states, "In those instances where a recently issued standard will impact the preparation of, but not materially affect, the financial statements, the registrant is encouraged to disclose that a standard has been issued and that its adoption will not have a material effect on its financial position or results of operation" (footnote 3). Professional auditing guidance likewise indicates, "If an accounting change has no material effect on the financial statements in the current year, but the change is reasonably certain to have substantial effect in later years, the change should be disclosed in the notes to the financial statements (AU Section 420.20)."

TABLE 1

Description of Sample Firms, Types of VIEs, FIN 46 Compliance, and Industry Affiliations

Panel A: Counts of Firms by Category Based on Use of VIEs and Compliance with FIN 46

Category	Firms Identified (n)	Firms in Final Sample (n)
1. Firms complying with FIN 46 (<i>F46</i>)	352	244
2. Firms reporting no material FIN 46 effect (<i>No_F46_Impact</i>)	1,753	1,145
Totals	2,105	1,389

Panel B: Types of VIEs and Actions Taken to Comply with FIN 46

Types of VIEs	Action Taken					
	On Books		Off Books		Total	
	n	Percent	n	Percent	n	Percent
Financial VIEs	48	33%	33	34%	81	33%
Operating VIEs	63	43%	52	53%	115	47%
Other VIEs	3	2%	2	2%	5	2%
Multiple Types	32	22%	11	11%	43	18%
Totals	146	100%	98	100%	244	100%

Panel C: Counts of Firms by Industry and FIN 46 Firm Categories

Industry	Description	<i>No_F46_Impact</i> Firms	<i>F46</i> Firms
1	Food	27	7
2	Mining and Minerals	10	1
3	Oil and Petroleum Products	43	7
4	Textiles, Apparel, and Footwear	26	2
5	Consumer Durables	29	7
6	Chemicals	12	6
7	Drugs, Soap, Perfumes, and Tobacco	38	4
8	Construction and Construction Materials	29	16
9	Steel Works, etc.	16	1
10	Fabricated Products	7	2
11	Machinery and Business Equipment	170	21
12	Automobiles	13	4
13	Transportation	44	12
14	Utilities	17	16
15	Retail Stores	81	19
16	Banks, Insurance Companies, and Other Financials	199	54
17	Other	384	65
Total		1,145	244

(continued on next page)

TABLE 1 (continued)

Panel A shows the counts of firms in each firm category: (1) firms that complied with FIN 46 according to disclosures in their 10-K reports; and (2) firms reporting that FIN 46 had no material effect. The number of firms in the final sample reflects firms with at least one implied cost of equity capital measure.

Panel B shows the counts of F46 firms that consolidated VIEs or otherwise brought VIEs onto their books and firms that took actions to keep VIEs off their books (e.g., restructuring, terminating) and the counts in each of four types of VIEs: (1) Financial (lease or finance VIEs); (2) Operating (alliances, affiliates, or joint ventures); (3) Other (trust-preferred securities or multiple unspecified bundles of VIEs), and (4) Firms reporting multiple types of VIEs.

Panel C recaps the number of firms in each firm category by industry. We use Fama and French industry definitions. Firms are categorized as described in Panel A of this table.

Next, for the sample, we used [Feng et al.'s \(2009\)](#) search process to verify the presence or absence of likely VIEs or SPVs in Exhibit 21 of Form 10-K. [Feng et al. \(2009\)](#) document the widespread use of SPVs by utilizing filings made with the SEC related to affiliates.^{17,18} [Feng et al. \(2009\)](#) identify likely SPVs as those subsidiaries and affiliates listed in Exhibit 21 with names that contain “Limited Partnership,” “L.P.,” “LP,” “LLC,” “L.L.C.,” or “trust,” since SPVs are typically organized as one of those legal structures. Given inconsistent disclosure before FIN 46, it may be that VIEs organized via one of these common legal structures were more likely to be identified by market participants prior to adoption of FIN 46.¹⁹ Absent voluntary disclosure, VIEs structured by other means may have been difficult to identify prior to adoption of FIN 46. As a result, we further restrict our hand-gathered sample by requiring that firms disclose at least one likely VIE in Exhibit 21 before adoption of FIN 46.²⁰ By placing this constraint on our sample, we bias against finding a change in cost of capital post-FIN 46, as our main sample includes only those firms with the most obvious, and therefore most likely understood, VIEs before FIN 46.

Categories of Firms in the Sample

We then used firm Central Index Keys (CIKs) to gather corresponding Compustat data and data necessary to estimate valid proxies for implied cost of equity capital as discussed in the next

¹⁷ SEC regulations require that firms list subsidiaries and affiliates in Exhibit 21 to their annual 10-K. Specifically, U.S. Federal Regulations (Regulation S-X) 17CFR 229.601(a) specify that public filers submit Exhibit 21, Subsidiaries of the Registrant, as part of the annual 10-K. U.S. Federal Regulations (Application of Regulation S-X) 17 CFR part 210.1-02(x) define a subsidiary as “an affiliate controlled by such person directly, or indirectly through one or more intermediaries” with control defined in 17 CFR part 210.1-02(g) as “the possession, direct or indirect, of the power to direct or cause the direction of the management and policies of a person, whether through the ownership of voting shares, by contract, or otherwise.” In other words, subsidiaries in Exhibit 21 may include entities not consolidated under the provisions of U.S. GAAP pre-FIN 46.

¹⁸ Based on our sample-gathering procedures, the [Feng et al. \(2009\)](#) sample appears to include at least some structures that were not VIEs affected by FIN 46, (e.g., exempted structures such as QSPEs or entities such as active LPs and LLCs that are not SPVs).

¹⁹ For example, upon its adoption of FIN 46, ConAgra Foods, Inc. disclosed detailed information about multiple VIEs impacted by the standard. A search of the firm’s prior-year filing, however, reveals no obvious indication of off-balance sheet structures (e.g., keywords such as “special purpose entity” “off-balance sheet” or “synthetic lease” do not appear within the report), but four likely SPVs (following the [Feng et al. \[2009\]](#) criteria) appear in Exhibit 21.

²⁰ To replicate the search process of [Feng et al. \(2009\)](#), we use the proximity search feature within directEDGAR® to identify which firms listed in Exhibit 21 subsidiaries or affiliates with names containing the terms identified by [Feng et al. \(2009\)](#). Additionally, but consistent with their intent, we also searched for Exhibit 21 entries using the terms “limited,” “Ltd.,” “Ltd.,” “Ltda,” or “limitada” both to broaden our search and capture similar terms in Spanish and Portuguese. After the proximity search, we used tools in directEDGAR® to manually examine each Exhibit 21 to confirm the results. Because [Feng et al. \(2009\)](#) note that firms sometimes list subsidiaries in Exhibit 22 rather than 21, we also included this exhibit in our search. As such, this component of our procedure represents only a refinement to the process of [Feng et al. \(2009\)](#) in that we expand the keyword set used.

section. After identifying sample firms as described above and verifying data availability, we formed two categories as follows:

1. *F46* firms are those 244 firms that disclosed an effect from FIN 46 and were verified to have likely SPVs disclosed in Exhibit 21; and
2. *No_F46_Impact* firms are those 1,145 firms that disclosed that FIN 46 had no material effect on their financial results.²¹

Panel A of Table 1 describes our final sample of 1,389 firms. Panel C of Table 1 reports the sample firm groups according to Fama and French industry classifications. As this panel shows, firms across both sample categories are concentrated in the Fama and French “other” category. However, in the “machinery and business equipment” group, more firms report no effect from FIN 46 than disclose an effect from FIN 46.

Categories of F46 Firms According to the Compliance Action Taken

To examine H2, as reported in Panel B of Table 1, we further categorized *F46* firms according to the action taken in response to the standard. We categorize firms by whether they (1) brought the VIEs onto their books (*on books*) by consolidation, purchase of assets, etc. or (2) did not bring VIEs onto their books (*off books*) because the firm was not the primary beneficiary, restructured its interest in the entity, etc. Panel B shows that 146 *F46* firms brought VIEs onto their books and 98 firms did not.

Categories of VIEs for FIN 46 firms

Panel B of Table 1 also shows the breakdown of the *F46* firms according to the type of VIE reported. Approximately one-third of firms reported financial VIEs, almost half the *F46* firms reported operating VIEs, and 18 percent of *F46* firms reported multiple types of VIEs. We separately categorize firms with multiple types, since it is difficult to determine the dominant VIE type for those firms. In general there is little difference in the types of VIEs brought onto books compared to those kept off books. However, firms with multiple types were more likely to bring at least one VIE onto their books.

IV. RESEARCH METHODS, IMPLIED COST OF EQUITY PROXIES, AND EMPIRICAL MODELS

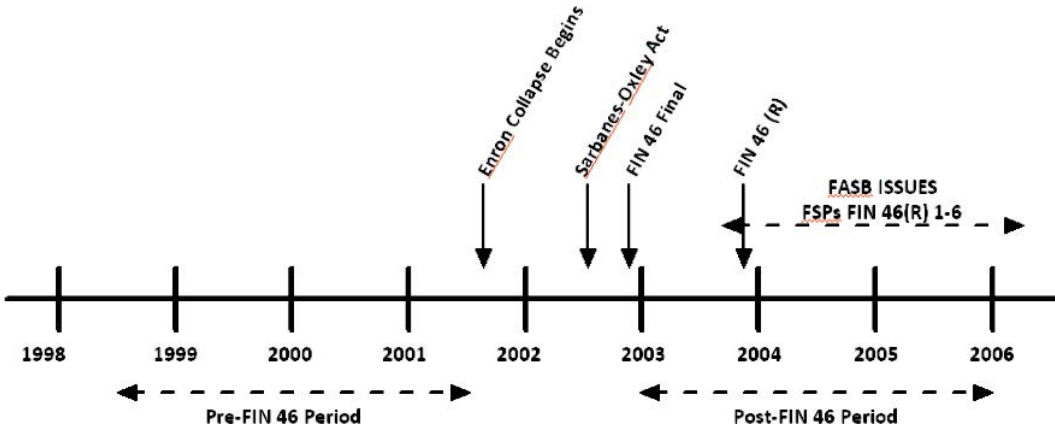
Defining the Pre- and Post-FIN 46 Periods

Our goal is to examine changes in implied cost of equity capital following the adoption of FIN 46. However, for many firms that adoption took place over several months or even over multiple years, as FIN 46 was issued and subsequently revised. Thus, there was likely some delay while analysts incorporated information into their estimates.

Firms issued the first financial statements under FIN 46 early in calendar year 2003, and we expect the full effect of FIN 46 to be reflected in sample firms’ cost of equity capital measures within 36 months as firms take actions to consolidate VIEs, make required disclosures, or reduce

²¹ While it is entirely possible that this group restructured VIEs so that FIN 46 would have no material effect on the firm, it is not possible to determine this from the disclosure provided within the annual report. We separate these firms because, considering the regulatory guidance discussed above, by making disclosures of this type, it is possible that these firms expect their use of VIEs may have a material effect in future periods, thus altering the current risk position.

FIGURE 1
Timeline



This figure presents a timeline of important and relevant events leading up to and following the issue of FIN 46, and it shows our control period, the pre-FIN 46 time period, and our focus for this research, the post-FIN 46 time period. We define the pre-FIN 46 period as the 3rd calendar quarter of 1998 through the 2nd calendar quarter of 2001 and the post-FIN 46 period as the 1st calendar quarter of 2003 through the 4th calendar quarter of 2005. We exclude the transitory period beginning the 3rd calendar quarter of 2001 and ending the 4th calendar quarter of 2002. FSP indicates FASB Staff Position document.

their participation in VIEs. We therefore define the post-FIN 46 time period as the 36-month period from the first calendar quarter of 2003 through the fourth quarter of 2005.

As a benchmark, we compare firms' cost of equity capital against a similar pre-FIN 46 period.²² Since Enron Corporation's collapse began in the Fall 2001 and the FASB's initial development of FIN 46 took place during 2002, those events could affect the cost of equity capital for firms that participated in VIEs and confound any comparison. Thus, we exclude from analysis firm-quarter observations for the 18 months beginning in the third calendar quarter of 2001 and ending in the fourth calendar quarter of 2002.²³ We therefore define the pre-FIN 46 time period as the 36 months immediately preceding that transitory period, beginning in the third calendar quarter of 1998 and ending in the second calendar quarter of 2001. We expect that measures of cost of equity capital during this time period were untainted by the notoriety generated by Enron's collapse and subsequent actions by the FASB to change treatment of special purpose entities. Figure 1 graphically portrays important events, such as the collapse of Enron and the adoption dates of FIN 46 and FIN 46(R), in relation to the pre- and post-FIN 46 periods.

Proxies for the Implied Cost of Equity Capital

We employ multiple accounting-based proxies for firms' implied cost of equity capital that are widely used in recent finance and accounting literature (see [Botosan and Plumlee \[2005\]](#) for a detailed discussion). We select these accounting-based proxies because they are forward-looking

²² We also tested shorter (one-year and two-year) pre- and post-FIN 46 periods with consistent results.

²³ The implications of our analyses are generally unchanged if we include these 18 quarters. However, we find substantial variation in estimates of implied cost of equity capital during this period consistent with the level of uncertainty connected with the Enron scandal and the prospective regulation of VIEs.

measures of expected returns. Furthermore, these proxies rely on analysts' estimates of future firm performance, and given the complexity of these structures and the limited disclosure about firms' involvement with VIEs prior to FIN 46, analysts should be well positioned to assess the impact of VIEs on firm performance both before and after FIN 46.

Consistent with prior research (e.g., Li 2010; Hail and Leuz 2006, 2009; Dhaliwal et al. 2007), our primary dependent variable is the average of four proxies. Ogneva et al. (2007), Chen et al. (2010), and Hail and Leuz (2006) all advocate the use of multiple measures to ensure that results are robust to method choice; for this reason we also present results for multiple measures.²⁴

First, we use the proxy based on Easton's (2004) PEG ratio since Botosan and Plumlee (2005) find this measure to be predictably and consistently related to other risk measures. Additionally, we use the proxy based on Ohlson and Juettner-Nauroth (2005), since Gode and Mohanram (2003) find that this proxy is reliably related to other risk measures as well as *ex post* returns. We also use proxies developed by Gebhardt et al. (2001) and Claus and Thomas (2001), which are based on residual income valuation models (e.g., Ohlson 1995) and widely used in other accounting research (e.g., Li 2010; Dhaliwal et al. 2007; Daske 2006; Hail and Leuz 2006, 2009; Hribar and Jenkins 2004). For each of the cost of equity capital measures, we use the last analyst earnings per share and long-term growth estimates from I/B/E/S in the calendar quarter and market prices as of the end of the quarter, consistent with Dhaliwal et al. (2007). We describe the calculation of each of these proxies in Appendix B.

Defining Control Variables for Analysis of Implied Cost of Equity Capital

Prior research examining implied cost of equity capital employs a broad set of control variables.²⁵ Until recently, little theory has been available to guide the choice of control variables. However, Hughes et al. (2009) demonstrate the difference between the implied cost of equity capital and expected returns is a function of beta and cash flow volatility, leverage, and growth. They conclude that studies employing implied cost of equity capital as a proxy for expected return should control for those factors. Thus, we control for the following:²⁶

ubeta = coefficient from a single factor value-weighted market model measured during the last month of each quarter using the previous 60 months' returns including firms with at least 24 observations in that period, unlevered by dividing by $(1 + \text{long-term debt}/\text{market value of equity})$;

²⁴ We acknowledge the difficulty in identifying a reliable measure of the cost of equity capital, reflected in discussion in the literature about deficiencies in existing *ex ante* measures of the implied cost of equity capital (Easton and Monahan 2005; Guay et al. 2005; Botosan et al. 2010; Easton and Monahan 2010). These limitations apply to our study as well as to all other studies that examine accounting-based cost of capital measures.

²⁵ For example, Dhaliwal et al. (2007) control for factors suggested by Gebhardt et al. (2001), as well as Fama and French (1996) factors. Ogneva et al. (2007) and Ashbaugh-Skaife et al. (2009) also control for firm characteristics, such as mergers, percentage of losses, z-score decile, extent of foreign operations, and number of segments. To the extent data for these controls are available quarterly, we also estimated our models using the controls proposed by these referenced studies and found results consistent with those reported here.

²⁶ Because Hughes et al. (2009) did not specify empirical measures of constructs such as cash flow volatility and growth, we examined several alternative measures using, for example, free cash flow and return on equity. We also acknowledge these control variables likely do not fully correct for all problems with the underlying cost of capital measures. Use of these controls, however, should improve our analysis compared to other available sets of controls. To the degree these are related to use of SPVs, use of these controls should bias against our hypothesized results. Further, although we report results using the control variables defined here, the results are also robust to alternate sets of control variables including controls relating to performance, firm structure and governance, compensation effects, and information environment.

sd_ocf = standard deviation of operating cash flows over the previous five years including firms with at least three annual observations in that period, log transformed;²⁷

sd_beta = standard deviation of the four beta values over the previous year for each firm, log transformed;

leverage = long-term debt divided by the market value of equity;

oi_growth = current quarterly operating income before depreciation and amortization divided by the previous quarter's value; and

size = market value of equity (in millions of dollars) at the end of the previous fiscal year, log transformed. Inclusion of this control is consistent with work such as [Kothari et al. \(2009\)](#) given the known relation between size and equity returns ([Berk 1995](#)).

Descriptive Statistics for Sample Firms Pre- and Post-FIN 46

Panel A of Table 2 presents descriptive statistics for the full sample of 1,389 firms for the pre-FIN 46 for three periods: (1) the pre-FIN 46 period, (2) the excluded time period (post-Enron scandal and during FIN 46 development), and (3) the post-FIN 46 period. We limited the sample to those firm-quarter observations with non-missing data for all variables. The mean (median) market capitalization ranges from \$7.2 billion (\$705 million) pre-FIN 46 to \$6.7 billion (\$1 billion) post-FIN 46. While leverage decreased over the 1998 through 2005 period, the average implied cost of equity capital (*re_ave*) likewise decreased from a mean value of 9.9 percent pre-FIN 46 to 9.0 percent post-FIN 46 consistent with [Dhaliwal et al. \(2007\)](#), who examined changes in implied cost of equity capital related to the Jobs and Growth Tax Relief Reconciliation Act of 2003.²⁸

Tests Investigating Differences among Firm Categories

Panel B of Table 2 compares descriptive statistics for *F46* and *No_F46_Impact* firms. These groups have almost identical average implied cost of capital (*re_ave*), although *F46* firms have lower *re_peg* values and higher *re_ct* values. *F46* firms also have lower unlevered beta (*ubeta*), and lower cash flow volatility (*sd_ocf*) than the *No_F46_Impact* firms. *F46* firms are also generally larger and have higher leverage than *No_F46_Impact* firms. All measures taken together suggest that *F46* firms present lower risk profiles than the *No_F46_Impact* firms.

Figure 2 compares average implied cost of equity capital (*re_ave*) for the two groups of firms by quarter, adjusted for the mean quarterly cost of capital for all firms with available implied cost of equity capital measures. Thus, zero on the horizontal axis represents average implied cost of capital for all public firms for which implied cost of capital measures could be calculated each quarter. The lines indicate changes for *No_F46_Impact* and *F46* firms relative to a broad universe of firms. Clearly, *F46* firms have lower costs of equity capital pre-FIN 46; however, that advantage disappears by the end of 2001 and the *F46* firms have consistently higher average implied cost of equity capital values post-FIN 46.

Correlations among Implied Cost of Equity Capital Proxies and Other Risk Measures

Table 3 presents correlations among the cost of capital proxies and related control variables. As expected, the proxies for implied cost of equity capital are highly correlated. Those proxies are also significantly related to a variety of risk measures, consistent with prior research. The average cost of equity capital measure (*re_ave*) is significantly and negatively related to firm size and positively

²⁷ We added 1 to the standard deviation of cash flows and beta figures before log transformation.

²⁸ Although not shown in the table, interest rates on five-year and ten-year Treasury bonds also decreased from over 5 percent pre-FIN 46 to 4 percent or less post-FIN 46, reflecting economy-wide decreases in the cost of capital.

TABLE 2
Descriptive Statistics

Panel A: Descriptive Statistics by Period Pre- and Post-FIN 46
(n = 20,350 Firm-Quarter Observations)

Variable	Mean	Std. Dev.	Q1	Median	Q3	n
1998 Qtr 3 to 2001 Qtr 2 (Pre-FIN 46 Period)						
<i>re_ave</i>	0.099	0.029	0.079	0.097	0.116	5,117
<i>re_ct</i>	0.092	0.030	0.070	0.088	0.108	5,117
<i>re_gls</i>	0.102	0.031	0.080	0.100	0.122	5,117
<i>re_peg</i>	0.100	0.048	0.068	0.091	0.122	5,117
<i>re_oj</i>	0.104	0.035	0.079	0.100	0.124	5,117
<i>ubeta</i>	0.852	0.727	0.367	0.684	1.147	5,117
<i>sd_ocf</i>	0.059	0.055	0.027	0.045	0.072	5,117
<i>sd_beta</i>	0.200	0.108	0.124	0.180	0.253	5,117
<i>leverage</i>	0.372	0.571	0.008	0.143	0.483	5,117
<i>oi_growth</i>	1.088	0.546	0.862	1.042	1.221	5,117
<i>size</i> (\$mm)	7,205.6	34,628.7	260.3	705.0	2,346.4	5,117
2001 Qtr 3 to 2002 Qtr 4 (Excluded Period—post-Enron scandal and during FIN 46 development)						
<i>re_ave</i>	0.093	0.022	0.078	0.090	0.105	2,844
<i>re_ct</i>	0.079	0.025	0.062	0.076	0.091	2,844
<i>re_gls</i>	0.097	0.024	0.081	0.096	0.111	2,844
<i>re_peg</i>	0.102	0.046	0.072	0.093	0.121	2,844
<i>re_oj</i>	0.093	0.028	0.075	0.091	0.108	2,844
<i>ubeta</i>	0.834	0.854	0.284	0.584	1.097	2,844
<i>sd_ocf</i>	0.057	0.049	0.026	0.044	0.070	2,844
<i>sd_beta</i>	0.157	0.088	0.096	0.141	0.200	2,844
<i>leverage</i>	0.338	0.520	0.008	0.142	0.420	2,844
<i>oi_growth</i>	1.081	0.554	0.841	1.026	1.222	2,844
<i>size</i> (\$mm)	8,252.7	36,371.5	385.8	969.4	2,844.4	2,844
2003 Qtr 1 to 2005 Qtr 4 (Post-FIN 46 Period)						
<i>re_ave</i>	0.090	0.019	0.077	0.087	0.099	6,602
<i>re_ct</i>	0.072	0.022	0.057	0.070	0.082	6,602
<i>re_gls</i>	0.091	0.022	0.077	0.090	0.104	6,602
<i>re_peg</i>	0.100	0.039	0.075	0.093	0.117	6,602
<i>re_oj</i>	0.095	0.030	0.076	0.092	0.108	6,602
<i>ubeta</i>	1.007	0.906	0.383	0.736	1.341	6,602
<i>sd_ocf</i>	0.060	0.064	0.025	0.044	0.070	6,602
<i>sd_beta</i>	0.069	0.081	0.000	0.043	0.119	6,602
<i>leverage</i>	0.264	0.425	0.001	0.112	0.323	6,602
<i>oi_growth</i>	1.096	0.534	0.869	1.047	1.233	6,602
<i>size</i> (\$mm)	6,736.2	26,398.0	403.7	1,017.3	3,021.5	6,602

(continued on next page)

related to leverage, consistent with [Botosan and Plumlee \(2005\)](#). It is also significantly and positively related to measures of operating cash flow and beta volatility (*sd_ocf* and *sd_beta*), consistent with [Hughes et al.'s \(2009\)](#) arguments that implied cost of equity capital is a function of beta and cash flow volatility, as well as leverage and growth. Similar to prior research, all the implied cost of capital measures, except *re_peg*, are negatively related to beta.

TABLE 2 (continued)

Panel B: Descriptive Statistics by Category of Firm

Variable	1. <i>No_F46_Impact</i> Firms		2. <i>F46</i> Firms		Comparison Prob(1 equals 2)
	Mean	Median	Mean	Median	
<i>re_ave</i>	0.094	0.090	0.094	0.091	ns
<i>re_ct</i>	0.079	0.075	0.084	0.080	**
<i>re_gls</i>	0.096	0.093	0.097	0.094	ns
<i>re_peg</i>	0.102	0.094	0.094	0.088	***
<i>re_oj</i>	0.097	0.094	0.100	0.097	ns
<i>ubeta</i>	0.976	0.727	0.733	0.551	***
<i>sd_ocf</i>	0.063	0.048	0.043	0.035	***
<i>sd_beta</i>	0.134	0.121	0.127	0.118	ns
<i>leverage</i>	0.271	0.102	0.464	0.225	***
<i>oi_growth</i>	1.096	1.041	1.073	1.041	**
<i>size</i> (\$mm)	6,904.1	705.3	8,155.9	2,184.2	***
<i>n</i>	11,152		3,411		

, * Indicate significance at 5 percent and 1 percent levels, respectively.

ns indicates not significant.

Panel A presents descriptive statistics for sample firms by period: (1) Pre-FIN 46 period is the 12 calendar quarters beginning with the 3rd quarter 1998 and ending with the 2nd quarter 2001, (2) the excluded period is the six quarters beginning with the 3rd quarter 2001 and ending with the 4th quarter 2002, and (3) the Post-FIN 46 period is the 12 quarters beginning with the 1st quarter 2003 and ending with the 4th quarter 2005. We limit the sample to those firm-quarter observations for which all the variables are available.

Panel B presents mean and median values for sample firms across all three time periods according to firm category:

(1) *No_F46_Impact* firms are those firms that indicated that FIN 46 had no meaningful effect on their financial results, and (2) *F46_firms* are those firms that reported complying with FIN 46. The Comparison column indicates whether there is a significant difference between values for *No_F46_Impact_firms* and *F46_firms* using two-tailed tests adjusting for intrafirm correlation with clustered standard errors.

Variable Definitions:

re_ave = average of other four measures of implied cost of capital;

re_ct = implied cost of capital based on Claus and Thomas (2001);

re_gls = implied cost of capital based on Gebhardt et al. (2001);

re_peg = implied cost of capital based on Easton (2004) PEG ratio;

re_oj = implied cost of capital based on Ohlson and Juettner-Nauroth (2005); *re* values are winsorized 1 percent at the high end of the distribution to limit the influence of extreme observations;

ubeta = unlevered beta, calculated by dividing beta by $(1 + \text{long-term debt}/\text{market value of equity})$; beta values are based on a single factor (value-weighted) market model based on monthly observations for firms with at least 30 observations in the previous 60 months;

sd_ocf = standard deviation of operating cash flows over previous five years plus 1, log transformed;

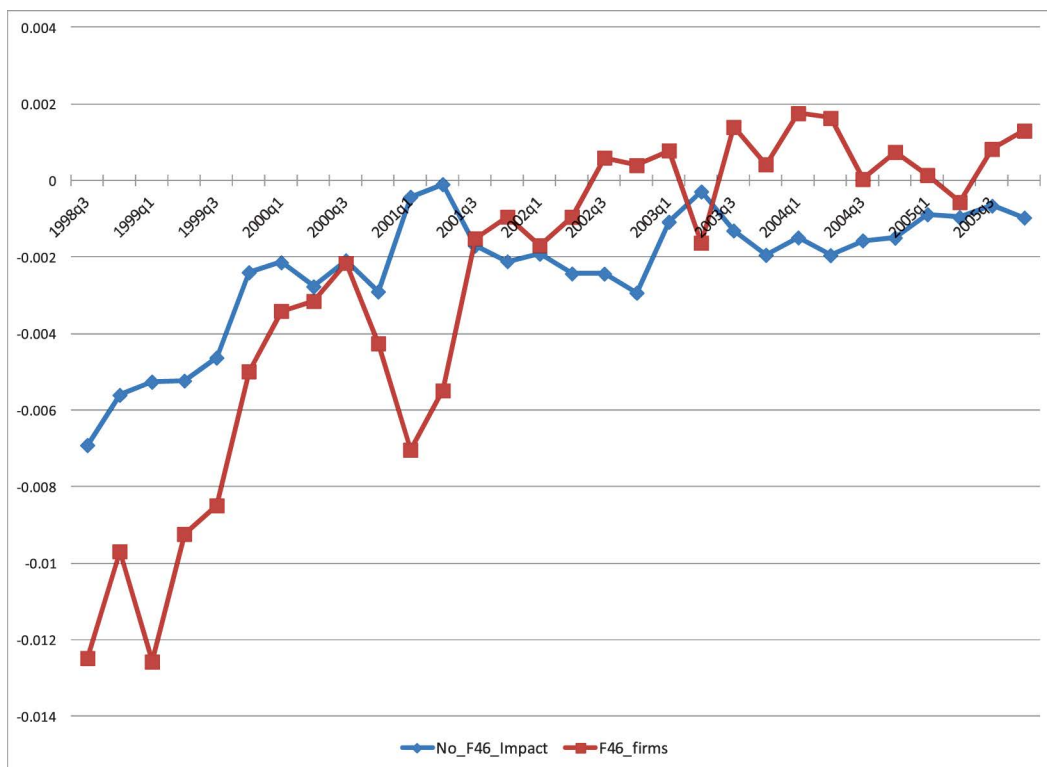
sd_beta = standard deviation of beta values over previous year plus 1, log transformed (proxy for beta volatility as suggested by results of Hughes et al. [2009]);

leverage = long-term debt divided by market value of equity, winsorized 1 percent at each end of the distribution;

oi_growth = operating income this quarter divided by operating income in the previous quarter, winsorized 1 percent at each end of the distribution; and

size = market value of equity (\$mm) at the end of the previous fiscal year.

FIGURE 2
Quarterly Average Implied Cost of Capital (Mean-Adjusted) from 1998 to 2005 by Firm Category



This chart shows the average, quarterly mean-adjusted, implied cost of equity capital calculated quarterly over the period 1998 to 2005 for categories of firms defined as follows: (1) *No_F46_Impact* firms are those firms that indicated that FIN 46 had no meaningful effect on their financial results; and (2) *F46* firms are those firms that disclosed an effect from FIN 46. Quarterly mean values are based on all firms with available implied cost of equity capital measures for the quarter.

Models for Multivariate Tests of Implied Costs of Equity Changes Post-FIN 46 (H1)

To test H1, we examine the change in implied cost of equity capital post-FIN 46 for two different categories of firms: (1) the *No_F46_Impact* group with VIEs or SPVs not materially affected by FIN 46, and (2) the *F46* firms that complied with FIN 46, as described earlier, using the following basic model (firm and time subscripts suppressed):

$$re = b_0 + b_1post46 + b_2F46 + b_3post46 \times F46 + b_4ubeta + b_5sd_ocf + b_6sd_beta + b_7leverage + b_8oi_growth + b_9size + \varepsilon. \quad (1)$$

In Equation (1) *re* is one of the four implied cost of equity capital measures or the average measure and *post46* indicates the change in regime from pre- to post-FIN 46. The interaction term coefficient, b_3 , indicates whether cost of capital changed for *F46* firms relative to *No_F46_Impact* firms, after controlling for other factors expected to affect cost of equity capital.

TABLE 3
Correlations

	<i>re_ave</i>	<i>re_ct</i>	<i>re_gls</i>	<i>re_peg</i>	<i>re_oj</i>	<i>ubeta</i>	<i>sd_ocf</i>	<i>sd_beta</i>	<i>leverage</i>	<i>oi_growth</i>	<i>size</i>
<i>re_ave</i>	1	0.764	0.758	0.700	0.665	-0.187	0.048	0.134	0.345	-0.065	-0.327
<i>re_ct</i>	0.789	1	0.735	0.229	0.502	-0.292	-0.036	0.178	0.380	-0.069	-0.183
<i>re_gls</i>	0.769	0.778	1	0.370	0.294	-0.151	0.043	0.181	0.335	-0.081	-0.351
<i>re_peg</i>	0.737	0.292	0.377	1	0.312	0.064	0.147	0.059	0.138	-0.009	-0.341
<i>re_oj</i>	0.667	0.458	0.284	0.269	1	-0.247	-0.082	-0.013	0.197	-0.069	-0.050
<i>ubeta</i>	-0.183	-0.290	-0.167	0.047	-0.225	1	0.368	0.032	-0.512	0.042	-0.014
<i>sd_ocf</i>	0.026	-0.038	0.000	0.110	-0.040	0.390	1	0.124	-0.361	0.039	-0.296
<i>sd_beta</i>	0.136	0.171	0.166	0.093	-0.005	0.079	0.086	1	0.027	-0.001	-0.158
<i>leverage</i>	0.368	0.391	0.374	0.212	0.164	-0.351	-0.190	0.059	1	-0.030	0.013
<i>oi_growth</i>	-0.035	-0.036	-0.049	0.011	-0.048	0.026	0.022	0.002	-0.013	1	-0.021
<i>size</i> (\$mm)	-0.349	-0.218	-0.371	-0.348	-0.071	-0.025	-0.228	-0.153	-0.087	-0.042	1

Table 3 presents Pearson correlations below the diagonal and Spearman correlations above the diagonal. Absolute correlations > 0.02 significant at 1 percent. n equals 14,563 firm-quarter observations. Variables are as defined in Table 2, except *size* is log transformed for this table.

Models for Multivariate Tests of Implied Costs of Equity Changes by VIE Action (H2)

To test H2, we divided *F46* firms into two subcategories based on the action they took in response to FIN 46: (1) *F46_on_books* firms brought VIE assets and liabilities onto the firm's balance sheet, and (2) *F46_off_books* firms kept VIE assets and liabilities off the firm's balance sheet.²⁹ We test changes in implied cost of equity capital using the following model where variables other than firm action categories are as previously defined:

$$\begin{aligned}
 re = & b_0 + b_1 post46 + b_2 F46_off_books + b_3 F46_on_books + b_4 post46 \times F46_off_books \\
 & + b_5 post46 \times F46_on_books + b_6 ubeta + b_7 sd_ocf + b_8 sd_beta + b_9 leverage \\
 & + b_{10} oi_growth + b_{11} size + \varepsilon.
 \end{aligned}
 \tag{2}$$

Econometric Considerations

Our sample is an unbalanced panel of 1,389 firms over 24 quarters. Peterson (2009) compared alternative approaches for dealing with serial correlation in panel datasets and concluded that, in the presence of unobserved firm effects, clustered standard errors are unbiased and produce correctly sized confidence intervals while controlling for those unobserved effects. We therefore present results estimated using OLS with clustered standard errors adjusted for intrafirm correlation.³⁰

Because firms chose their policies following FIN 46, self-selection bias may arise.³¹ However, it is reasonable to assume that firms selected actions to minimize the adverse impact of FIN 46. Thus, firm choice should act to reduce the impact of FIN 46, counter to our hypotheses that FIN 46 affected the cost of equity capital.

²⁹ Some firms with multiple VIEs took both actions and we classified those firms as *F46_on_books* firms.

³⁰ We also analyze our models using the dual controls suggested by Gow et al. (2010) to account for cross-sectional and time-series dependency. While this method does cause small changes in the standard errors, it does not change the results reported in the following sections.

³¹ Firms also chose to participate in off-balance sheet activities, but that choice should not affect post-FIN 46 cost of capital.

V. RESULTS

Results for Tests of Implied Cost of Equity Changes by Firm Category (H1)

Table 4 presents results comparing implied cost of equity capital pre- and post-FIN 46 by firm category. Panel A presents univariate tests of average implied cost of equity capital (*re_ave*) values for the pre- and post-FIN 46 periods. Both *F46* and *No_F46_Impact* firms experienced, on average, significantly lower cost of equity capital post-FIN 46 compared to pre-FIN 46. However, costs for *No_F46_Impact* firms decreased, on average, 1.1 percent, while *F46* firms decreased only 0.6 percent and these differences are significantly different from one another ($p < 0.01$, one-tailed test). As shown in Figure 2, across adoption of FIN 46, cost of capital for *F46* firms changed from less than to greater than that of *No_F46_Impact* firms.

Panel B of Table 4 presents results from the multivariate analysis using Equation (1). The *post46* variable indicates the change in regime from pre- to post-FIN 46 and is significantly negative. The interaction term, *post46* \times *F46* firms, then captures the post-FIN 46 change for *F46* firms relative to the *No_F46_Impact* firms. Focusing on results for the average implied cost of equity capital (*re_ave*), the coefficient on *post46* \times *F46* is positive and highly significant ($p < 0.01$). Consistent with prior research (Botosan and Plumlee 2005), leverage is significant and positively related to *re_ave*, while *size* is significant and negatively related to *re_ave*, as well as to all of the other cost of equity capital proxies. Unlevered beta (*ubeta*) is significantly negatively related to *re_ave*. Among the control variables suggested by Hughes et al. (2009) and shown in Equation (1), only beta volatility (*sd_beta*) is not significantly related to *re_ave*, although it is significantly related to *re_gls*, *re_peg*, and *re_oj*. Overall, these results support H1. Cost of equity capital increased for firms with VIEs subject to FIN 46 relative to firms that reported no material effect from FIN 46.

Results for Tests of Implied Cost of Equity Changes by VIE Action (H2)

To examine the impact of actions taken to comply with FIN 46, we divided the *F46* firms into two categories according to whether they kept VIEs off (*F46_off_books*) or brought VIEs onto (*F46_on_books*) their books. Figure 3 shows that pre-FIN 46, the cost of equity capital moves together for those two groups; however, post-FIN 46, the average cost of equity capital diverges and *F46_on_books* firms have higher adjusted cost of equity capital than *F46_off_books* firms.

Panel A of Table 5 presents univariate results comparing the implied cost of equity capital pre- and post-FIN 46 for *No_F46_Impact*, *F46_off_books*, and *F46_on_books* firms. Both *No_F46_Impact* and *F46_off_books* firms experienced significant decreases in *re_ave* from pre- to post-FIN 46, but *F46_on_books* firms did not. Furthermore, the *F46_on_books* firms experienced a significantly smaller decrease than the *No_F46_Impact* firms ($p < 0.01$, one-tailed test) as well as the *F46_off_books* firms ($p < 0.05$, one-tailed test).

Panel B of Table 5 presents results from the multivariate analysis using Equation (2). Again, the *post46* variable indicates the change in regime from pre- to post-FIN 46 and is significantly negative. The interaction terms *post46* \times *F46_off_books* and *post46* \times *F46_on_books* reflect the relative post-FIN 46 change for those two firm categories. Focusing on results for the average implied cost of equity capital (*re_ave*), the *post46* \times *F46_off_books* coefficient is not significant, but the *post46* \times *F46_on_books* coefficient is positive and highly significant ($p < 0.01$). In untabulated tests the difference in coefficients between *post46* \times *F46_on_books* and *post46* \times *F46_off_books* is marginally significant ($p < 0.10$, F-test). The results for control variables are similar to those in Panel B of Table 4.³²

³² We also separately examine for each group the residuals (e.g., unexplained cost of equity) remaining after controlling for the Hughes et al. (2009) control variables; both univariate and multivariate analyses of these residuals are consistent with the results reported in Tables 4 and 5.

TABLE 4

Analysis of Implied Cost of Capital Pre- and Post-FIN 46 (H1)

Panel A: Univariate Analysis of the Average Implied Cost of Capital Pre- and Post-FIN 46

Categories	Pre-FIN 46	n	Post-FIN 46	n	Change Pre-Post	Prob (pre < > post)	Prob (> No_F46_Impact)
No_F46_Impact	0.100	3,903	0.089	5,109	-0.011	***	
F46	0.097	1,214	0.091	1,493	-0.006	***	***
Total	0.099	5,117	0.090	6,602	-0.009	***	

*** Indicates significance at 1 percent, two-tailed test, correcting for intrafirm correlation with clustered standard errors.

Panel B: Multivariate Analysis of Implied Cost of Capital Pre- and Post-FIN 46 (H1a and H1b)

	Pred. Sign	Dependent Variables				
		re_ave	re_ct	re_gls	re_peg	re_oj
post46	+/-	-0.007 (7.02)***	-0.018 (15.62)***	-0.007 (5.80)***	0.006 (3.09)***	-0.011 (6.64)***
F46	+/-	-0.002 (1.23)	-0.001 (0.43)	-0.001 (0.49)	-0.006 (2.08)**	-0.000 (0.13)
post46 × F46	+/-	0.005 (2.81)***	0.007 (3.33)***	0.006 (3.03)***	0.005 (1.44)	0.004 (1.36)
ubeta	+	-0.003 (5.57)***	-0.006 (10.64)***	-0.003 (4.35)***	0.004 (4.08)***	-0.008 (9.91)***
sd_ocf	+	0.022 (2.50)**	0.025 (2.89)***	0.002 (0.22)	0.030 (1.95)*	0.029 (2.67)***
sd_beta	+	0.001 (0.12)	-0.002 (0.33)	0.010 (1.85)*	0.019 (2.32)**	-0.025 (3.72)***
leverage	+	0.014 (10.72)***	0.015 (10.67)***	0.016 (11.24)***	0.020 (7.85)***	0.006 (3.32)***
oi_growth	-	-0.002 (4.80)***	-0.002 (3.80)***	-0.003 (6.94)***	-0.000 (0.61)	-0.003 (4.51)***
size	-	-0.004 (15.00)***	-0.003 (8.82)***	-0.005 (15.22)***	-0.008 (15.02)***	-0.002 (3.64)***
Constant		0.128 (45.57)***	0.111 (37.88)***	0.136 (41.45)***	0.140 (28.57)***	0.125 (31.72)***
Observations		11,719	11,719	11,719	11,719	11,719
Adj R ²		0.27	0.30	0.28	0.18	0.09

*, **, *** Indicate significance at 10 percent, 5 percent, and 1 percent levels, respectively.

Robust standard errors adjusted for intrafirm correlation with clustered standard errors are in parentheses.

Panel A presents mean values for average implied cost of equity capital (*re_ave*) during the pre- and post-FIN 46 periods for firms reporting no material FIN 46 effect (*No_F46_Impact*), and for firms subject to FIN 46 (*F46*). The Prob(pre < > post) column indicates whether the change in *re_ave* is significantly different from zero, and the Prob(> *No_F46_Impact*) column indicates whether the change in *re_ave* was significantly greater than the change for *No_F46_Impact* firms (one-tailed test) correcting for intrafirm correlation with clustered standard errors.

(continued on next page)

TABLE 4 (continued)

Panel B presents OLS regressions testing H1 using the following model to compare firms' implied cost of capital between the pre-FIN 46 period (1998 Qtr 3 to 2001 Qtr 2) and the post-FIN 46 period (2003 Qtr 1 to 2005 Qtr 4), excluding observations from 2001 Qtr 3 to 2002 Qtr 4, according to whether the firm had VIEs and complied with FIN 46:

$$re = b_0 + b_1post46 + b_2F46 + b_3post46 \times F46 + b_4ubeta + b_5sd_{ocf} + b_6sd_{beta} + b_7leverage + b_8oi_{growth} + b_9size + \varepsilon.$$

Variable Definitions:

re = indicates one of the following accounting-based measures of implied cost of capital:

re_ave = average of other four measures of implied cost of capital;

re_ct = implied cost of capital based on Claus and Thomas (2001);

re_gls = implied cost of capital based on Gebhardt et al. (2001);

re_peg = implied cost of capital based on the Easton (2004) PEG ratio;

re_oj = implied cost of capital based on Ohlson and Juettner-Nauroth (2005);

re values are winsorized 1 percent at the high end of the distribution to limit the influence of extreme observations;

post46 = 1 if calendar quarter is during 2003 Qtr 1 to 2005 Qtr 4, 0 if calendar quarter is during 1998 Qtr 3 to 2001 Qtr 2;

F46 = 1 if firm reported complying with FIN 46, 0 otherwise;

post46 × *F46* = interaction term with value of 1 if both *post46* and *F46* firms equal 1, 0 otherwise;

ubeta = unlevered beta based on single factor market model;

sd_ocf = standard deviation of operating cash flows over previous five years plus 1, log transformed;

sd_beta = standard deviation of beta values over previous year plus 1, log transformed (proxy for beta volatility as suggested by Hughes et al. [2009]);

leverage = long-term debt divided by market value of equity, winsorized 1 percent at each end of the distribution;

oi_growth = operating income this quarter divided by operating income in previous quarter, winsorized 1 percent at each end of the distribution; and

size = log of market value of equity (\$mm) at the end of the previous fiscal year.

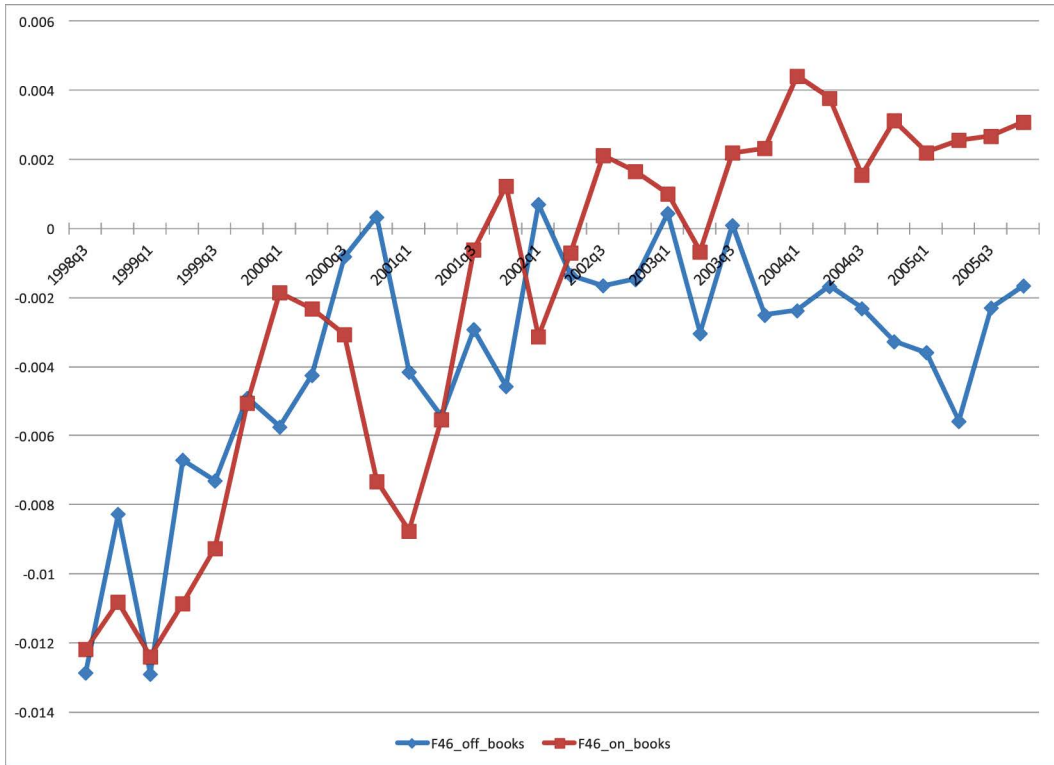
Overall, Table 5 provides support for H2. The impact of FIN 46 on firms' cost of equity capital depends on the action that firms took to comply with FIN 46. Firms that reported consolidation of VIEs experienced the largest relative change in implied cost of equity capital post-FIN 46, an increase of approximately 70 basis points for the *re_ave* measure. In summary, the results show that FIN 46 affected *ex ante* measures of cost of equity capital for firms with VIEs impacted by FIN 46 relative to firms with no impact from the standard. Firms that consolidated VIEs (*F46_on_books* firms) following FIN 46 saw the largest relative increase in implied cost of equity capital. These results suggest that by restricting off-balance sheet options, the potential effect of FIN 46 on firms' future cash flows outweighed any benefit from more transparent disclosures.

Supplementary Analysis

In untabulated analysis³³ consistent with the methodology in Table 5, we also considered whether different types of VIEs modify the effects documented here. First, we categorized *F46_on_books* VIEs as described in Panel B of Table 1 and performed univariate analysis of average implied cost of capital (*re_ave*) for *F46_on_books* firms by VIE type, compared to the *No_F46_Impact* and *F46_off_books* firms. Although multiple VIE firms had changes in *re_ave* similar to the *No_F46_Impact* firms, *F46_on_books* firms (categorized by VIE type) generally had significantly smaller decreases than firms not consolidating VIEs under the standard ($p < 0.05$). Next, in untabulated multivariate analysis we further examined the effect of VIE type on *re_ave*.

³³ The results discussed in this section are untabulated but are available upon request.

FIGURE 3
Quarterly Average Implied Cost of Capital (Mean-Adjusted) from 1998 to 2005 for FIN 46
Off-Books and On-Books Firms



This chart shows the average, quarterly mean-adjusted, implied cost of equity capital calculated quarterly over the period 1998 (quarter 3) to 2005 (quarter 4) for F46 firms according to the action taken with their VIEs post-FIN 46: keeping off books (*F46_off_books*) or bringing them onto books (*F46_on_books*). Quarterly mean values are based on all firms with available implied cost of equity capital measures for the quarter.

The *post46* interaction coefficients terms for both financial and other VIEs are significantly positive at the 1 percent level (coefficients of 0.013 and 0.025, respectively) and the other VIE interaction coefficient is the largest, but there are few firms in that group. Overall, these results suggest type of VIE does not materially affect the impact of FIN 46 on implied cost of capital.

We also examined an additional control sample of firms unaffected by FIN 46 (e.g., those firms making no disclosures about FIN 46 and reporting no likely SPVs within Exhibit 21). The majority of this sample of 2,296 firms (which we term *No_VIE* firms) did not file an Exhibit 21. These firms serve as an additional benchmark against which to evaluate our *F46* and *No_Impact_F46* groups. Across adoption of FIN 46, we found the decrease in *re_ave* for *No_VIE* firms to be significantly greater than the decrease for both *No_F46_Impact* and *F46* firms ($p < 0.01$, two-tailed test), and the decrease for *No_F46_Impact* firms was also significantly greater than that for *F46* firms ($p < 0.01$, two-tailed test). Untabulated multivariate analysis including this group yields stronger, but consistent results compared to those reported here.

Considering [Botosan and Plumlee \(2005\)](#), we also examined a cost of equity estimate based on Value Line forecasts ($r_{DIVPREM}$). This untabulated analysis finds very little difference across firm

TABLE 5

Analysis of Implied Cost of Capital Pre- and Post-FIN 46 According to the Action Taken with Reported VIEs (H2)

Panel A: Univariate Analysis of the Average Implied Cost of Capital Pre- and Post-FIN 46

Categories	Pre-FIN 46	n	Post-FIN 46	n	Change Pre-Post	Prob (Pre < > Post)	Prob (> <i>No_F46_Impact</i>)	Prob (> <i>F46_off_books</i>)
<i>No_F46_Impact</i>	0.100	3,903	0.089	5,109	-0.011	***		
<i>F46_off_books</i>	0.097	489	0.088	577	-0.009	***	ns	
<i>F46_on_books</i>	0.096	725	0.093	916	-0.003	ns	***	**
Total	0.099	5,117	0.090	6,602	-0.009	***		

, * Indicate significance at 5 percent and 1 percent levels, respectively.
ns indicates not significant.

Panel B: Multivariate Analysis of Implied Cost of Capital Pre- and Post-FIN 46

	Dependent Variables					
	Pred. Sign	<i>re_ave</i>	<i>re_ct</i>	<i>re_gls</i>	<i>re_peg</i>	<i>re_oj</i>
<i>post46</i>	+/-	-0.007 (7.02)***	-0.018 (15.64)***	-0.007 (5.79)***	0.006 (3.08)***	-0.011 (6.64)***
<i>F46_off_books</i>	+/-	-0.001 (0.42)	-0.001 (0.47)	-0.003 (1.03)	-0.001 (0.17)	0.000 (0.13)
<i>F46_on_books</i>	+/-	-0.003 (1.38)	-0.000 (0.16)	0.000 (0.10)	-0.010 (2.86)***	-0.001 (0.22)
<i>post46</i> × <i>F46_off_books</i>	+/-	0.002 (0.84)	0.004 (1.24)	0.006 (2.03)**	-0.001 (0.22)	-0.000 (0.01)
<i>post46</i> × <i>F46_on_books</i>	+/-	0.007 (3.04)***	0.008 (3.59)***	0.006 (2.51)**	0.008 (2.11)**	0.007 (1.67)*
<i>ubeta</i>	+	-0.003 (5.53)***	-0.006 (10.59)***	-0.003 (4.34)***	0.005 (4.09)***	-0.008 (9.86)***
<i>sd_ocf</i>	+	0.021 (2.44)**	0.024 (2.81)***	0.001 (0.17)	0.030 (1.95)*	0.029 (2.61)***
<i>sd_beta</i>	+	0.001 (0.14)	-0.002 (0.31)	0.010 (1.87)*	0.019 (2.30)**	-0.025 (3.70)***
<i>leverage</i>	+	0.014 (10.56)***	0.015 (10.53)***	0.016 (11.15)***	0.020 (7.79)***	0.006 (3.21)***
<i>oi_growth</i>	-	-0.002 (4.83)***	-0.002 (3.86)***	-0.003 (6.99)***	-0.000 (0.58)	-0.003 (4.53)***
<i>size</i>		-0.005 (14.94)***	-0.003 (8.86)***	-0.006 (15.24)***	-0.008 (14.86)***	-0.002 (3.71)***
Constant		0.128 (45.39)***	0.112 (37.97)***	0.136 (41.58)***	0.139 (28.32)***	0.125 (31.65)***
Observations		11,719	11,719	11,719	11,719	11,719
Adj R ²		0.27	0.31	0.28	0.18	0.09

*, **, *** Indicates significance at 10 percent, 5 percent, and 1 percent levels, respectively.
Robust standard errors adjusted for intrafirm correlation with clustered standard errors are in parentheses.

(continued on next page)

TABLE 5 (continued)

Panel A presents mean values for average implied cost of equity capital (re_ave) during the pre- and post-FIN 46 periods for firms reporting no material FIN 46 effect (No_F46_Impact) and for firms subject to FIN 46 ($F46$ firms) subdivided according to whether the firms kept the VIEs off their books ($F46_off_books$) or brought the VIEs onto their books ($F46_on_books$). The Prob(pre < > post) column indicates whether the change in re_ave is significantly different from zero, the Prob(> No_F46_Impact) column indicates whether the change in re_ave was significantly greater than the change for No_F46_Impact firms (one-tailed test), and Prob(> $F46_off_books$) column indicates whether the change in re_ave for $F46_on_books$ firms is significantly greater than the change for $F46_off_books$ firms (one-tailed tests correcting for intrafirm correlation with clustered standard errors).

Panel B presents OLS regressions testing H2 using the following model to compare firms' implied cost of capital between the pre-FIN 46 period (1998 Qtr 3 to 2001 Qtr 2) and the post-FIN 46 period (2003 Qtr 1 to 2005 Qtr 4), excluding observations from 2001 Qtr 3 to 2002 Qtr 4, according to the action taken by the firm with respect to the reported VIEs:

$$re = b_0 + b_1post46 + b_2F46.off.books + b_3F46.on.books + b_4post46 \times F46.off.books \\ + b_5post46 \times F46.on.books + b_6ubeta + b_7sd.ocf + b_8sd.beta + b_9leverage + b_{10}oi.growth + b_{11}size + \varepsilon.$$

Variable Definitions:

re = indicates one of the following three accounting-based measures of implied cost of capital:

re_ave = average of other four measures of implied cost of capital;

re_ct = implied cost of capital based on Claus and Thomas (2001);

re_gls = implied cost of capital based on Gebhardt et al. (2001);

re_peg = implied cost of capital based on the Easton (2004) PEG ratio;

re_oj = implied cost of capital based on Ohlson and Juettner-Nauroth (2005);

re values are winsorized 1 percent at the high end of the distribution to limit the influence of extreme observations;

$post46$ = 1 if calendar quarter is during 2003 Qtr 1 to 2005 Qtr 4, 0 if calendar quarter is during 1998 Qtr 3 to 2001 Qtr 2;

$F46_off_books$ = 1 if firm reported complying with FIN 46 but kept VIEs off their books, 0 otherwise;

$F46_on_books$ = 1 if firms reported complying with FIN 46 and consolidated or otherwise brought the VIEs onto their books, 0 otherwise;

$post46 \times F46_off_books$ = interaction term;

$post46 \times F46_on_books$ = interaction term;

$ubeta$ = unlevered beta based on single factor market model, winsorized 1 percent at each end of the distribution;

sd_ocf = standard deviation of operating cash flows over previous five years, log transformed;

sd_beta = standard deviation of beta values over previous year (proxy for beta volatility as suggested by results of Hughes et al. [2009]);

$leverage$ = long-term debt divided by market value of equity, winsorized 1 percent at each end of the distribution;

oi_growth = operating income this quarter divided by operating income in previous quarter, winsorized 1 percent at each end of the distribution; and

$size$ = log of market value of equity (\$ mm) at the end of the previous fiscal year.

type. However, Value Line documentation indicates that Value Line forecasts after 2003 are largely based on pre-FIN 46 data and, therefore, the $r_{DIVPREM}$ measure would reflect only changes due to FIN 46, if any, with substantial delay.³⁴

Additionally, we considered whether the impact of FIN 46 on debt ratios affected firms' cost of equity capital. We formed three portfolios for $F46$ firms based on debt ratios prior to FIN 46 and additional liabilities recorded due to consolidating VIEs. In untabulated results we found that firms with high debt ratios and the highest increase in liabilities from VIEs experienced a 220 basis point increase in average cost of equity capital (re_ave). This change was significantly greater than for firms in the other two categories, both of which experienced changes similar to the No_F46_Impact firms. Firms in the high debt category also had the lowest relative cost of equity capital pre-FIN 46.

³⁴ Specifically, the documentation says, "The 3–5 year average price is determined by applying a 'normalized' P/E ratio to projected 3–5 year earnings per share." Value Line estimates their EPS growth from the recent average growth rate ("The annual compounded growth rate using the average of the three latest base years.").

Finally, consistent with previously discussed theory and evidence, we also examined changes in cost of debt surrounding adoption of FIN 46. In untabulated multivariate analysis of credit ratings using Compustat S&P ratings and controls previously established in the literature (e.g., [Jorion et al. 2005](#); [Jiang 2008](#)), we find long-term issuer credit ratings did not significantly change after FIN 46, although we observe more downgrades for firms associated with VIEs.³⁵ Further, the results suggest *F46_on_books* firms had better credit ratings prior to FIN 46 than did *No_F46_Impact* and *F46_off_books* firms. Credit ratings in general deteriorated after FIN 46, significantly so for the *No_F46_Impact* and *F46_on_books* firms; however, in the multivariate analysis, we did not observe significant increases in cost of debt for either *F46_off_books* or *F46_on_books* firms.

VI. CONCLUSIONS

This study explores whether adoption of FASB Interpretation No. 46/R (FIN 46), *Consolidation of Variable Interest Entities—An Interpretation of ARB No. 51*, in 2003 changes the cost of equity capital for affected firms. Using comparative analysis on a broad sample of 11,719 firm-quarter observations for 1,389 firms during the period 1998 to 2005, we find evidence that FIN 46 significantly increased the cost of equity capital for firms with affected VIEs by an average of 50 basis points. Further, firms that consolidated these formerly off-balance sheet structures experienced the largest increase. Additional analysis finds that the type of VIE does not materially affect the impact of FIN 46 on implied cost of equity capital. Further, the cost of debt as proxied by debt credit ratings did not significantly change after FIN 46, although debt downgrades increased.

Consistent with warnings from some financial analysts that the changes initiated by FIN 46 could adversely affect loan covenants, credit ratings, and regulatory capital requirements, our results indicate firms with VIE structures were, in general, negatively affected by FIN 46. Taken together, these results suggest FIN 46 reduced the opportunity for firms to use off-balance sheet structures to reduce their cost of equity capital. Our findings imply the FASB's stated purpose in enacting FIN 46 was at least partially satisfied.

This study is subject to limitations. We tested the cost of capital implications of FIN 46 using a variety of *ex ante* measures of cost of equity capital, all widely used in prior research. We compared values for individual, as well as the average, *ex ante* measures of implied cost of equity capital for a three-year period pre-FIN 46 against a similar period post-FIN 46 for firms materially impacted by FIN 46 against those that were not. We recognize the ongoing debate about the validity of implied cost of equity capital measures, but our use of these measures is consistent with current academic literature and appropriate for understanding the impact of FIN 46, given the theoretical asset-pricing literature to date.

REFERENCES

- Amihud, Y., and H. Mendelson. 1986. Asset pricing and the bid-ask spread. *Journal of Financial Economics* 17 (2): 223–249.
- Ashbaugh-Skaife, H., D. Collins, W. Kinney, Jr., and R. LaFond. 2009. The effect of SOX internal control deficiencies on firm risk and cost of equity. *Journal of Accounting Research* 47 (1): 1–43.
- Barry, C., and S. Brown. 1985. Differential information and security market equilibrium. *Journal of Financial and Quantitative Analysis* 20 (4): 407–422.

³⁵ *F46_on_books* firms are likely to experience more downgrades than the *No_VIE* control firms in both the pre- and post-FIN 46 periods ($p < 0.01$, ordered probit with clustered standard errors). *F46_off_books* firms are likely to experience more downgrades in the post-FIN 46 period than the *No_VIE* control firms. Both *F46_on_books* and *F46_off_books* categories are likely to experience more downgrades post-FIN 46 than pre-FIN 46 ($p < 0.10$, ordered probit with clustered standard errors).

- Barth, M. E., G. Clinch, and T. Shibano. 2003. Market effects of recognition and disclosure. *Journal of Accounting Research* 41 (4): 581–609.
- Barth, M. E., and K. Schipper. 2008. Financial reporting transparency. *Journal of Accounting, Auditing, and Finance* 173–190.
- Bauman, M. 2003. The impact and valuation of off-balance-sheet activities concealed by equity method accounting. *Accounting Horizons* 17 (4): 303–314.
- Bens, D., and S. Monahan. 2008. Altering investment decisions to manage financial reporting outcomes: Asset-backed commercial paper conduits and FIN 46. *Journal of Accounting Research* 46 (5): 1017–1054.
- Berk, J. B. 1995. A critique of size-related anomalies. *The Review of Financial Studies* 8 (2): 275–286.
- Blundell-Wignall, A., P. Atkinson, and S. Lee. 2009. Dealing with the financial crisis and thinking about the exit strategy. *OECD Journal: Financial Market Trends* (1): 11–28.
- Botosan, C. 1997. Disclosure level and the cost of equity capital. *The Accounting Review* 72 (3): 323–349.
- Botosan, C., and M. Plumlee. 2002. A re-examination of disclosure level and the expected cost of equity capital. *Journal of Accounting Research* 40 (1): 21–40.
- Botosan, C., and M. Plumlee. 2005. Assessing alternative proxies for the expected risk premium. *The Accounting Review* 80 (1): 21–54.
- Botosan, C., M. Plumlee, and H. Wen. 2010. The relation between expected returns, realized returns, and firm risk characteristics. Working paper, The University of Utah.
- Chen, Z., D. S. Dhaliwal, and H. Xie. 2010. Regulation Fair Disclosure and the cost of equity capital. *Review of Accounting Studies* 15: 106–144.
- Claus, J., and J. Thomas. 2001. Equity premia as low as three percent? Evidence from analysts' earnings forecasts for domestic and international stock markets. *The Journal of Finance* LVI (5): 1629–1666.
- Credit Suisse. 2003. *FIN 46: New Rule Could Surprise Investors*. Boston, MA: Credit Suisse Equity Research.
- Daske, H. 2006. Economic benefits of adopting IFRS or US-GAAP—Have the expected costs of equity capital really decreased? *Journal of Business Finance and Accounting* 33 (3-4): 329–373.
- Dhaliwal, D., L. Krull, O. Li, and W. Moser. 2005. Dividend taxes and implied cost of equity capital. *Journal of Accounting Research* 43 (5): 675–708.
- Dhaliwal, D., L. Krull, O. Li, and W. Moser. 2007. Did the 2003 Tax Act reduce the cost of equity capital? *Journal of Accounting and Economics* 43: 121–150.
- Diamond, D., and R. Verrecchia. 1991. Disclosure, liquidity, and the cost of capital. *Journal of Finance* 46 (4): 1325–1359.
- Easley, D., and M. O'Hara. 2004. Information and the cost of capital. *The Journal of Finance* LIX (4): 1553–1583.
- Easton, P. 2004. PE ratios, PEG ratios, and estimating the implied expected rate of return on equity capital. *The Accounting Review* 79 (1): 73–95.
- Easton, P., and S. Monahan. 2005. An evaluation of accounting-based measures of expected returns. *The Accounting Review* 80 (2): 501–538.
- Easton, P., and S. Monahan. 2010. *Evaluating Accounting-Based Measures of Expected Returns: Easton and Monahan and Botosan and Plumlee Redux*. Working paper, University of Notre Dame and INSEAD.
- Fama, E., and K. French. 1996. Multifactor explanations of asset pricing anomalies. *The Journal of Finance* LI (1): 55–84.
- Fama, E., and K. French. 1997. Industry costs of equity. *Journal of Financial Economics* 43 (2): 153–193.
- Feltham, G., and J. Ohlson. 1995. Valuation and clean surplus accounting for operating and financial activities. *Contemporary Accounting Research* 11 (2): 689–732.
- Feng, M., J. Gramlich, and S. Gupta. 2009. Special purpose vehicles: Empirical evidence on determinants and earnings management. *The Accounting Review* 84 (6): 1833–1876.
- Financial Accounting Standards Board (FASB). 2003. *Consolidation of Variable Interest Entities, an Interpretation of ARB No. 51*. FASB Interpretation 46(R). Financial Accounting Series. Norwalk, CT: FASB.
- Francis, J., I. Khurana, and R. Pereira. 2005a. Disclosure incentives and effects on cost of capital around the world. *The Accounting Review* 80 (4): 1125–1162.

- Francis, J., R. LaFond, P. Olsson, and K. Schipper. 2005b. The market pricing of accruals quality. *Journal of Accounting and Economics* 39 (2): 295–327.
- Gebhardt, W., C. Lee, and B. Swaminathan. 2001. Toward an implied cost of capital. *Journal of Accounting Research* 39 (1): 135–176.
- Gode, D., and P. Mohanram. 2003. Inferring the cost of capital using the Ohlson-Juettner model. *Review of Accounting Studies* 8 (4): 399–431.
- Gow, I., G. Ormazabal, and D. Taylor. 2010. Correcting for cross-sectional and time-series dependence in accounting research. *The Accounting Review* 85 (2): 483–512.
- Guay, W., S. P. Kothari, and S. Shu. 2005. Properties of implied cost of capital using analysts' forecasts. MIT Sloan School of Management Working Paper 4422-03. Cambridge, MA: MIT.
- Hail, L., and C. Leuz. 2006. International differences in the cost of equity capital: Do legal institutions and securities regulation matter? *Journal of Accounting Research* 44 (3): 485–531.
- Hail, L., and C. Leuz. 2009. Cost of capital effects and changes in growth expectations around U.S. cross-listings. *Journal of Financial Economics* 93 (3): 428–454.
- Healy, P. M., and K. G. Palepu. 2001. Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature. *Journal of Accounting and Economics* 31: 405–440.
- Herz, B. 2008. *Lessons Learned, Relearned, and Relearned Again from the Credit Crisis—Accounting and Beyond*. Speech presented at structured finance forum, New York, NY, September 18. Available at: http://www.fasb.org/news/09-18-08_herz_speech.pdf
- Hribar, P., and N. T. Jenkins. 2004. The effect of accounting restatements on earnings revisions and the estimated cost of capital. *Review of Accounting Studies* 9 (2-3): 337–356.
- Hughes, J., J. Liu, and J. Liu. 2009. On the relations between expected returns and implied cost of capital. *Review of Accounting Studies* 14: 246–259.
- Jiang, J. 2008. Beating earnings benchmarks and the cost of debt. *The Accounting Review* 83 (2): 377–416.
- Jin, L., R. Merton, and Z. Bodie. 2006. Do a firm's equity returns reflect the risk of its pension plans? *Journal of Financial Economics* 81: 1–26.
- Jorion, P., Z. Liu, and C. Shi. 2005. Informational effects of Regulation FD: Evidence from rating agencies. *Journal of Financial Economics* 76: 309–330.
- Khurana, I. 1991. Security market effects associated with SFAS 94 concerning consolidation policy. *The Accounting Review* 66 (3): 611–621.
- Kothari, S. P., X. Li, and J. E. Short. 2009. The effect of disclosures by management, analysts, and business press on cost of capital, return volatility, and analyst forecasts: A study using content analysis. *The Accounting Review* 84 (5): 1639–1670.
- KPMG. 2003. From SPEs to VIEs. *Defining Issues* 3 (3): 1–6.
- Lambert, R., C. Leuz, and R. E. Verrecchia. 2007. Accounting information, disclosure, and the cost of capital. *Journal of Accounting Research* 45 (2): 385–420.
- Lewellen, J., and J. Shanken. 2002. Learning, asset-pricing tests, and market efficiency. *The Journal of Finance* LVII (3): 1113–1145.
- Li, S. 2010. Does mandatory adoption of international financial reporting standards in the European Union reduce the cost of equity capital? *The Accounting Review* 85 (2): 607–636.
- Livdan, D., H. Sapriza, and L. Zhang. 2009. Financially constrained stock returns. *The Journal of Finance* LXIV (4): 1827–1862.
- Maines, L. A., E. Bartov, A. L. Beatty, C. A. Botosan, P. M. Fairfield, D. E. Hirst, T. E. Iannaconi, R. Mallett, M. Venkatachalam, and L. Vincent. 2003. Comments on the FASB's proposals on consolidating special-purpose entities and related standard-setting issues. *Accounting Horizons* 17 (2): 161–173.
- Mills, L., and K. Newberry. 2005. Firms off-balance sheet and hybrid debt financing: Evidence from their book-tax reporting differences. *Journal of Accounting Research* 43 (2): 251–282.
- Ogneva, M., K. R. Subramanyam, and K. Raghunandan. 2007. Internal control weakness and cost of equity: Evidence from SOX Section 404 disclosures. *The Accounting Review* 82 (5): 1255–1297.
- Ohlson, J. 1995. Earnings, book values, and dividends in equity valuation. *Contemporary Accounting Research* 11 (2): 661–687.

- Ohlson, J., and B. Juettner-Nauroth. 2005. Expected EPS and EPS growth as determinants of value. *Review of Accounting Studies* 10: 349–365.
- Peterson, M. A. 2009. Estimating standard errors in finance panel data sets: Comparing approaches. *The Review of Financial Studies* 22 (1): 435–480.
- PricewaterhouseCoopers. 2004. *Analysis of FIN 46: A Guide through the Maze*. New York, NY: PricewaterhouseCoopers LLP.
- Reason, T. 2002. Reporting: See-through finance. *CFO Magazine* (October 1). Available at: http://www.cfo.com/article.cfm/3006578/c_3046581?f=insidecfo
- Reason, T. 2003. False security? *CFO Magazine* (June 2). Available at: <http://www.cfo.com/article.cfm/3009430>
- Wall Street Journal. 2003. Accounting board delays rule. (October 9).
- Zechman, S. L. 2010. The relation between voluntary disclosure and financial reporting: Evidence from synthetic leases. *Journal of Accounting Research* 48 (3): 725–765.

APPENDIX A

Exhibit 1: On-Books Financial VIE—Black Hills Corp (12/31/2003)

FIN 46-R

In January 2003, the FASB issued Interpretation No. 46, *Consolidation of Variable Interest Entities* (FIN 46). In December 2003, the FASB issued FIN No. 46 (Revised) (FIN 46-R) to address certain FIN 46 implementation issues. The Company's subsidiary, Black Hills Wyoming, has an agreement with Wygen Funding, Limited Partnership, an unrelated variable interest entity (VIE) to lease the Wygen plant. Under the new accounting interpretation, as amended, the Company consolidated the VIE effective December 31, 2003. The effect of consolidating the VIE into the Company's Consolidated Balance Sheet was an increase in total assets of \$129.0 million, of which \$121.5 million, net of accumulated depreciation of \$3.0 million, is included in Property, Plant, and Equipment and an increase in long-term debt in the amount of \$128.3 million. Prior to the December 31, 2003 consolidation, the Company recorded lease expense on the Wygen plant. Lease payments began upon completion of the plant in February 2003. During 2003, lease payments were \$2.7 million and are included in Operations and Maintenance on the accompanying 2003 Consolidated Statement of Income. The net effect of consolidating the income statement of the VIE on December 31, 2003 was to recognize a cumulative effect charge for \$2.5 million (net of \$1.4 million of income taxes), which represents the depreciation and interest expense that would have been recorded had the VIE been consolidated at inception. The net effect on future results will be to recognize depreciation and interest expense in place of recognizing lease expense, which is estimated to have an approximate \$3.0 million negative annual effect to after-tax net income.

Exhibit 2: On-Books Operational VIE—Cisco Systems, Inc. (07/31/2004)

Acquisition of Andiamo Systems, Inc.

In April 2001, the Company entered into a commitment to provide convertible debt funding of approximately \$84 million to Andiamo, a privately held storage switch developer. This debt was convertible into approximately 44 percent of the equity of Andiamo. In connection with this investment, the Company obtained a call option that provided the Company the right to purchase Andiamo. The purchase price under the call option was based on a valuation of Andiamo using a negotiated formula. On August 19, 2002, the Company entered into a definitive agreement to

acquire Andiamo, which represented the exercise of its rights under the call option. The Company also entered into a commitment to provide nonconvertible debt funding to Andiamo of approximately \$100 million through the close of the acquisition. Substantially all of the convertible debt funding of \$84 million and nonconvertible debt funding of \$100 million has been expensed as research and development costs.

The Company adopted FIN 46(R) effective January 24, 2004. The Company evaluated its debt investment in Andiamo and determined that Andiamo was a variable interest entity under FIN 46(R). The Company concluded that the Company was the primary beneficiary as defined by FIN 46(R) and, therefore, accounted for Andiamo as if the Company had consolidated Andiamo since the Company's initial investment in April 2001. The consolidation of Andiamo from the date of the Company's initial investment required accounting for the call option as a repurchase right. Under FASB Interpretation No. 44, *Accounting for Certain Transactions Involving Stock Compensation*, and related interpretations, variable accounting was required for substantially all Andiamo employee stock and options because the ending purchase price was primarily derived from a revenue-based formula.

Effective January 24, 2004, the last day of the second quarter of fiscal 2004, the Company recorded a noncash cumulative stock compensation charge of \$567 million, net of tax (representing the amount of variable compensation from April 2001 through January 2004). This charge was reported as a separate line item in the Consolidated Statements of Operations as a cumulative effect of accounting change, net of tax. The charge was based on the value of the Andiamo employee stock and options and their vesting from the adoption of FIN 46(R) pursuant to the formula-based valuation.

On February 19, 2004, the Company completed the acquisition of Andiamo, exchanging approximately 23 million shares of the Company's common stock for Andiamo shares not owned by the Company and assuming approximately 6 million stock options, for a total estimated value of \$750 million, primarily derived from the revenue-based formula, which after stock-price-related adjustments resulted in a total amount recorded of \$722 million, as summarized in the table below.

Subsequent to the adoption of FIN 46(R), changes to the value of Andiamo and the continued vesting of the employee stock and options resulted in an adjustment to the noncash stock compensation charge. The Company recorded a noncash variable stock compensation adjustment of \$58 million in the third quarter of fiscal 2004 to the cumulative stock compensation charge recorded in the second quarter of fiscal 2004 to account for the additional vesting of the Andiamo employee stock and options and changes in the formula-based valuation from January 24, 2004 until February 19, 2004. This noncash adjustment was reported as operating expense in the Consolidated Statements of Operations, as amortization of deferred stock-based compensation in the Consolidated Statements of Cash Flows, and as an increase to additional paid-in capital in the Consolidated Statements of Shareholders' Equity. In addition, upon completion of the acquisition, deferred stock-based compensation of \$90 million was recorded in the Consolidated Balance Sheets to reflect the unvested portion of the formula-based valuation of the Andiamo employee stock and options. The amount of deferred stock-based compensation was fixed at the date of acquisition and will be amortized over the remaining vesting period of Andiamo employee stock and options of approximately two years.

A summary of the accounting of the consolidation under FIN 46(R) and the subsequent purchase of Andiamo, after stock price related adjustments, is as follows (in millions):

	<u>Amount</u>
Cumulative effect of accounting change, net of tax benefit of	\$567
Variable stock-based compensation	58
Deferred stock-based compensation	90
Net assets	<u>7</u>
Total	\$722

Exhibit 3: Both On-Books and Off-Books Other VIE—Aetna, Inc. (12/31/2003)

Accounting for Variable Interest Entities (“VIE”)

In January 2003, the FASB issued Interpretation No. 46, *Consolidation of Variable Interest Entities* (FIN 46). This interpretation requires the Company to consolidate a VIE if the entity meets certain criteria and the Company is considered the primary beneficiary of the VIE (such as where the Company has a direct or indirect ability to make significant decisions for the entity or the obligation to absorb a majority of the entity’s expected losses or gains). FIN 46 also requires additional disclosure of the Company’s relationship with a VIE regardless of whether the Company is the primary beneficiary.

In December 2003, the FASB issued a revision to Interpretation No. 46, *Consolidation of Variable Interest Entities* (FIN 46-R). FIN 46-R amended certain provisions of FIN 46 and delayed implementation for entities that are not considered special purpose entities until the first quarter of 2004. As of December 31, 2003, the Company has no investments that are considered special purpose entities.

The Company does not have any material relationships with VIEs that would require consolidation. The Company does have relationships with certain real estate partnerships that are considered VIEs. However, the Company would not be considered the primary beneficiary. The Company records the amount of its investment in these partnerships as an asset on its Consolidated Balance Sheet and recognizes its share of partnership income or losses in earnings. The Company’s maximum exposure to loss as a result of its investment in these partnerships is its investment balance at December 31, 2003 of approximately \$125 million and the risk of recapture of tax credits previously recognized, which the Company does not believe is significant. The partnerships construct, own, and manage low-income housing developments and had total assets of approximately \$1.3 billion as of December 31, 2003.

Effective September 15, 2003, the Company’s leasing program with an independent third party grantor trust (primarily for the lease of a corporate aircraft and certain office furniture), accounted for as an operating lease under previous accounting standards, was terminated, and the Company purchased those assets for cash. The Company would have been required to consolidate this grantor trust in accordance with the requirements of FIN 46.

APPENDIX B

Easton (2004) *re_peg* Measure

Easton (2004) develops a proxy for the cost of equity capital implied by the price-earnings-growth ratio (*re_peg*):

$$re_peg = \sqrt{((eps_2 - eps_1)/price_0)}. \quad (1)$$

In Equation (1) eps_1 and eps_2 are the last mean earnings per share forecasts in the calendar quarter for fiscal years $t+1$ and $t+2$, respectively, and $price_0$ equals the market price at the end of the calendar quarter. The *re_peg* measure requires earnings growth to be positive. For the *re_peg* measure, we follow Francis et al. (2005a) and Botosan and Plumlee (2005) in assuming zero dividends per share.³⁶

³⁶ We also calculated a version of the *re_peg* measure including dividends and found similar results in all analyses.

Ohlson and Juettner-Nauroth (2005) *re_oj* Measure

Our second proxy for the cost of equity capital was developed by Ohlson and Juettner-Nauroth (2005) and examined by Gode and Mohanram (2003):

$$re_{oj} = A + \sqrt{A^2 + (eps_1/price_0)(g_2 - (\gamma - 1))}. \quad (2)$$

Again, eps_1 equals analyst forecasts of earnings per share for the following fiscal year, $price_0$ is the final price for the current calendar quarter, g_2 is the earnings growth percentage $((eps_2 - eps_1)/eps_1)$, and $\gamma - 1$ is long-term growth rate set to the risk-free rate less 3 percent (Hribar and Jenkins 2004), and A equals:

$$A = \left(\frac{1}{2}\right)((\gamma - 1) + dps_1/price_0), \quad (3)$$

where dps_1 is the dividends per share for the following year assumed to continue at the same level as in the current year. We use ten-year U.S. Treasury bond rates as the risk-free rate (e.g., Hribar and Jenkins 2004; Dhaliwal et al. 2005). The long-term growth rate, $\gamma - 1$, sets a lower bound on the *re_oj* measure.

Gebhardt et al. (2001) *re_gls* Measure

Our third cost of equity capital measure is based on Gebhardt et al. (2001). They use a version of the residual income valuation model (Ohlson 1995; Feltham and Ohlson 1995) to derive their proxy for the cost of equity capital:

$$P_t = B_t + \frac{FROE_{t+1} - r_e}{(1 + r_e)} B_t + \frac{FROE_{t+2} - r_e}{(1 + r_e)^2} B_{t+1} + TV, \quad (4)$$

where P_t equals the market price at the end of calendar quarter, B_t equals the book value per share at the beginning of the quarter, r_e equals the cost of equity capital, $FROE$ equals the forecasted return on equity (forecasted eps_{t+i}/B_{t+i-1} for the $t+i$ period), and TV is a terminal value estimate calculated as follows:

$$TV = \sum_{i=3}^{T-1} \frac{FROE_{t+i} - r_e}{(1 + r_e)^i} B_{t+i-1} + \frac{FROE_{t+T} - r_e}{(1 + r_e)^{T-1}} B_{t+T-1}. \quad (5)$$

In Equations (4) and (5), we calculate $FROE_{t+3}$ by multiplying forecast eps_{t+2} by 1 plus the I/B/E/S long-term growth rate forecast.³⁷ We set $T = 12$ in Equation (5) and calculated the terminal value assuming that ROE linearly reverts to the industry median ROE over periods 4 to 12.³⁸ We calculate the industry median ROE using ten-year averages for Fama and French's (1997) 48 industry classifications, excluding loss firms from the calculation (Dhaliwal et al. 2005).³⁹ Assuming clean surplus accounting, we calculate $B_{t+1} = B_{t+1-1} + (1 - \text{payout ratio}) \times eps_{t+1}$, where *payout ratio* equals current dividends per share divided by current earnings per share.⁴⁰ In cases where the

³⁷ We constrained the maximum long-term growth rate to less than or equal to 50 percent, since long-term growth rates exceeding 50 percent are highly unlikely.

³⁸ We winsorized future ROE values at 1 percent on the high end of the distribution to limit the influence of untenable rates for forecast return on equity and also constrained ROE to be greater than zero.

³⁹ We also estimated *re_gls* values without removing loss firms from the calculation. The implied cost of equity capital measures was lower on average but the overall results were unaffected.

⁴⁰ We constrained the payout ratio to less than or equal to 1.

earnings per share are negative, we calculate the payout ratio as current dividends divided by 6 percent of total assets (Hribar and Jenkins 2004; Dhaliwal et al. 2005, 2007).⁴¹

Claus and Thomas (2001) *re_ct* Measure

Claus and Thomas (2001) base their cost of equity capital measure on an alternate form of the residual income valuation model. In particular, they assume that abnormal earnings grow at a constant rate beyond the fifth year, in contrast to reverting to the industry median for the *re_gls* measure:

$$P_t = B_t + \frac{AE_{t+1}}{(1+r_e)} + \frac{AE_{t+2}}{(1+r_e)^2} + \frac{AE_{t+3}}{(1+r_e)^3} + \frac{AE_{t+4}}{(1+r_e)^4} + \frac{AE_{t+5}}{(1+r_e)^5} + \frac{AE_{t+5}(1+g_{ae})}{(r_e - g_{ae})(1+r_e)^5}, \quad (7)$$

where AE_{t+i} equals expected abnormal earnings for year $t+i$ calculated as forecasted $eps_{t+i} - r_e(B_{t+i-1})$, and g_{ae} is the growth rate on abnormal earnings equal to the yield on ten-year Treasury bonds (Hribar and Jenkins 2004; Dhaliwal et al. 2005, 2007). We estimate AE_{t+3} to AE_{t+5} by multiplying the prior-year forecast by the long-term growth forecast.⁴² Again, we estimate B_{t+i} assuming clean surplus accounting and constant payout ratios as with the *re_gls* measure.⁴³

⁴¹ We calculated the implied cost of capital iteratively beginning with a value for r_e of 0.0001 and incrementing that value by 0.0001 until the calculated price is within 1 percent of the actual price. See Guay et al. (2005) for issues with respect to selecting the appropriate market price and adjusting the price for changes in shares outstanding.

⁴² Again, where an I/B/E/S long-term growth rate was not available, we used $(eps_2 - eps_1)/eps_1$, and we constrained the maximum long-term growth rate to less than or equal to 50 percent, since long-term growth rates exceeding 50 percent are highly unlikely. I/B/E/S long-term growth rate estimates are not available for approximately 10 percent of the sample.

⁴³ For both the *re_gls* and *re_ct* measures, we calculate the implied cost of capital iteratively beginning with a value of 0.0001 and incrementing that value by 0.0001 until the calculated price is within 1 percent of the actual price. For the *re_ct* measure, the long-term growth in abnormal earnings, g_{ae} , presents a lower bound on the cost of equity capital.