

Does Derivative Accounting Affect Risk Management? International Survey Evidence

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October 27, 2009

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Abstract

This paper uses worldwide survey evidence to study the effect of derivative accounting standards on firms' risk management activities. More than 40% of the companies indicate that their risk management policies have been affected by the new standards. Their ability to hedge from an economic perspective has been compromised, but so have their speculative activities. Firms are more affected by the new standards if they operate in an environment where they are more likely to write contracts based on accounting numbers, attach greater importance to the reduction in earnings volatility as a benefit of risk management, and are more inclined to take active positions. We also document a substantial decrease in foreign exchange hedging and in the use of non-linear hedging instruments. This evidence indicates that the impact of the new standards has been mixed, and has not affected all firms equally.

Keywords: derivative accounting, risk management, speculation, regulation

JEL Classifications: G32, M41

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1. Introduction

One of the most important changes in worldwide accounting regulation over recent years has been the introduction of new standards for financial reporting of derivative securities, known in the U.S. as SFAS 133 and internationally as IAS 39. These standards require firms to report all derivatives at fair values in the financial statements, with any changes in value recorded in either the income statement or an equity account (other comprehensive income). As a result, these standards have the potential to increase the volatility of both reported earnings and stockholders' equity.

The implementation of these derivative accounting standards has been met with protest and controversy, centered around two issues. First, the standards are complicated to implement. In fact, SFAS 133 is the only standard for which the FASB created an implementation group, the Derivatives Implementation Group (DIG), to address implementation questions raised by companies. The difficulty in implementing these standards has also been acknowledged by the International Accounting Standard Board (IASB), which is currently revising IAS 39 in an attempt to reduce its complexity.¹ Second, when the standards were proposed, many companies argued against the standards because their implementation would lead to increased earnings and/or balance sheet volatility.

¹ On March 19, 2008, the IASB published for public comment a discussion paper "Reducing the Complexity in Reporting Financial Instruments". The IASB notes that "The existing requirements for the reporting of financial instruments are widely regarded as difficult to understand, interpret and apply and constituents have urged the IASB to develop standards that are principle-based and less complex. The document is the first stage in a project which aims to replace IAS 39 Financial Instruments: Recognition and Measurement". In his comment on this proposal (Financial Times, March 20, 2008), the current chairman of the IASB, David Tweedie, wrote that "IAS 39 ... has become a by-word for being well-nigh incomprehensible".

Revsine, Collins and Johnson (2002) suggest that "...this may force managers to choose between achieving sound economic results – meaning hedges that effectively address real financial risks – or minimizing accounting volatility using risk management approaches that are less efficient or simply not prudent (p 545).”^{2,3}

While a large number of firms registered their concerns through comment letters and other means, what we do not know is the extent to which firms have actually changed their hedging policies as a result of the new standards. It is quite possible that firms complained about the standards, but eventually learned to live with them, and did not materially change their policies. Alternatively, it is possible that legitimate economic hedging strategies, or speculative activities, or both, have been affected.

The objective of our study is to gain a better understanding of the real effects of these new derivative accounting standards. In particular, we explore whether the new standards have affected the hedging policies of companies, and, if so, which types of companies and activities have been affected the most. To address these questions, we analyze the responses to a worldwide CFO survey on corporate financial and risk management policies conducted in 2005. Three hundred and thirty four companies from 39 countries participated in the survey. Several items in the survey addressed elements of risk management and, in particular, the effect of the new accounting standards on risk management policies. We focus on the responses to these questions.

² As an example, Revsine, Collins, and Johnson (2002) quote a Wall Street Journal article by McKay and Niedzielski (2000): “In a letter to the FASB, Al Wargo of Eastman Chemical said that hedge accounting could cause his company’s quarterly earnings per share (EPS) to fluctuate roughly 100% in either direction ... The only way Eastman can eliminate this EPS volatility is to change how it hedges financial risk. But this means replacing sound economic hedging transactions with a less effective hedge. EPS would then be less volatile, but the company may be more exposed to financial risk.”

³ A similar concern was raised by the former Chairman of the Federal Reserve Board, Alan Greenspan, who wrote a comment letter to the FASB indicating: “The proposal may discourage prudent risk management activities and in some cases could present misleading financial information.”

There are several advantages to using survey data rather than archival data to address our research questions. First, it is difficult to determine using archival data whether a firm's hedging policies have actually changed as a result of the new accounting standards - many derivative positions were unrecorded prior to the introduction of the standards and confounding events may have prompted managers to change their risk management practices. The survey asks questions relating to the standards and risk management, which allows us to directly assess causality between changes in reporting standards and changes in risk management practices. Second, financial reporting may have no effect on hedging policies but may affect firms' active positions (speculative activities). To assess the impact of the new standards on hedging it is therefore crucial to separate "hedgers" from "speculators". Geczy, Minton, and Schrand (2007) show that identifying speculators using non-survey data is problematic. The survey used in this paper overcomes this problem by directly asking firms about their active (speculative) positions (as in Geczy, Minton, and Schrand (2007)). Finally, our survey approach also allows us to assess changes in the risk management policies of private companies whose financial statements are not available in many countries.⁴

Many interesting results emerge from our analyses. First, 40% of the companies that actively engage in some form of risk management report that at least some of their risk management policies have been materially affected by the introduction of the new accounting standards. Second, a large fraction of the affected firms feel that their ability to hedge from

⁴ An alternative approach would be to study the firms that sent comment letters to the FASB and IASB, but this approach is not without shortcomings. First, it would lead to a biased sample. Firms are more likely to voice concerns about new standards if they believe they will be adversely affected by them (even if this turns out not to be the case). Second, firms may criticize proposed standards simply because they have to change their accounting procedures and not because they lead to policy changes. Third, based on comment letters, it is not possible to differentiate between speculators and hedgers. Finally, comment letters are based on what firms expect to happen, not on actual outcomes.

an economic perspective has been compromised. However, we also find that firms are more likely to be affected if they take active (speculative) positions. Third, firms have substantially reduced the use of non-linear instruments in risk management, while the use of linear instruments has been less affected. Fourth, the extent to which firms indicate that their policies are affected by the new standards depends on country and firm characteristics. Firms are more likely to be affected: (a) if the intensity of disclosure of financial information is higher in the country in which they are incorporated, (b) if it is easier to prove wrongdoing on the part of accountants, and (c) if they are listed on a stock exchange. These firms are more likely to use financial statement numbers for contracting purposes. We also find that more affected firms consider the reduction of earnings volatility to be an important benefit of risk management and have less sophisticated shareholders. Fifth, firms that are materially affected by the new standards believe that qualifying for hedge accounting is very important, and this is especially the case for large firms, publicly traded firms, and firms that believe that the reduction of earnings volatility is an important benefit of risk management.

Overall, our findings indicate that the new standards curtailed speculative activities. However, sound economic hedging practices have also been adversely affected. If firms were hedging optimally to begin with, the fact that the new standards affected their risk management policies implies a perceived reduction in value. Whether this reduces overall welfare depends on the trade-off between the loss in economic benefits of hedging and the gains from curtailing speculation.⁵ However, given that speculation does not appear to be

⁵ Articles on the economic benefits of hedging include Smith and Stulz (1985), DeMarzo and Duffie (1991), Froot, Scharfstein, and Stein (1993), Graham and Smith (1999), Brown (2001), and Graham and Rogers (2002).

very prevalent (50% of our sample firms admit to taking active positions, but most do so infrequently)⁶, the costs are likely to outweigh the benefits.

This paper contributes to the literature on derivative accounting by assessing the economic consequences of the new standards. Unlike other studies [e.g., Zhang (2008)], we provide direct measures of the impact of the new standards on firms' risk management activities and show that, in addition to speculative activities, hedging strategies have also been compromised. We therefore believe that Zhang's conclusion that SFAS133 has encouraged firms to engage in more prudent risk management activities and has not affected firms that employ derivatives to hedge is premature.

Our paper also contributes to the literature on the effect of changes in accounting standards on firms' economic behavior. The empirical evidence on this area is scarce (see Beatty (2007) for an overview), but is generally consistent with accounting changes leading to changes in firms' operating and financing decisions. Our study documents another setting in which accounting standards affect firms' policies and shows that the effect of regulation varies with the demand for accounting, and the level of accounting transparency and enforcement. Beatty (2007) argues that our understanding of the economic incentives that give rise to changes in firms' economic behavior is limited. The cross-sectional analyses in this paper provide a starting point for understanding these economic incentives (e.g., contracting, investor sophistication, enforcement).

The remainder of this paper is organized as follows. The next section provides a brief background on the new standards. Section 3 reviews the related literature and develops the

⁶ Geczy, Minton, and Schrand (2007) report similar percentages of speculators and show that those firms that speculate do not take large positions.

hypotheses. Section 4 introduces the survey and provides summary statistics. Section 5 contains the empirical results and Section 6 concludes.

2. Background on Derivative Accounting

Developing consistent and complete accounting standards for derivative instruments has been an important and long-awaited item on the agenda of regulators and standard setters. Their main concern was that under historical cost accounting many derivatives remained unrecorded in the financial statements until maturity because they have negligible or zero historical costs. Both SFAS 133 “*Accounting for Derivative Instruments and Hedging Activities*” issued in 1998, and IAS 39 “*Financial Instruments: Recognition and Measurement*” issued in 1998 and thoroughly revised in 2003, prescribe fair value accounting for derivatives.⁷ As such, derivatives must be reported at fair values in the financial statements, with any changes in value recorded in either the income statement or an equity account (other comprehensive income).⁸

These new accounting standards therefore have the potential to increase the volatility of reported earnings and stockholders’ equity. The extent to which this happens depends on whether the derivative position qualifies for so-called “hedge accounting”. Under hedge accounting, if the derivative is fully effective as a hedge there is no effect on net income;

⁷ Although IAS 39 became effective on January 1, 2001, most EU firms did not adopt it until January 1, 2005, when IAS/IFRS (International Financial Reporting Standards) became *mandatory* for all firms listed on stock exchanges of EU member states. The IAS/IFRS requirement for unlisted companies varies across EU members – while in some countries it is required, it is permitted in some others. However, most large private firms report under IAS/IFRS. Further details on worldwide adoption of IAS/IFRS can be found in <http://www.iasplus.com/country/useias.htm>.

⁸ The main provisions, common to both SFAS 133 and IAS 39, are: (i) All derivatives must be reported at fair values in the financial statements; (ii) Changes in the market value of derivatives not designated as hedging instruments (speculative or trading hedges) must be recognized in net income; (iii) Changes in the market value of derivatives used to hedge risk exposures (i.e., designated hedges) are recorded in net income or an equity account (other comprehensive income); (iv) Changes in the market values of the hedged item must also be recognized in net income; and (v) When a derivative is not fully effective as a hedge, the inefficient portion of changes in the derivative’s market value must be included in net income.

changes in the value of the derivative either (i) bypass the income statement and are reported in other comprehensive income (for cash flow hedges) or (ii) are reported in net income but are perfectly offset by the changes in the value of the underlying exposure (for fair value hedges).⁹ If the hedge is not fully effective, however, net income is affected because the ineffective portion of the derivative gain or loss must be included in net income. To achieve hedge accounting status, firms have to show that the derivative is designed to offset an underlying economic exposure, and that the hedge is highly effective, which implies that the value of the hedging instrument and the underlying exposure move closely together.

Many firms, however, employ economically effective hedging strategies which are designed such that the derivative instrument's value and the underlying exposure do not always move closely together. Additionally, even a derivative usage strategy designed to do so will have some uncertainty as to whether an auditor will deem that it qualifies for hedge accounting. Absent hedge accounting status, the entire change in the value of the derivative flows through the income statement.

The academic literature assessing the economic effect of fair value reporting on firms' risk management and speculative activities is inconclusive. While Melumad, Weyns, and Ziv (1999) argue that fair value recognition of derivatives makes the use of derivatives more transparent and encourages prudent risk management, DeMarzo and Duffie (1995), Sapra (2002) and Sapra and Shin (2008) show theoretically that more transparency may distort firms' hedging decisions.

Only a few papers study the economic effect of the standards empirically. Singh (2004) finds no changes in earnings or cash flow volatilities or the notional amount of

⁹ Cash flow hedges are intended to mitigate the volatility of future cash flows while fair value hedges are intended to mitigate changes in the fair value of recognized assets or liabilities.

derivatives after the adoption of SFAS 133. In contrast, Zhang (2009) finds that the volatility of cash flows for “speculators” (defined as a new derivative user whose risk exposures do not decrease after the initiation of a derivatives program) decreases after the introduction of SFAS 133. She interprets this result as evidence that the new standards have reduced speculation and led to more prudent risk management activities.

The conclusions in Zhang (2009), however, should be interpreted with caution since it is not possible using archival data to determine with much confidence whether a firm uses derivatives to hedge or to speculate (see Geczy, Minton, and Schrand (2007)). In fact, it is quite possible that firms experience an increase in their risk exposures after the initiation of a derivatives program even if they are using derivatives to hedge. This will be the case if firms start a program to hedge anticipated exposures (which they did not face previously) and the hedging program does not perfectly remove underlying risk. The resulting risk profile will increase, but it will be lower than what it would have been had the firm not hedged at all. For example, a firm that starts selling its products abroad for the first time may start hedging its foreign exchange exposure, but, because it is impossible to fully anticipate all foreign sales, it is likely that the exposure to foreign exchange risk increases (from zero or a low level). Labelling firms with an increased exposure after initiating derivatives as speculators or ineffective hedgers is therefore imprecise and can lead to wrong conclusions. In addition, such an approach removes most large companies with longstanding hedging programs from the analyses, thereby making it difficult to generalize the results.

3. Development of Hypotheses

3.1. Which firms are affected by the new standards?

As mentioned previously, the introduction of the new standards has been met with protest and controversy, mainly due to two issues. First, the standards impose direct costs because they are complicated to implement.¹⁰ Second, many companies argue that there are indirect costs as well. This latter argument focuses almost exclusively on the economic consequences of increased earnings and/or balance sheet volatility. While the direct costs are clearly important, the potential impact of indirect costs is more nuanced and is likely to vary widely across firms.

We predict that firms are more likely to be affected by the new standards *if they are more prone to write contracts on accounting numbers*.¹¹ Prior studies have identified several factors that affect the extent to which accounting numbers are used for contracting purposes; we expect these factors to also determine whether a company is affected by the new standards for derivatives. Some of these factors are firm-specific while others are country-specific.

The most relevant firm-specific factors are their public vs. private status and their size. Ball and Shivakumar (2005), for example, argue that the demand for public financial information is greater for public firms than private firms. In private companies, shareholders take a more active role in management than in public companies, which reduces their reliance on financial statements to monitor managers. In contrast, in public companies accounting information is often used to monitor managers [see also Ke, Petroni, and

¹⁰ Some indication of the complexity of implementing the standard is provided by the number of restatements due to improper use of hedge accounting. In 2005, a total of 57 US firms restated their accounts because some aspects of hedge accounting had not been properly applied. Among them is General Electric, which claims to have 40 people working full-time to ensure the adequacy of its hedge accounting [CFO Magazine (2006)].

¹¹ We refer to firms whose risk management policies are affected as “affected firms.”

Safieddine (1999)]. Similar arguments apply to firm size. Lang and Lundholm (1993), for example, argue that larger firms have a greater demand for information about them and thus produce greater information compared to smaller firms. Bushman, Piotroski, and Smith (2004) take this premise to international data and find that firm size is an important variable for financial transparency across a wide range of countries. Thus, we expect larger and public firms to be more affected by the new standards.¹²

As mentioned above, country specific factors are also likely to affect the extent to which a firm is affected by the new standards. Higher financial reporting quality is associated with country-level institutional parameters such as disclosure levels, the enforcement of securities laws, and overall investor protection (see, for example, Leuz, Nanda, and Wysocki (2003), and Bushman and Piotroski (2006)). Further, across countries, Ball, Robin, and Wu (2003) argue that even if companies have similar accounting standards (such as IAS), financial reporting quality will still be affected by incentives of managers and auditors, and these are likely to be determined by the institutions present in a country. Thus, we expect the effect of the new financial reporting standards to be larger for firms operating in countries with better reporting quality and better enforcement.

We also predict that firms that *perceive earnings stabilization to be a major benefit of engaging in risk management* to be more affected by the new standards. Such firms fall in three non-mutually exclusive groups: (a) firms that have written contracts based on earnings (as discussed previously); (b) firms whose investors rely on earnings measures to assess economic performance; (c) firms that care about earnings volatility for other reasons. We now elaborate on groups (b) and (c).

¹² If the direct costs associated with implementation of the new standards outweigh the indirect costs, we may find that large firms are less affected.

Increased earnings volatility may impact the way investors form opinions about a firm's value in a setting with less than perfect information. Barry and Brown (1985) suggest that the cost of capital is a function of "estimation risk" and the better investors are able to assess the prospects of a company, the lower is its expected cost of capital. This argument suggests that disclosing more information by marking hedges to market is actually a good thing, because it would reduce estimation risk. However, if investors are not sophisticated and rely on reported earnings to estimate underlying economic performance, then their assessments of performance could be impaired when derivatives are marked to market and the change in value is recorded in the income statement.

The lack of investor sophistication is not a necessary ingredient to make investors worse off when derivatives positions are disclosed. DeMarzo and Duffie (1995) show theoretically that if hedges are not disclosed in detail, managers may be more willing to hedge. If investors use profits to infer managerial quality and determine compensation, reporting gains/losses from hedges separately makes profits more informative; however, this increases the volatility of managerial compensation, which is to the detriment of risk averse managers. They may therefore decide not to hedge at all.

Research also shows that the stock market rewards firms with increasing earnings patterns [Barth, Elliott, and Finn (1999)], which provides an incentive for managers to shy away from volatile earnings paths [DeFond and Park (1997)]. Graham, Harvey, and Rajgopal (2005) survey US and Canadian firms and report that 96.9% of CFOs surveyed prefer a smooth earnings path and that 78% of CFOs would sacrifice a small, moderate, or large amount of value to achieve a smoother earnings path. Given this aggregate body of work regarding smooth earnings, it is not surprising that managers who may not be opposed

to disclosing their derivative positions per se will be opposed to standards under which such a disclosure causes increased earnings volatility.

Finally, we predict that firms that take *active positions* (entering into a derivative contract without underlying exposure) are also more affected by the new standards. If managers use derivatives to express a view on future price movements instead of hedging underlying exposures, it is likely that fair value reporting will shed more light on these activities. Geczy, Minton, and Schrand (2007) use survey evidence to show that forty percent of US firms that use derivatives took an active position based on their market view of interest or exchange rates at least once, and seven percent did so frequently. They conclude that managers are not taking extreme bets with such active positions, however. We ask a similar question in our survey and, as we document later, close to 50% of our respondents report using derivatives so that they can actively take a market view on underlying economic variables at least some of the time.¹³ We expect such firms to be more affected by the new standards.

3.2. *Which types of hedges and instruments have been affected?*

As discussed previously, derivative positions only qualify for hedge accounting if the hedges are deemed to be highly effective. This requirement may exclude some common hedging strategies. Brown and Toft (2002) show that it is often optimal for a firm to hedge using derivative strategies that feature non-linear payoffs. Such strategies usually involve basic or exotic option contracts. While it is possible to specify a risk exposure as one-sided, it may be more difficult to show that the price of the option is sufficiently correlated with the

¹³ Using archival data and indirect methods to determine whether a firm hedges/speculates with derivatives, Guay (1999) shows that most firms use derivatives to hedge.

price of the underlying exposure so that the derivative position qualifies for hedge accounting. Thus, *we expect a reduction in the use of non-linear contracts after the adoption of the new standards.*

In terms of types of hedges, option contracts are much more suitable to hedge anticipated transactions, because they allow the owner of the option to walk away if the transaction does not happen. *We therefore expect hedges of anticipated transactions to decline.* Linear contracts are also less likely to qualify for hedge accounting if there is uncertainty about the quantity being hedged (for example, it is difficult to predict the level of foreign profits before the fiscal year-end). *We also expect such hedges to decline.*

Finally, to obtain hedge accounting, firms need to identify specific cash flows or securities that are being hedged. If firms hedge their economic exposure by netting off a number of exposures and/or by taking into account indirect exposures (e.g., import competition), such hedges will not qualify for hedge accounting. We therefore expect a reduction in these types of hedges as well.

3.3. *Which firms are more concerned about achieving hedge accounting?*

We also study whether qualifying for hedge accounting is important for firms when they consider risk management alternatives. We believe that the factors that determine whether a firm is affected by the new standards also determine whether firms are concerned about achieving hedge accounting, except for a firm's tendency to take active positions. Hence, we expect firms that are more likely to write earnings-based contracts, firms that care about earnings volatility per se, and firms with relatively unsophisticated investors to be more interested in getting hedge accounting treatment for derivatives.

4. Survey Design and Sample

Our data come from a CFO survey conducted in the summer of 2005 covering publicly traded and privately owned firms (see the Appendix for further details). The survey instrument was sent to approximately 4,000 non-financial firms in 48 countries and 354 firms answered at least part of the survey. In terms of the response rate and overall number of respondents, the survey panel is similar in size to that in other studies. For example, in the US and Canadian firm CFO survey conducted by Graham and Harvey (2001) the final sample is 392 respondents, with a response rate of about 9%. Graham, Harvey, and Rajgopal (2005) obtain a similar response rate of around 8% for the portion of their survey of US and Canadian firm CFOs that was conducted via email. The findings of the survey were also presented and discussed at various practitioner conferences around the world aimed at CFOs and other top finance professionals. The feedback received during these conferences is consistent with the findings and interpretations presented in the results section.

Our initial sample consists of a subset of the 354 responding firms because not all the companies were asked and/or answered all the questions relevant for this study. The first step we take in the sample selection process is to identify how many of the respondents engage in risk management activities. The survey instrument asks firms basic questions regarding their risk management/exposure to three areas of risk that are frequently hedged. It asks a) whether a firm engages in foreign exchange risk management activities, b) whether it engages in interest rate risk management activities, and c) whether, in the absence of risk management activities, the firm would have any material commodity exposures.

The number and fraction of firms that answered “yes” to each of these questions are reported in the first three rows of Table 1. The number of respondents varies with the area of

risk from 248 to 253 but, in total, 263 firms answered at least one of these questions. Table 1 also reports (in the fourth row) the fraction of firms that managed at least one type of risk based on the answers given above. As shown in the table, three-fourths or more of the respondent firms engaged in management of foreign exchange and/or interest rate risk. About one half of the firms would face material commodity exposures in the absence of risk management activities. When responses are aggregated across all respondent firms (fourth row in the table), over 90% of the firms manage at least one type of exposure among the three basic areas of risk covered in the survey. Thus, risk management is an important function for the vast majority of firms that responded to the survey.

The survey instrument also asks a set of questions that directly assess the importance of hedge accounting standards. Specifically, firms were asked “*Has your Foreign Exchange Risk Management policy been materially affected by the introduction or impending introduction of new derivative accounting standards (e.g., IAS 39, FAS 133, or local equivalent) under which your company currently reports or will report?*” The identical question was asked twice more, substituting the words “Interest Rate” or “Commodity” for the words “Foreign Exchange.” Firms were not asked this question if they did not engage in any risk management activities (as their policies would not be affected). In addition, because we ask about their risk management *policies*, firms that only change the accounting for derivatives without making changes to what they actually do would not be affected.¹⁴

Firms that indicated that they are affected by the new standards were also asked “*How*

¹⁴ As with any survey, the exact interpretation of the wording of a question is of primary importance. We believe that respondents properly interpreted the above question to refer to changes in hedging policies, and not the way they account for derivatives because: (a) a beta version of the survey was discussed with several CFOs to make sure there were no misunderstandings; (b) the survey findings were presented at several practitioner seminars, where participants confirmed their understanding of the survey questions; and (c) if the respondents had assumed that the question was about changes in accounting and not policies, the vast majority would have responded that they were affected, and the cross-sectional results discussed subsequently would not hold.

important is achieving 'hedge accounting' for accounting purposes when examining Risk Management execution alternatives?'" As before, this question was asked separately for Risk Management relating to Foreign Exchange, Interest Rate and Commodity Risk.

Responses to these questions are presented in Table 2. In total, of the 239 firms that reported management of or exposure to at least one type of risk (Table 1), 229 firms answered at least one of the questions regarding whether their risk management policies have been affected by the new derivative accounting standards. Thus, the vast majority of respondents that engage in risk management activities also indicated whether or not they were affected by the new standards. This alleviates any concern that affected firms might be more likely to respond to this question.

As reported in Panel A of the table, close to 50% of the firms managing foreign exchange risk and 38% of the firms managing interest rate risk are affected by the new standards. The fraction is much lower for commodity risk at 18%. The fourth row of Panel A of Table 2 shows that 42% of the 229 sample firms indicate that at least one of their risk management activities is affected by the new standards. We next compute a measure called *Affected*, which is based on the fraction of risk management policies affected by the new standards. It captures how much a firm is affected by the new standards relative to the risks it actually manages. For example, if a firm manages two areas of risk and one of them is affected by the new standards and the other is not, then the value would be 0.5. As illustrated in row 5, 32% of the average respondent's risk management policies are affected.

Going forward, the paper focuses on the 229 firms that indicate whether or not their risk management policies have been affected by the new accounting standards, as this question relates to our main hypotheses. These firms therefore constitute our final sample.

Panel B of Table 2 contains the distribution of the responses regarding the importance of qualifying for hedge accounting. Only affected firms were asked this question. The vast majority of companies consider it very important to qualify for hedge accounting: about 80% of the firms fall in the highest two categories for all three areas of risk management.

Table 3 contains data on the country of origin for the firms in our sample. About 56% of the respondents come from Europe, and just over one-fourth of our sample firms come from Asia and Australia/New Zealand. The countries with the largest representation are Germany, the US, and Japan. Finally, 4 firms did not disclose their country (these firms will obviously be eliminated from any analyses that involve country-level parameters).

In Table 4, we report summary statistics for a variety of characteristics of the sample firms. They have mean revenues of about \$7.7 billion and median revenues of \$2 billion. Thus, they are larger than the US and Canadian firms studied by Graham, Harvey, and Rajgopal (2005) which had median revenues of about \$1 billion. A unique feature of our sample, as shown in the second row of Table 4, is that one-third of the firms are not listed on a stock market. The third row reports the extent to which “reduce the volatility of earnings (without affecting cash flows)” was rated as an important benefit of a successful risk management program. The sample firms consider the pure reduction of earnings volatility to be relatively important, with an average score of 2.6 on a scale from 0 (not important) to 5 (very important). The next row shows that firms are not likely to take active positions (speculate). Firms were asked whether their view on Foreign Exchange Rates, Interest Rates, or Commodity Prices causes them to actively take positions in a given market. This question was asked for each area of risk management separately and the response is first averaged across all risk management areas within the firm and then averaged across all firms. On a

scale from 0 to 5, where 0 is never and 5 is frequently, the average response is only 0.74. Nevertheless, close to 50% of the respondents indicate that they take active positions at least some of the time (not reported in the table).

The next row in Table 4 shows that sample firms have average institutional ownership of approximately 32%, with a median of 17.5%. Note, however, that firms were not asked to provide an exact measure of institutional ownership. Instead, they were given categories (0%, 1-5%, 6-10%, 11-25%, 26-50%, and over 50%) and the figures reported in the table are computed based on the assumption that each firm has ownership at the category mean. Firms were also asked to report the extent to which “difficulty in explaining to investors” is a substantial drawback of a Risk Management program. The second-to-last row of Table 4 shows that sample firms consider the difficulty of explaining their risk management program to investors to be a moderately important drawback, with an average score of 1.44 on a scale from 0 (not important) to 5 (very important).

Eighty seven percent of the sample firms already use fair value derivatives accounting, as shown in the final row of Table 4, while most remaining firms plan to adopt it in the very near future (not reported in the table).

5. Results

5.1. Differences between affected and unaffected firms

We start by dividing the sample into two groups of firms: firms whose risk management policies are not affected by the new accounting standards and firms whose policies are affected for at least one of the three risks. We then compare means and median across the subsample along various characteristics. The findings are reported in Table 5.

There are substantial differences between affected and unaffected firms, consistent with the hypotheses proposed in Section 3. First, we find that affected firms are much larger than unaffected firms: median revenues for affected firms are \$2.57 billion versus \$1.58 billion for unaffected firms. Unaffected firms are also more likely to be private (38%) than affected firms (23%).

To study the quality of the accounting standards at the country level, we rely on the CIFAR score reported in Bushman, Piotroski, and Smith (2004). This score is an index based on the inclusion or omission of 90 data items. We divide firms into two groups depending on whether the CIFAR score for their country of domicile is above or below the sample median of 71. As illustrated in Table 5, affected firms are much more likely to be domiciled in countries with high quality accounting standards. The second country-level variable focuses on the legal liabilities of accountants in case of misrepresentation. We employ the burden of proof for accountants variable developed by La Porta, Lopez-de-Silanes, and Shleifer (2006). This variable captures how difficult it is to prove liability due to misleading statements by accountants. We split the sample into two groups depending on whether the burden of proof in a firm's country of domicile is low (≤ 0.5) or high (> 0.5). Table 5 shows that the burden of proof is much more likely to be low for affected firms (73%) than for unaffected firms (59%).

We do not find any differences between affected and unaffected firms in the level of institutional ownership, which provides no evidence for the investor sophistication argument. We also employ another proxy for sophistication: the extent to which difficulty in explaining risk management policies to investors is a substantial drawback of a risk management program. Table 5 illustrates that the difficulty in explaining their risk management policies

to investors is more of a drawback for affected firms. While the mean difficulty score is low for both sets of firms, the mean score is 1.68 for affected firms and 1.28 for unaffected firms; the difference between the two is significant at the 2% level. Taken together, the univariate analyses provide mixed support for the investor sophistication argument.

Next we study the importance of reducing earnings volatility (without necessarily affecting cash flows) as a perceived benefit of risk management. While this question does not allow us to identify why firms want to reduce earnings volatility through hedging, it does allow us to study whether firms who rely on hedging to reduce earnings volatility are more affected by the new standards. This is indeed the case: affected firms find that reducing earnings volatility is a more important benefit (score = 3.36) than unaffected firms (score = 2.78).

Finally, we investigate whether affected firms are more likely to take active positions, and find that this is the case, albeit that both sets of firms have a low score. While this suggests that affected firms are more likely to take active positions, they generally do not do so frequently.

Overall, the univariate analyses provide substantial support for the hypotheses proposed in this paper.

5.2. *Which factors determine whether firms are affected by the new standards?*

We now turn to a multivariate analysis to study the factors that determine whether firms are affected by the new standards. Two different methods are employed to investigate this issue.

In the first approach we treat each firm's response to each risk management area as a separate observation. Thus, a firm that responded to all three areas is included three times in our analysis. We then estimate various probit models to explain whether or not a firm's specific policy is affected or not. While most explanatory variables are measured at the firm or country level, the survey asks whether firms would ever take active positions for each risk management area separately, and we employ this information in these models. Because firms potentially enter the models multiple times, we cluster the standard errors at the firm level. In addition, all standard errors are adjusted for heteroscedasticity.

Panel A of Table 6 contains the findings. We do not have responses on institutional ownership and the importance of reducing earnings volatility for all firms. Instead of discarding firms from models in which these characteristics are employed as explanatory variables, we set them equal to zero when missing, but also include a dummy variable set equal to one if the observation is missing, and zero otherwise.

We present several models. In model (i) of Table 6, we include only size and accounting quality. Both significantly increase the likelihood of being affected by the new standards. We replace accounting quality with the burden of proof variable in model (ii). While accounting quality only speaks to the level of disclosure, the burden of proof captures an element of enforcement. Since the disclosure and enforcement variables are highly correlated ($\rho=0.58$, $p\text{-value}=0.00$), we do not combine them in one model. The regression indicates that firms from countries with a low burden of proof are more likely to be affected. Model (iii) illustrates that private firms are less likely to be affected by the new standards. All the proxies employed in these models indicate that firms are more affected when there is a higher likelihood that accounting figures are used for contracting. We combine two of

these proxies in model (iv) and also control for institutional ownership to proxy for investor sophistication. We find that firms with more sophisticated investors (more institutional ownership) are less affected by the new rules. Finally, in model (v), we add the importance of reducing earnings volatility as a benefit of risk management and the willingness of the firm to take active positions. The positive coefficients on both variables indicate that these features increase the likelihood of being affected.¹⁵

The economic significance of these findings is presented in Panel B of Table 6, where we show how the likelihood of being affected by the new standards changes as firm characteristics change (based on model (v) of Panel A). We start by considering several base case probabilities for combinations of public and private firms with high and low burdens of proof. For these base cases, we report the probabilities of being affected, given that all other explanatory variables are set at their means. For example, the likelihood of a private (public) firm with a high burden of proof being affected is 13.4% (24.6%), while the same likelihood is 23.2% (37.8%) for a private (public) firm with a low burden of proof. These differences illustrate that the effects of burden of proof and listing status are also economically large. Subsequent columns highlight the economic significance of the other variables. They show what happens to the base case probabilities when the continuous explanatory variables increase by one standard deviation, while the other explanatory variables remain at the means. For example, when $\log(\text{revenues})$ increases by one standard deviation, the likelihood that a public firm with a low burden of proof is affected increases by 7.67% from its base case of 37.8%. The changes in probabilities are large for all explanatory variables. This

¹⁵ We have also estimated separate models for each area of risk management (foreign exchange, interest rate, and commodities). Our findings are qualitatively the same for the three areas.

indicates that our findings are not only statistically significant, but also economically significant.

We also employ a second estimation approach to examine the types of firms that are more affected by the new standards. This approach treats each firm as an individual observation. The dependent variable in these models is the affected variable as described in Table 2. *Affected* is the proportion of the three areas of risk management affected by the new standards. It takes on the values of 0, 0.333, 0.5, 0.666, or 1¹⁶. While firms with a score of 0.5 are more affected than those with score of 0.333, it is not clear that we should interpret a score of 0.5 to imply that the effect is truly 50% larger than for firms with a score of 0.333. We therefore estimate ordered probit models, in which the exact magnitude of the variables is ignored, but higher numbers imply that the firm is more affected.

Table 7 contains our findings. Panel A contains the regression models, while Panel B sheds light on the economic significance of the findings. The models reported in Panel A contain the same sets of explanatory variables as the probit models displayed in Panel A of Table 6. The findings are also very similar: more firm policies are affected when the companies operate in countries with high accounting standards and a low burden of proof for accountant misdeeds. Private firms are less affected, while firms that consider earnings volatility reduction to be an important benefit of risk management and firms that more often take active positions are more affected. All of these effects remain statistically significant. Only institutional ownership is no longer statistically significant.

The analysis of economic significance reported in Panel B of Table 7 is based on model (v) of Panel A. We follow the same general approach as in Panel B of Table 6. We

¹⁶ Note that this variable can take on a value of 0.5 if the firm only manages two of the three areas of risk and indicates its policies are affected in 1 of the 2 areas.

start by considering two sets of firms: (a) private firms that operate in countries with a high burden of proof and (b) public firms that operate in countries with a low burden of proof. For each set, we compute the probability that all of their risk management policies are affected and the probability that none of their policies are affected, after setting all the other explanatory variables equal to their means. We call these the base case probabilities (column (iii)). They vary dramatically across these two sets of characteristics. For example, the probability that a private firm operating in a country with a high burden of proof reports that *all* its risk management policies are affected is only 7.3%; this probability more than triples to 25.9% for public firms in low burden of proof countries. In the next two columns, we report the change in probabilities when we switch the burden of proof and the public/private status. Switching these variables has a very large effect on the base case probabilities. For example, for private firms from high burden of proof countries the base case probability that none of their risk management activities are affected is 79.4%. The same firms in low burden of proof countries are 12.2% less likely to be unaffected.

In columns (vi) through (ix), we report the change in probability when we increase the continuous variables by one standard deviation. For example, increasing *the importance of reducing earnings volatility* variable by one standard deviation increases the probability that all risk policies are affected by 9.5% for public firms in low burden of proof countries. This effect is very large relative to the base case of 25.9%. The economic importance of the other explanatory variables is also substantial, and this is particularly the case for the *active positions* variable.

Overall, the evidence presented in this section provides strong support for our hypotheses. The effect of the new standards on risk management varies cross-sectionally

with financial reporting quality, enforcement, speculation, and the extent to which firms manage risk to reduce earnings volatility.

5.3. *The effect of the new standards on policies and instrument use*

In this section we analyze the affected firms in more detail to find out how their risk management policies have been changed. Firms that indicated that they were affected by the new standards were asked a series of additional questions to better understand how these standards changed their behavior.

The first element we focus on is whether firms feel the new standards have reduced (or increased) their ability to hedge from an economic perspective. This question goes to the heart of the concern expressed by many that the potential increase in earnings volatility will lead firms to hedge less, even though such hedging has economic benefits. Firms were given a 5 point scale and could indicate that the new standards had reduced their ability (1), not affected their ability (3), or improved their ability (5) to hedge from an economic perspective. The survey clarified that a reduction in the ability to hedge from an economic perspective implies that it *leads to a reduction in expected future cash flows*. In column (ii) of Table 8, we tabulate the responses. Firms were asked this question for each of their risk management policies (foreign exchange, interest rate, commodity), but only if they indicated that this specific policy was affected. We average the response for all affected policies across each firm, before computing statistics for the sample. The results are striking: out of 93 firms, 51 indicated a reduced ability (score of 1 or 2), 27 mention their ability has remained unchanged (score of 3), and 15 firms report an increase (score of 4 or 5). The average score is 2.5, the median is 2, and both are significantly different from 3 (the score for unaffected firms).

Since these statistics are only computed for firms that indicate that their policies have been affected, we repeat this exercise, but assume that unaffected firms would have responded with a 3 to this question. Even after including these firms, we continue to find that the average and the median are both significantly below 3 (untabulated).

We next study specific foreign exchange hedging activities. For different types of foreign exchange hedges, firms were asked to indicate whether those activities will be increased, unaffected or reduced as a result of the new accounting standards. This question was only asked of the 96 firms that indicated that their foreign exchange risk management policies were affected. The results are displayed in Table 9. Note that the sample size is smaller than 96 because firms could also indicate that they did not engage in a specific activity to begin with (this response is not tabulated). We assign ‘decreased activity’ a score of -1, ‘unaffected’ a score of 0, and ‘increased activity’ a score of 1, and perform a t-test to determine whether the average response is significantly different from zero. The p-value of that test is reported in the final column. The conclusion from this analysis is that firms substantially reduce their foreign exchange hedging as a result of the new standards; virtually every activity is significantly reduced. The only exceptions are *on balance sheet assets and liabilities* (hedges of accounts receivable and payable) and *balance sheet book values*. These types of hedges are the most likely to qualify for hedge accounting because there is little uncertainty about the amounts involved.

The last three lines of Table 9 contain activities that are all related to taking a view on future exchange rates.¹⁷ While not many firms undertake these activities to begin with, about

¹⁷ *Undertake directional trading* is taking a position in an exchange rate, without taking any offsetting positions in another one. For example, a firm may feel that the Yen will appreciate and purchase Yen futures. *Arbitrage* involves taking two offsetting positions which yield a guaranteed positive return without risk. It is unlikely that such opportunities truly exist in foreign exchange markets, but firms were given the option to provide this

one third of the respondents indicate that they have decreased them as a result of the new standards. Thus, reducing speculative activities appears to be a positive outcome of the new standards. This reinforces our earlier findings that firms that take active positions are more affected.

Table 10 focuses on the use of instruments. Affected firms were asked to describe whether they would increase or decrease their reliance on specific instruments as a result of the new standards. This question was asked three times, once for each area of risk management; the list of instruments was always the same, except that *debt in a foreign currency* was offered only as an option in the foreign exchange section, and *forward rate agreements* was an option only in the interest rate section. In our analysis, we treat each response as a separate observation. Thus, if a firm provides a response in each area of risk management, it would be counted three times. However, when computing the t-statistics to assess whether the use of a particular instrument has been reduced, we take into account the lack of independence of the observations. We also report statistics after combining all linear (forward contracts, forward rate agreements, futures contracts, swaps, and foreign currency debt) and all non-linear contracts (options on futures, OTC options, and exchange traded options).

Table 10 shows that there is a clear difference across instruments in the effect of the new standards. Linear instruments are generally unaffected, except for a decline in the use of futures contracts. This lack of an effect is not surprising because it much easier to qualify for hedge accounting with linear instruments. The decline in the use of options is quite dramatic,

response because they may feel such opportunities do exist or because this is an easier way to characterize speculative trades. *Relative value opportunities* are trades similar to arbitrage trades, but the expected payoffs are not deemed to be riskless. We verified through discussions with CFOs and treasurers that this terminology is well understood by risk management practitioners.

however. For example, almost 45% of the firms decrease their reliance on OTC options as a result of the standards. Hedges with option contracts are much less likely to qualify for hedge accounting and these findings suggest that their use declined substantially. Given that hedging strategies with non-linear payoffs are often optimal [see Brown and Toft (2002)], this outcome appears undesirable.

5.4. The importance of qualifying for hedge accounting

As mentioned in Section 3 and documented in Panel B of Table 2, the survey also asks affected firms their opinion about how important it is to qualify for hedge accounting when considering risk management alternatives (on a scale from 0=not important to 5=very important). In this section, we study what determines the cross-sectional variability in the response to this question.

We expect the factors determining the importance of qualifying for hedge accounting to be the same as the factors explaining whether firms are affected by the new standards, with one exception: we do not expect firms that take active positions to be more concerned with achieving hedge accounting when evaluating risk management solutions. Taking a view has nothing to do with risk management as such.

Because the responses are categorical, we estimate ordered probit models. We treat each firm response to each risk management area as an individual observation, so the same firm may enter the regression multiple times, but we adjust the standard errors for the lack of independence of the observations. Table 11 contains the findings. The regression models are displayed in Panel A, while Panel B analyzes the economic significance. As these answers

are only available for firms whose risk management policies have been affected by the new standards, the findings should be interpreted with caution given the smaller sample size.

In model (i), we study size and accounting quality. Both variables are insignificant. In model (ii) we replace accounting quality with the low burden of proof dummy; this variable is significantly positive, suggesting that firms in countries where it is easier to prove accountant wrongdoings care more about achieving hedge accounting. In model (iii), we find evidence that private firms are less concerned with hedge accounting. We combine several explanatory variables in model (iv). We continue to find a positive effect for low burden of proof and a negative effect for private firms. Institutional ownership is not significant, however, which suggests that investor sophistication is not an important driver of the desire to qualify for hedge accounting. Finally, model (v) shows that firms that consider earnings volatility reduction to be important care more about achieving hedge accounting. In this model, size, the burden of proof, and the private company dummy are all significant at the 10% level or better. These findings broadly support our predictions, with the exception of the role of investor sophistication.

Panel B of Table 11 contains an analysis of the economic significance of these findings, based on model (v). We again start by identifying two base cases: private firms with high burden of proof and public firms with low burden of proof. We then compute the probability of various responses to the question: how important is it to qualify for hedge accounting. Recall that six categories were possible, ranging from 0 (not important) to 5 (very important). We pick three of these categories – the two extremes and one in the middle – and compute the probability that firms from the two base cases we have identified fall into each of these categories, assuming that the other explanatory variables are set equal to the

mean. As illustrated in column (ii), the base case probabilities differ substantially between the two sets of firms. For example, only 17% of private firms with a high burden of proof fall in category 5, while 55.5% of public firms with a low burden of proof fall in that category. In columns (iv) and (v), we illustrate what happens to these probabilities when we switch the indicator variables. The changes in probabilities are quite substantial. For example, the 55.5% probability we just discussed declines by 20.2% when we move the firm from public to private status.

Finally, in columns (vi) to (viii), we report the change in probability when one of the continuous variables increases by one standard deviation. For instance, the 55.5% probability increases by 20.7% if the importance of reducing earnings volatility increases by one standard deviation.

The computations in Panel B of Table 11 illustrate that the results that are statistically significant also have a very large economic impact.

5.5. Robustness tests

We conduct four sets of tests to verify whether the findings reported previously are robust. First, we include dummy variables for all countries with more than 5 respondent firms in our sample to make sure the explanatory variables employed in our analyses are not proxying for country characteristics. When estimating models with the inclusion of these dummies, we remove the country level variables from the regressions. Inclusion of these dummies does not affect our findings, and the dummies are generally not statistically significant. Second, we include dummies for 18 broad industry classifications from which respondents could choose when completing the survey. None of these dummies are

significant at conventional levels. Moreover, their inclusion does not affect the other findings reported previously. Third, as reported in Table 4, 87% of the respondents already employ fair value accounting for derivatives in preparing their financial statements. The majority of the remaining firms indicate that they plan to adopt the new standards in the near future, but some firms are uncertain about the timing. We verify that our results persist when we remove firms that are undecided as to when or whether they will adopt the new standards. Fourth, not all firms implemented FAS 133, IAS 39 or their local equivalent at the same time. Some firms implemented the standards as early 1998 while others are required to adopt it in or after 2005, the year in which the survey took place. Experience with derivative accounting may have two effects: (a) over time, firms may change their opinion about the indirect costs associated with the standards, and their effect on hedge accounting policies; and (b) firms that adopted the standards several years before the survey was conducted may not remember its exact impact. This second effect would only add noise to the data, making it more difficult to uncover cross-sectional differences in responses. To study the first effect, we include in our regressions the number of years since the adoption of derivative accounting standards as an additional control variable. It is never significantly different from zero and its inclusion does not affect the significance of the other findings.

5.6. Limitations of the Study and Discussion

Our study has a number of limitations. First, only firms that were engaged in risk management activities when the survey was conducted (2005) were asked about the effect of the new accounting standards. Hence, our sample does not include firms (if any) that stopped using derivatives in response to the standard before 2005, which may understate the

effect of the new standards. Thus, our results provide a conservative estimate of the impact of fair value reporting on risk management. Second, as in any survey, there could be some concerns about the respondents' understanding of the questions. We are confident that the survey questions were generally well understood because: (a) a beta version of the survey was discussed with several CFOs to make sure there were no misunderstandings; (b) the survey findings were presented at several practitioner seminars, where participants confirmed their understanding of the survey questions; and (c) misunderstanding the questions would add noise to the data, which would weaken our ability to uncover the cross-sectional results reported previously. The fact that we uncover relationships between the survey responses and firm characteristics that are economically meaningful is evidence against the notion that the responses are just noise. Finally, there could also be concerns about response biases and sample selection bias in general. We find no differences in industry composition between respondents and non-respondents, but the firms responding to the risk management part of the survey are significantly larger. This size effect is not surprising, however, as prior work indicates that large firms are more likely to manage risk [see, for example, Nance, Smith, and Smithson (1993)].

Overall, we believe that the benefits of this survey based study outweigh the above limitations. Unlike studies that employ archival data to draw inferences about the effect of the new standards, we are able to: (a) distinguish more precisely between speculators and hedgers; (b) study the effect of the new standards on large companies with established risk management programmes in place, rather than new users. These are in fact the companies that raised more concerns about the standards and that are likely to engage in the bulk of all corporate risk management activities; (c) investigate in detail what types of activities and

instruments have been affected. This cannot be done by studying changes in cash flows and earnings volatilities; (d) shed some light on the importance of qualifying for hedge accounting when firms consider risk management alternatives.

6. Conclusion

This paper employs survey evidence to study the impact of fair value reporting of derivatives on the risk management policies of companies worldwide. Using the changes in reporting standards as a natural experiment, we show that fair value reporting has a substantial impact on risk management policies: more than forty percent of the companies that responded to the survey have been affected by the new standards in at least one area of risk management. The vast majority of those that have been affected indicate that their ability to hedge from an economic perspective has been compromised. However, we also find that the new standards have reduced the use of derivatives for speculative purposes: firms that are more likely to take active positions are more likely to be affected by the standards. In terms of instruments, we observe that firms are less likely to employ strategies that involve securities with non-linear payoffs (which are less likely to qualify for hedge accounting), while there is little or no decline in the use of linear instruments.

We also document cross-sectional differences in the extent to which companies have been affected by the standards, and care about qualifying for hedge accounting. Firms that operate in an environment where contracts are more likely to be written on accounting data, and firms that attach more importance to the reduction of earnings volatility as a benefit of risk management are more affected and care more about obtaining hedge accounting. Affected firms also have less sophisticated investors. Accounting quality at the country-

level, and particularly the ability to take accountants to court, also has a dramatic impact on the effect of the new standards on corporate risk management activities.

While our analyses of the survey evidence shed light on the types of firms being affected and their changes in risk management policies, we are not in a position to evaluate the overall welfare impact of the standards. This depends on whether the cost of the decline in economic hedging is outweighed by the benefit of the reduction in speculation, or other benefits of increased disclosure, such as the ability of investors to better assess the quality of the company. Our study also does not address whether the new standards have led to an improvement in financial reporting quality. Studying the overall welfare effect of the standards is a fruitful, but challenging, area for future work.

Appendix: Survey Design and Delivery

The survey data employed in this study come from a broader survey on corporate finance and risk management practices conducted in 2005. This survey contains questions organized in nine sections (Company Information, CFO Views, Capital Structure, Liability Management, Liquidity Management, General Risk Management, Interest Rate Risk Management, Foreign Exchange Risk Management and Commodity Risk Management). The survey makes use of conditional branching (i.e., certain responses lead to detailed additional questions, while others do not). Because of the size of this survey, the survey administrators encouraged CFOs to complete the “CFO Views” section, but allowed them to delegate responding to some parts of the survey to those people within their organizations more knowledgeable about specific areas within the finance function. A beta version of the survey was discussed with several CFOs to make sure the questions were well understood. Several modifications were made in response to the feedback received from these discussions.

The survey contains two types of questions on financial policies and risk management: (i) benchmarking questions; and (ii) attitudinal questions. Benchmarking questions focus on the decisions firms make, whether these decisions are typically observable by others or not. For example, respondents are asked to indicate whether they manage exchange rate risk, and whether their risk management policies have been materially affected by the new derivative accounting standards. Attitudinal questions, on the other hand, ask respondents to indicate their agreement or disagreement with certain statements, or ask them to select items from a list to help explain why their firms take certain decisions.

The survey was completely anonymous via the internet and the survey team went to great lengths to ensure the confidentiality of the companies involved. It is therefore not possible to tie the survey responses to company information not disclosed in the survey.

The survey was conducted in collaboration with Deutsche Bank Securities, Inc. The firms targeted for the survey include all firms worldwide that have a coverage officer assigned to them by the investment banking division of Deutsche Bank. This sample comprises 4000 firms, generally the largest companies in their respective countries and industries. Note that this sample does not include smaller firms in the bank's home market, because those are covered by local branches, and that a large fraction of the targeted firms are not currently Deutsche Bank clients.

CFOs received a written request from the academic researchers involved in the survey asking them to participate. The investment bank officers covering the companies were requested to follow up the written request with a telephone call encouraging the firms to complete the survey. Because the survey was completely anonymous, the bank was unable to use the information in the survey for direct marketing purposes. However, in return for completion of the survey, firms were promised access to detailed benchmarking reports.

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Table 1
Number of firms that answered questions regarding risk management/exposure

This table lists the number of firms who indicate whether they manage foreign exchange and interest rate risk and whether, in the absence of risk management, they have commodity exposure. We list the number of firms responding to the question and the number of firms managing the risk or exposed to commodities. The fourth row lists the number of firms with at least one exposure.

Variable	Number of respondents	Number of firms managing risk/with exposure	Fraction
Foreign exchange risk	253	210	0.83
Interest rate risk	248	184	0.74
Commodity exposure	248	122	0.49
Managing/exposed to at least 1 risk	263	239	0.91

Table 2
Number of firms affected by the new derivative accounting standards and statistics on importance of hedge accounting

Panel A of this table lists the fraction of firms who indicated whether they are affected by the new derivative accounting standards. For each area of risk management, the survey asked: “Has your Risk Management policy been materially affected by the introduction or impending introduction of new derivative accounting standards (e.g., IAS 39, FAS 133, or local equivalent) under which your company currently reports or will report?” To compute the average in the fifth row (*Affected*), we first average the response by firm, before averaging across firms. Panel B contains the distribution of responses regarding the importance of hedge accounting. Firms that indicate whether they were affected by the new standards were asked: “How important is achieving ‘hedge accounting’ for accounting purposes when examining Risk Management execution alternatives?” The numbers in parentheses are fraction of the total.

Panel A: Firms affected by the new accounting standards

Variable	Number of respondents	Number of firms affected	Fraction
Foreign exchange risk management	200	96	0.48
Interest rate risk management	168	64	0.38
Commodity risk management	109	20	0.18
Affected in at least 1 risk management area	229	116	0.42
Average of foreign exchange, interest, commodity (<i>Affected</i>)	229		0.32

Panel B: Importance of achieving hedge accounting

Response	Foreign exchange	Interest rate	Commodity
0	2 (3%)	0 (0%)	1 (5%)
1	0 (0%)	0 (0%)	0 (0%)
2	7 (10%)	2 (3%)	1 (5%)
3	7 (10%)	11 (18%)	2 (10%)
4	25 (37%)	17 (27%)	6 (30%)
5	26 (39%)	32 (52%)	10 (50%)
Total	67	62	20

Table 3
Distribution of sample firms by country of origin

The sample consists of 229 firms that answered whether their risk management policies are affected by the new standards in at least one area of risk management.

<i>Country</i>	<i>Number of Firms</i>
Algeria	1
Argentina	3
Australia	1
Austria	5
Belgium	7
Canada	1
Cayman Islands	1
Chile	7
Denmark	2
Finland	1
France	3
Germany	46
India	5
Indonesia	3
Italy	9
Japan	20
Korea (South)	7
Liechtenstein	1
Luxembourg	4
Malaysia	2
Netherlands	4
New Zealand	5
Norway	1
Philippines	5
Poland	1
Portugal	2
Singapore	2
South Africa	3
Spain	11
Sri Lanka	2
Sweden	3
Switzerland	14
Taiwan	5
Thailand	1
Undisclosed	4
United Kingdom	15
United States	22
Total	229

Table 4
Summary statistics on sample firms

Only firms who respond whether at least one of their risk management policies has been or will be affected by the new accounting standards are included in the sample. Firms are asked to indicate in which category institutional ownership falls: 0%, 1-5%, 6-10%, 11%-25% 26-50%, 51% or more. The average and medians in this table are computed based on the assumption that each firm in a category has institutional ownership equal to the category average.

Variable	Mean	Median	N
Revenues (\$ millions)	7,749	1,998	210
Private (Not listed)	0.32	0	223
Importance of reducing earnings volatility (scale 0 -5)	2.60	3	229
Do you take active positions (0=never 5=frequently) averaged across 3 areas of risk management	0.74	0.33	229
Institutional ownership	0.3226	0.1750	145
Difficulty in explaining to investors is a drawback (0-5)	1.44	1	195
Already using fair value accounting for derivatives	0.87	1	229

Table 5
Characteristics of firms affected and unaffected by the new standards

High accounting standards is an indicator variable equal to one if the firm is domiciled in a country with an index of disclosure quality (CIFAR score) equal to 71 and above and zero otherwise. Low burden of proof is a dummy variable set equal to one if the burden of proof for accountants index developed by La Porta, Lopez-de-Silanes, and Shleifer (2006) is bigger than 0.5 and zero otherwise. Survey respondents indicate whether institutional ownership falls in one of the following categories: 0%, 1%-5%, 6%-10%, 11%-25%, 26%-50%, 51% or more. We assume that ownership in each category is equal to the category average before computing sample means and medians. *P-value means* is the p-value of a t-test of equality of means of the two groups. *P-value medians* is the p-value of a rank sum test of equality of medians of the two groups.

Variable	Unaffected			Affected			P-value means	P-value medians
	Mean	Median	N	Mean	Median	N		
Revenues (in \$ millions)	4,701	1,579	122	11,974	2,570	88	0.00	0.01
Private firm	0.3846	0	130	0.2258	0	93	0.01	0.01
High accounting standards	0.5020	0.5	128	0.6395	1	86	0.04	0.04
Low burden of proof	0.5859	1	128	0.7303	1	89	0.03	0.03
Institutional ownership	0.3336	0.1750	84	0.3074	0.3750	61	0.57	0.90
Difficulty in explaining to investors	1.275	1	120	1.6933	1	75	0.02	0.03
Importance of reducing earnings volatility	2.78	3	120	3.36	3	78	0.00	0.00
Take active positions	0.60	0	133	0.93	0.67	96	0.01	0.03

Table 6
Probit regressions explaining determinants of whether firms are affected by the new standards

In Panel A, the dependent variable is equal to 1 if a specific risk management area for a firm has been affected by the new standards and zero otherwise. Each firm response for each risk management area is considered to be a separate observation. Three areas of risk management are considered: foreign exchange, interest rate, and commodities. Standard errors are adjusted to reflect the lack of independence of the observations. High accounting standards is an indicator variable equal to one if the firm is domiciled in a country with an index of disclosure quality (CIFAR score) equal to 71 and above and zero otherwise. Low burden of proof is a dummy variable set equal to one if the burden of proof for accountants index developed by La Porta, Lopez-de-Silanes, and Shleifer (2006) is bigger than 0.5 and zero otherwise. Survey respondents indicate whether institutional ownership falls in one of the following categories: 0%, 1%-5%, 6%-10%, 11%-25%, 26%-50%, 51% or more. We assume that ownership in each category is equal to the category average before computing sample means and medians. Revenues, institutional ownership, and the importance of reducing earnings volatility are measured at the firm level. High accounting quality and low burden of proof are measured at the country level. Active positions is measured for each firm and for each area of risk management separately. When institutional ownership and the importance of reducing earnings volatility are missing, we set these variables equal to zero. Dummy variables are set equal to one of these variables are missing and zero otherwise. The coefficients on the dummy variables are not reported in the table. P-values are in parentheses. Panel B presents the marginal effects of changing the independent variables. The base case probabilities are calculated using the coefficients of model (v) in Panel A, and setting the continuous independent variables equal to their mean values. In the base case scenario, the dummy variables are set equal to 0 or 1 depending on the base case (first two columns). We re-calculate the effect on each of these probabilities of an increase of one standard deviation in each of the continuous independent variables. Column (ii) reports the base case probabilities while columns (iii) to (vi) report the change in probabilities.

Table 6 (continued)

Panel A: Regression models

Variable	(i)	(ii)	(iii)	(iv)	(v)
Intercept	-1.413 (0.000)	-1.648 (0.000)	-0.793 (0.048)	-1.133 (0.015)	-2.146 (0.000)
Log (revenues)	0.096 (0.058)	0.107 (0.027)	0.056 (0.243)	0.082 (0.116)	0.109 (0.057)
High accounting quality	0.282 (0.058)				
Low burden of proof		0.491 (0.004)		0.417 (0.026)	0.378 (0.051)
Private company			-0.455 (0.018)	-0.400 (0.073)	-0.420 (0.067)
Institutional ownership				-0.661 (0.072)	-0.630 (0.088)
Importance of reducing earnings volatility					0.181 (0.021)
Active positions					0.145 (0.008)
Pseudo R-squared	0.025	0.035	0.029	0.049	0.112
N	418	424	438	422	422

Table 6 (continued)

Panel B: Analysis of economic significance based on model (v) of Panel A

Case		Base Case Probability of Being Affected	Change in probability			
			Log (revenues)	Institutional ownership	Importance of reducing earnings volatility	Active positions
(i)	(ii)	(iii)	(iv)	(v)	(vi)	
Private Firm	High Burden	13.39%	4.72%	-3.34%	7.01%	5.00%
	Low Burden	23.24%	6.43%	-4.86%	9.40%	6.80%
Public Firm	High Burden	24.58%	6.59%	-5.04%	9.62%	6.98%
	Low Burden	37.81%	7.67%	-6.27%	11.01%	8.10%

Table 7
Ordered probit regressions explaining the fraction of firm policies affected by the new standards

In Panel A, the dependent variable is *Affected*, which is the fraction of each firm's risk management policies affected by the new standards. Three areas of risk management are considered: foreign exchange, interest rate, and commodities. High accounting standards is an indicator variable equal to one if the firm is domiciled in a country with an index of disclosure quality (CIFAR score) equal to 71 and above and zero otherwise. Low burden of proof is a dummy variable set equal to one if the burden of proof for accountants index developed by La Porta, Lopez-de-Silanes, and Shleifer (2006) is bigger than 0.5 and zero otherwise. Survey respondents indicate whether institutional ownership falls in one of the following categories: 0%, 1%-5%, 6%-10%, 11%-25%, 26%-50%, 51% or more. We assume that ownership in each category is equal to the category average before computing sample means and medians. Revenues, institutional ownership, and the importance of reducing earnings volatility are measured at the firm level. High accounting quality and low burden of proof are measured at the country level. Active positions is measured for each firm by averaging the response for each area of risk management separately. When institutional ownership and the importance of reducing earnings volatility are missing, we set these variables equal to zero. Dummy variables are set equal to one if these variables are missing and zero otherwise. P-values are in parentheses. Panel B presents the marginal effects of changing the independent variables. The base case probabilities are calculated using the coefficients of model (v) in Panel A, and setting the continuous independent variables equal to their mean values. In the base case scenario, the dummy variables are set equal to 0 or 1 depending on the base case (first two columns). We re-calculate these probabilities changing one independent variable at a time. Continuous independent variables are increased by one standard deviation and the dummy variables are changed from 0 to 1, or from 1 to 0, depending on the case. Column (iii) reports the base case probabilities while columns (iv) to (ix) report the change in probabilities.

Table 7 (continued)

Panel A: Regression models

Variable	(i)	(ii)	(iii)	(iv)	(v)
Log (revenues)	0.084 (0.104)	0.091 (0.049)	0.045 (0.360)	0.068 (0.204)	0.082 (0.151)
High accounting quality	0.328 (0.065)				
Low burden of proof		0.455 (0.012)		0.390 (0.052)	0.375 (0.067)
Private company			-0.431 (0.031)	-0.391 (0.101)	-0.434 (0.080)
Institutional ownership				-0.618 (0.124)	-0.550 (0.163)
Importance of reducing earnings volatility					0.171 (0.029)
Active positions					0.189 (0.022)
Pseudo R-squared	0.017	0.019	0.016	0.027	0.077
N	199	202	209	201	201

Table 7 (continued)

Panel B: Analysis of economic significance based on model (v) of Panel A

Case	Risk Mgmt Policies Affected	Base Case Probability	Change in probability					
			Switch between low and high burden of proof	Switch between private and public status	Log (revenues)	Institutional ownership	Importance of reducing earnings volatility	Active positions
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)
Private with high burden of proof	None	79.38%	-12.22%	-14.35%	-4.55%	4.01%	-8.59%	-5.81%
	All	7.27%	6.72%	8.06%	2.32%	-1.85%	4.56%	2.99%
Public with low burden of proof	None	50.43%	14.60%	16.73%	-5.98%	5.96%	-10.75%	-7.52%
	All	25.87%	-10.54%	-11.88%	5.09%	-4.61%	9.52%	6.48%

Table 8
Effect of new standards on ability to hedge from an economic perspective

This table shows the response rate to the question: has the introduction of IAS 39, FAS 133, or local equivalent affected your ability to hedge from an economic perspective: scale 1 (reduced ability) to 5 (improved ability), where 3 = not affected, averaged across 3 areas of risk management. Column (ii) contains the distribution of responses.

(i) Effect	(ii) # firms
1.00	13
1.33	2
1.50	2
1.67	2
2.00	28
2.33	2
2.50	1
3.00	27
3.33	0
3.50	0
3.67	0
4.00	12
5.00	3
Number of firms	93
Average	2.50
P-value t-test mean=3	0.00
Median	2.00
P-value signed-rank test median=3	0.00

Table 9
Impact of new accounting standards on foreign exchange hedging

This table presents summary statistics on the impact of the new standards on different types of FX hedging. To compute p-values, we set decrease activity equal to -1, not affected equal to 0, and increase activity equal to +1, and perform a t-test of equality of the average to zero.

Type of hedging	Decrease Activity	Activity not Affected	Increase Activity	p-value
<i>Transaction Hedging</i>				
Foreign repatriations	7	34	2	0.10
On balance sheet assets and liabilities	8	38	4	0.25
Off balance sheet contractual commitments	7	22	0	0.01
Anticipated transactions < 1 year	16	29	3	0.00
Anticipated transactions > 1 year	13	25	4	0.03
Committed M&A	8	25	1	0.02
Anticipated M&A	10	11	1	0.00
<i>Translation Hedging</i>				
P&L translation	8	23	2	0.06
Balance sheet book values	6	21	2	0.16
Economic/Market value balance sheet	5	8	1	0.10
<i>Competitive</i>				
Economic/Competitive exposures	8	17	0	0.00
<i>Other</i>				
Undertake directional trading	6	14	0	0.01
Arbitrage	5	12	0	0.02
Exploit relative value opportunities	6	12	0	0.01

Table 10
The impact of new accounting standards on the instruments being used

This table presents summary statistics on the impact of new accounting standards on the instruments being used. Responses for all three areas of hedging have been combined. To compute p-values, we set decrease reliance equal to -1, no change equal to 0, and increase reliance equal to +1, and perform a t-test of equality of the average to zero, taking into account the lack of independence of the observations. *Debt in foreign currency* only applies to foreign exchange risk management and *forward rate agreements* only applies to interest rate risk management. The other instruments apply to all areas of risk management.

Type of instrument	Decrease Reliance	No change	Increase Reliance	p-value
Forward contracts	12	78	16	0.47
Forward rate agreements	9	29	4	0.17
Futures contracts	9	39	3	0.09
Swaps	23	85	16	0.32
Debt in foreign currency	4	36	4	1.00
<i>Linear contracts</i>	57	267	43	0.39
Options on futures	12	25	3	0.03
OTC options	36	38	7	0.00
Exchange traded options	9	24	1	0.01
<i>Non-linear contracts</i>	57	87	11	0.00

Table 11
Ordered probit regressions explaining the importance of qualifying for hedge accounting when considering risk management alternatives

In Panel A, the dependent variable is *Importance_of_Hedge*, which summarizes firms' opinion about how important is to qualify for hedge accounting when considering risk management alternatives (on scale from 0=not important to 5=very important). Each firm response for each risk management area is considered to be a separate observation. Three areas of risk management are considered: foreign exchange, interest rate, and commodities. Standard errors are adjusted to reflect the lack of independence of the observations. High accounting standards is an indicator variable equal to one if the firm is domiciled in a country with an index of disclosure quality (CIFAR score) equal to 71 and above and zero otherwise. Low burden of proof is a dummy variable set equal to one if the burden of proof for accountants index developed by La Porta, Lopez-de-Silanes, and Shleifer (2006) is bigger than 0.5 and zero otherwise. Survey respondents indicate whether institutional ownership falls in one of the following categories: 0%, 1%-5%, 6%-10%, 11%-25%, 26%-50%, 51% or more. We assume that ownership in each category is equal to the category average before computing sample means and medians. Revenues, institutional ownership, and the importance of reducing earnings volatility are measured at the firm level. High accounting quality and low burden of proof are measured at the country level. When institutional ownership and the importance of reducing earnings volatility are missing, we set these variables equal to zero. Dummy variables are set equal to one if these variables are missing and zero otherwise. The coefficients on the dummy variables are not reported in the table. P-values are in parentheses. Panel B presents the marginal effects of changing the independent variables. The base case probabilities are calculated using the coefficients of model (v) in Panel A, and setting the continuous independent variables equal to their mean values. In the base case scenario, the dummy variables are set equal to 0 or 1 depending on the base case (first column). We re-calculate these probabilities changing one independent variable at a time. Continuous independent variables are increased by one standard deviation and the dummy variables are changed from 0 to 1, or from 1 to 0, depending on the case. Column (iii) reports the base case probabilities while columns (iv) to (viii) report the change in probabilities.

Table 11 (continued)

Panel A: Regression models

Variable	(i)	(ii)	(iii)	(iv)	(v)
Log (revenues)		0.120 (0.171)	0.052 (0.466)	0.086 (0.270)	0.132 (0.107)
High accounting quality	0.062 (0.807)				
Low burden of proof		0.500 (0.059)		0.495 (0.072)	0.516 (0.083)
Private company			-0.715 (0.032)	-0.731 (0.040)	-0.579 (0.102)
Institutional ownership				0.883 (0.144)	0.639 (0.364)
Importance of reducing earnings volatility					0.331 (0.004)
Pseudo R-squared	0.003	0.021	0.035	0.062	0.112
N	125	130	137	129	129

Table 11 (continued)

Panel B: Analysis of economic significance based on model (v) of Panel A

Case	Importance of qualifying for hedge accounting	Base Case Probability	Change in probability					Importance of reducing earn volatility
			Switch between low and high burden of proof	Switch between private and public status	Log (revenues)	Institutional ownership		
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	
Private with high burden of proof	0	3.99%	-2.82%	-3.00%	-1.82%	-1.13%	-2.99%	
	3	27.92%	-8.19%	-9.33%	-3.87%	-2.00%	-9.25%	
	5	16.95%	16.05%	18.35%	7.63%	4.04%	18.18%	
Public with low burden of proof	0	0.22%	0.77%	0.95%	-0.13%	-0.08%	-0.19%	
	3	9.89%	8.70%	9.84%	-3.45%	-2.03%	-6.25%	
	5	55.52%	-20.23%	-22.53%	10.29%	5.82%	20.70%	