Corporate Risk Management and Hedge Accounting

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February 10, 2009

Abstract

This paper provides evidence of the impact of hedge accounting under International Financial Reporting Standards (IFRS) on corporate risk management. Using a sample of large UK non-financial firms from 2003 to 2006, we show that the implementation of the new standards reduces the level of asymmetric information faced by derivative users. Specifically, for firms that hedge under IFRS we find that analysts' forecast error and dispersion are significantly lower. The paper contributes to prior research on the effects of hedge accounting and on the adoption of IFRS.

Keywords: derivatives, hedging, asymmetric information, hedge accounting

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1 Introduction

The use of derivative instruments for corporate risk management has grown dramatically over the past decades and so has the need to regulate the accounting treatment and reporting of these instruments. This paper evaluates the impact of accounting for derivatives on the scope of corporate risk management, measured by the level of asymmetric information regarding firm's earnings. The results offer empirical evidence on the total effect of hedge accounting.

According to risk management theories, firms optimally hedge if some market imperfections make volatility costly. Through hedging, firms are able to reduce the cost of financial distress (Mayer and Smith (1982), Smith and Stulz (1985)) and the amount of corporate tax paid (Smith and Stulz (1985)). Ross (1997) and Leland (1998) show that through hedging, firms can reduce the probability of financial distress and hence increase their debt capacity and associated tax advantages. When external financing is more costly, hedging can also ensure that the firm has enough cash flow to internally finance attractive investments (Froot et al (1993), Myers and Majluf (1984)). Finally, financial hedging improves the informativeness of corporate earnings as a signal of management ability (DeMarzo and Duffie (1995)). Barth et al (1999) provide evidence that stock markets reward firms with patterns of increasing earnings, giving managers an additional incentive to avoid volatility.

Accounting for derivatives as prescribed by International Financial Reporting Standards (IFRS) stirred important debate regarding its effect on corporate risk management. On the one hand, it is argued that hedge accounting with fair value measurement[1] makes the use of derivatives more transparent, providing a better picture of the firm's underlying risk exposure. This encourages optimal use of deriva-

[1] According to IFRS, derivatives are measured at transaction price and all fair value gains and losses are recognized in the profit and loss, except where derivatives qualify as instruments for cash flow hedges or hedges of net investment in a foreign entity.

tives, as in a setting with no asymmetric information (Melumad et al (1999)) and improves the informativeness of corporate earnings as a signal of management ability (DeMarzo and Duffie (1995)). On the other hand, hedging under this new accounting regime can increase earnings volatility if derivative instruments do not qualify for hedge accounting treatment. This reduces the hedging benefits associated with earnings smoothing.

If hedging instruments do not qualify for hedge accounting treatment, firms can either accept the impact on their annual reports and follow what it is considered as an optimal *economic* hedge, or adjust their hedging behavior to achieve more desirable accounting results. Adjustments in hedging behavior can imply changes in the type of derivative instruments used, the hedging horizon and the extent of hedging. In the extreme, firms may abandon their hedging program. Under any scenario hedging benefits decrease, as the use of derivatives is either associated with higher earnings' volatility or become suboptimal in terms of risk management.

The above discussion leads to an interesting research question. Which effect of accounting for derivatives under IFRS dominates, the positive; increase in the transparency of derivative disclosure or the negative; increase in the earnings volatility and/or deviation of hedging policy from the optimal? To investigate this question we look at the effect of derivatives usage on the level of asymmetric information regarding firms' earnings[2] before and after the introduction of IFRS. Higher information quality on derivative instruments reduces the noise contained in earnings and thus decreases information asymmetry. Not qualifying for hedge accounting, all else equal, increases the noise contained in earnings, achieving the opposite result.

The UK provides a unique framework for this analysis for a number of reasons. Firstly, in the UK market we observe extensive hedging activity (Grant and Marshall

[2]We choose earnings because they are primarily influenced by the new hedge accounting regime.

(1997), Judge (2006)).[3] Therefore, the effects of hedge accounting are expected to be more pronounced, compared to markets with limited hedging activity. Secondly, the quality of UK GAAP does not differ substantially from IFRS (Christensen et al (2007)). Hence, we expect IFRS effects on information asymmetry to be largely driven by the particular standards that introduce substantial changes, including those concerning hedge accounting. Finally, according to UK GAAP, listed firms were required to report derivatives usage from 1999. This enables us to identify hedgers before the introduction of IFRS.

Using analysts' forecast error and dispersion as proxies for asymmetric information[4] we find that the positive effects of hedge accounting under IFRS dominate. Specifically, derivative usage under IFRS is negatively associated with analysts' forecast error and dispersion. Whether or not derivative positions qualify fully for hedge accounting treatment does not significantly influence earnings' forecast accuracy. The results enhance our understanding of the effect of hedge accounting and suggest that potential IFRS benefits include reduced information asymmetry, which has been shown to reduce cost of capital in theoretical research (Easley and O'Hara (2004)).

The paper is organized as follows: Section 2 presents a review of related academic research. Section 3 summarizes the accounting treatment and disclosure of hedging activity in the UK. The sample and data sources are presented in Section 4. Section 5 presents the variables and models used. The main results of the paper are presented in Section 6. Section 7 concludes.

[3]This is due to high hedging incentives and well developed market for derivatives.

[4]Forecast error and dispersion are used as proxies for asymmetric information in the studies of Lang and Lundholm (1996), Dadalt et al (2002), Hope (2003) and Ernstberger et al (2008), among others.

2 Review of related academic research

Three streams of the literature are most relevant to this paper. First, a number of authors have looked at the informational effect of hedging. In a perfect market with full information, hedging at firm level is irrelevant since shareholders can undertake hedging activity on their own, according to their own risk preferences. However, under a more realistic setting where managers have better information regarding the risk exposure of the firm, corporate hedging can decrease asymmetric information, and potentially increase the value of the firm.

DeMarzo and Duffie (1995) argue that hedging increases the informativeness of earnings as a signal of management ability and project quality by reducing the amount of noise in the firm profits. Tufano (1996) suggests that hedging driven by managerial incentives is not designed to increase shareholders' value. However, Stulz (1996) argues that hedging driven by managerial incentives can reduce the expected payment to corporate "stakeholders" and hence can positively influence the value of the firm. An example is provided by Myers and Majluf (1984), where hedging reduces the cost of externally raised funds, by alleviating the problem of asymmetric information. Empirical studies support this theory, providing evidence that firms with more severe under-investment problems are more likely to hedge (Geczy et al (1997), Allayannis and Ofek (2001) among others).

More closely related to our study, Dadalt et al (2002), investigate the relationship between derivatives usage and asymmetric information. Using analyst forecast accuracy as a proxy for asymmetric information, the study provides evidence that both the use of derivatives and the extent of derivatives usage is associated with lower asymmetric information. The study uses a sample of non-financial firms where derivatives are reported under US GAAP during the entire sample period. In con-

trast to our study, the effect of a change in hedge accounting regime on asymmetric information is not investigated.

A second stream of related research considers the effects of financial reporting on asymmetric information. This influence has been examined widely, from several perspectives. Of particular relevance here are the studies that use forecast accuracy to capture changes in the information environment driven by the financial reporting regime. Lang and Lundholm (1996) find that firms with more informative disclosure policies have a larger analysts' following, more accurate analysts' earnings forecasts and lower forecast dispersion. Using an international sample, Hope (2003) confirms such results, providing evidence that the level of disclosure concerning accounting policies is negatively related to forecast dispersion and forecast error. Evaluating the impact of Regulation Fair Disclosure[5] on the quality and quantity of firm specific information released to the market, Irani and Karamanou (2003) document a decrease in forecast dispersion following its passage. Such an inverse relationship between the quality of disclosure and forecast error is also documented in a number of other studies (for example, Chang et al (2000), Acker et al (2002) and Vanstraelen et al (2003)).

A number of studies look at changes in forecast accuracy following the adoption of new financial reporting standards. Gassen and Sellhorn (2006) show that voluntary adopters of IFRS in Germany have less predictable earnings. In contrast, Ernstberger et al (2008) provide evidence that earnings estimates based on IFRS or UK GAAP are more accurate than estimates based on German GAAP. In an earlier study, Ashbaugh and Pincus (2001) had shown that forecast accuracy improves after voluntary IAS adoption. However, authors note that results based on such voluntary adopting firms may be driven by firms' characteristics rather than by changes in the

[5]Regulation Fair Disclosure was adopted by US Securities and Exchange Commission in 2000 to address the selective disclosure of information by listed companies and other issuers.

financial reporting system. Using data from the Netherlands, Peek (2005) finds that earnings forecast accuracy increases on first adoption if accounting changes have not previously been disclosed.

The preceding discussion of conflicting research findings indicates that the effects of IFRS adoption on asymmetric information remain unclear. This paper provides additional evidence by examining the effect of hedge accounting under IFRS on forecast error and dispersion. Capturing the incremental effect of particular standards that introduce substantial changes in the financial reporting regime enhances our understanding of the sources of IFRS informational effects.

Hedging disclosures essentially turn private information into public information. The third stream of related research addresses the role of public information in affecting hedging decisions. DeMarzo and Duffie (1995) show that if hedge transactions are not disclosed, managers hedge more than they would under a full disclosure regime. Therefore, when the information increase due to hedging outweighs the information provided by hedging activity disclosure, it is optimal for the shareholders to request only aggregate accounting reports. Melumand et al (1999) show that under no-hedge accounting, the hedging decisions deviate from the optimal economic hedge the firm would undertake under symmetric information. The direct empirical investigation of this area is problematic due to data availability. An indirect way of studying the effects of hedge accounting on hedging decisions is by evaluating its impact on the hedging benefits. Higher/lower hedging benefits following a change in hedge accounting regime can be associated with hedging decisions deviating less/more from the optimal policy. Our study contributes to this area, providing evidence of the effect of hedge accounting on the informational benefits of hedging.

3 Accounting treatment and disclosure of hedging activity

Until recently UK firms provided little information in their annual reports regarding derivatives usage, restricting the empirical research. The disclosure of information on the use of derivatives and risk management policy was non-mandatory before 1999. With the introduction of FRS 13, publicity traded entities and all financial institutions except insurance companies were required to provide narrative and numerical disclosures regarding the use of derivatives.[6] According to Woods and Marginson (2004), due to the generic nature of narrative disclosures and the lack of detail and comparability of numerical disclosure, the information provided by firms on the use of derivatives under FRS 13 was of limited value. A clear aim of adopting a more comprehensive IFRS regime in this area has been to enhance the transparency in the reporting of derivatives and their use for risk management purposes. Firms are now required to measure and disclose derivatives as prescribed by IAS 32 Financial Instruments: Disclosure and Presentation and IAS 39 Financial Instruments: Recognition and Measurement.[7]

IAS 39 prescribes the principles for the recognition and measurement of financial instruments, including derivatives. The accounting treatment of derivatives depends on whether hedge accounting is applied as well as on the type of the hedging relationship that is engaged in for accounting purposes. In order for a hedge relationship to exist a hedged item and a hedging instrument are required. According to para.9 of IAS 39, a hedged item can be either "an asset, a liability, a firm commitment, a highly probable forecasted transaction or a net investment in a foreign operation that exposes the entity to the risk of changes in fair value or future cash flows, and

[6]FRS 13 is effective for accounting periods ending on or after 23 March 1999.

[7]IAS 32 and IAS 39 are applicable in the UK for annual periods beginning on or after 1 January 2005.

has to be designated at the outset as being hedged".

The hedging instrument can be a designated derivative (or a designated non-derivative financial asset or financial liability, when hedging foreign currency risk[8]) whose fair value or cash flows are expected to offset changes in the fair value or cash flows of the designated hedged item. A financial instrument is required to meet eight essential criteria in order to be classified as a hedging instrument. These include that it must be designated as a hedging instrument at the inception of the hedge, it must be a derivative[9], it must be expected to offset changes in the value of the hedged item and it must be with an external party[10] to the reporting entity party.

The above criteria for the classification of derivatives as hedging instruments have implications for risk management practice, as certain derivatives used for hedging will not qualify for hedge accounting. For example, although prior theoretical work illustrates that it is optimal for a hedger to sell options under certain conditions (Adam-Muller and Panaretou (2008)), a written option cannot be a hedging instrument for the writer under IFRS. This because the potential loss on the hedging instrument is greater than the potential gain on the hedged item (IAS 39, AG 94) and, as such, the financial instrument does not meet criterion number 4, according to which it must be expected to offset changes in the fair value of cash flows of the hedged item.

IAS 39 recognizes three types of hedging relationship: a fair value hedge, a cash flow hedge and a hedge of a net investment in a foreign operation. A fair value hedge refers to the hedge of the exposure to changes in the fair value of a recognized asset, liability or unrecognized firm commitment. A cash flow hedge refers to the hedge of the exposure to variability in cash flows of a recognized asset or liability,

[8]Permitted for a hedge of the risk of changes in foreign currency exchange rate only.
[9]Unless it used to hedge foreign currency risk, in which case it can also be non-derivative.
[10]An exception for some intragroup monetary items exists.

or a highly probable forecasted transaction. Finally, a hedge of a net investment in a foreign operation concerns the hedge of the changes in the value of a foreign net investment in a subsidiary, due to the exchange rates. The accounting treatment of derivatives depends on whether hedge accounting is applied as well as on the hedging relationship that is recognized. In particular:

1. Fair value hedges: The gain or loss on the hedging instrument is recognized immediately in the income statement. The hedged item is adjusted for fair value changes and its gain or loss is recognized in the income statement. Hedging effectiveness is achieved automatically since the profit or loss both on the hedged item and on the hedging instrument is offset in the income statement.

2. Cash flow hedges: The effective portion of the gain or loss on the hedging instrument is recognized directly in equity. Any ineffective portion is recognized immediately in the income statement. As the hedged item is a future cash flow, there is no gain or loss on the hedged item, since it is not yet recognized in the financial statements. The gain or loss on the hedging instrument which had been initially recognized in equity is recycled to the income statement, when the cash flow hedged item finally is recognized.

3. Hedge of a net investment in a foreign entity: This has a similar accounting treatment for the hedging instrument to when a cash flow hedge exists.

Finally, IAS 39 requires that gains or losses arising from the changes in the fair values of derivative instruments that are not part of a hedging relationship or do not qualify for hedge accounting be immediately recognized in the income statement.

In order for hedge accounting to be applied certain conditions must be met. At the inception of the hedge, formal designation and documentation of the hedging

relationship and of the firm's risk management objective and strategy for the undertaken hedge, is required. The hedge must be highly effective,[11] and it must be possible to continuously measure the effectiveness of the hedge throughout all the financial reporting periods for which the hedge was designated.

IAS 32 defines the information that must be disclosed about financial instruments and prescribes requirements for their presentation in annual reports, resulting in the more extensive and detailed presentation and disclosure of derivatives used for financial risk management purposes.[12]

The new hedge accounting regime has considerably influenced derivatives users. For many, the implementation of IAS 32 and IAS 39 has required changes to the systems, processes, documentation and for some to the management of financial risks. The disclosure requirements and strict criteria have increased the workload for derivative users. In order to qualify for hedge accounting firms are required to implement new procedures from hedge inception until the end of the hedging period, including continuing effectiveness tests and fair value evaluation for every intervening reporting period. The use of certain complex and not easily justifiable derivatives is likely to be reduced.[13] In addition firms with limited Treasury resources may abandon their hedging activities.

Therefore, while derivatives are broadly used to reduce volatility, it can be plausibly argued that the introduction of the new accounting standards may achieve overall the opposite result for some derivative users. For example, derivatives, which do not now qualify as hedging instruments, will be measured at fair value generating

[11] Hedge effectiveness refers to the degree to which changes in the fair value or cash flows of the hedged item that are attributed to the hedged risk are offset by changes in the fair value or cash flows of the hedging instrument. This requires that changes must be almost fully offset, and actual results must be within a range of 80%-125%.

[12] IAS 32 does not prescribe the format or location of its required disclosures.

[13] Many exotic options or options combinations do not meet the strict criteria for hedge accounting.

additional gains and/or losses for the firm. According to Alfredson et al (2007), the fact that some instruments will be now classified as liabilities rather than equity will affect the gearing and solvency ratios of the firm, debt covenants with financial institutions and regulatory requirements for capital adequacy.

4 The sample

For the implementation of the study we collect data from FTSE 350 firms, covering four fiscal years (2003 to 2006). Since we study the impact of hedge accounting on corporate risk management, we restrict the sample to non-financial firms.[14] Throughout the sample period, reporting derivatives usage was compulsory for UK listed firms (2003-2004 under FRS 13, 2005 under FRS 13 or IAS 32, 2006 under IAS 32). For the financial year 2005, whether financial instruments are measured and reported according to IFRS or not, depends on the inception of the financial year (83 firms reported under IFRS and 94 firms reported under UK GAAP).

Data for the calculation of the dependent variables are taken from Institutional Brokers Estimates System (IBES). From IBES we also obtain the forecast date, the date of the actual earnings' announcement, the number of analysts following and the Earnings' stability measure. The Loss dummy[15] is calculated based on actual earnings provided by IBES. Data on the hedging activity of the firms and the application of hedge accounting are hand-collected from annual reports. Annual reports are downloaded from Perfect Information database. We use the Thomson Worldscope database to obtain the other control variables.

Table 1 presents data on sample selection. After we exclude financial firms from the FTSE350 firms, annual reports are available for a total of 845 firm years. After

[14]Financial firms commonly use derivatives for trading purposes.

[15]The Loss dummy equals to 1 if the firm had negative EPS during the last financial year and 0 otherwise.

the loss of 180 observations because of missing forecast, control and explanatory variables data, the final sample comprises 665 firm years for tests of forecast error and 642 firm years for tests of forecast dispersion.

(Insert Table 1 here.)

Table 2 provides detailed information on the percentage of firms using derivatives per year and industry group. We partition our sample according to the Fama-French 17 industry classification, based on their four-digit SIC code. As we exclude financial firms from the analysis and as no firm in the sample belongs to the clothes industry, we are left with 15 industry groups.

(Insert Table 2 here.)

Of the 665 firm year observations we identify derivative usage in 586 (88.12%). This percentage is higher than the percentage of derivative usage documented in US studies[16], supporting the argument that large UK firms use derivatives more widely for risk management. A high percentage of derivative users implies that a large number of firms in the UK market are influenced by changes in accounting treatment and reporting of financial instruments. This justifies the extensive debate that was created concerning the impact of hedge accounting under IFRS.

From the industry breakdown we can see that the use of derivatives is less common in steel works and consumer durables industries. All firms belonging to the mining, chemical, fabricated products, automobile and utilities industries report hedging activity. High hedging activity is also reported in oil, transportation and retail stores industries.

[16] 21.21% in Nelson et al (2005), 56.7% in Guay and Kothari (2003).

5 Variables and models

5.1 Dependent variables

As a proxy for information asymmetry we use analysts' earnings forecast error and dispersion. Following Lang and Lundholm (1996), we define forecast error as the absolute difference between actual EPS and mean forecasted EPS scaled by the stock price at the beginning of the financial year. The mean forecasted EPS is computed using all available forecasts as of the last IBES reporting month prior to the announcement of actual earnings.[17]

$$FError_t = \frac{|ActualEPS_t - ForEPS_t|}{StockPrice_{t-1}} \tag{1}$$

Forecast dispersion measures consensus among analysts. As in Chang et al (2000), we calculate forecast dispersion as the standard deviation of the analysts' forecasted EPS, scaled by the absolute mean analyst forecast.

$$FDisp_t = \frac{StDev(ForEPS_t)}{|ForEPS_t|} \tag{2}$$

(Insert Table 3 here.)

Table 3 provides summary statistics for the dependent variables. Panel A describes the distribution of forecast error and dispersion for the whole sample. Panel B describes the subgroup of observation years that firms use derivatives and report under UK GAAP. Panel C describes the subgroup of firm years where derivative usage is identified and reported under IFRS. From the table we can see that hedgers

[17]The mean forecast EPS of the last month before the announcement is used as the forecast closer to the announcement date is more accurate.

under IFRS have lower mean, median and standard deviation of forecast error and dispersion.

5.2 Independent and Control variables

To test our hypotheses we use three dummy variables. The first variable indicates the application of IFRS. Hence, *IFRSdummy* takes the value 1 if the firm reports under IFRS in the current financial year and 0 otherwise. A hedging dummy (*Hedge*) equals to 1 if the firm uses derivatives to hedge any type of financial risk and 0 otherwise. Finally, we include the interaction of *IFRSdummy* and *Hedge*. *IFRSHedge* dummy equals to 1 if the firm is a derivative users and reports under IFRS in the current period and 0 otherwise.

For the multivariate analysis several control variables are used, based on the extensive literature on forecast accuracy determinants.[18] The literature suggests that forecast error and dispersion are influenced by:

1. *Firm size:* Atiase (1985) argues that larger firms are likely to have less asymmetric information due to higher institutional ownership and greater analyst following. Furthermore, firm size influences the hedging behavior as larger firms are more likely to hedge than smaller firms. To control for firm size we use the natural log of the market value [19] of the firm (*MarketValue*).

2. *Earnings' variability:* To control for earnings variability we use the natural log of the earnings stability measure, provided by the IBES database (*EarnStab*). *EarnStab* measures the consistency of earnings per share growth over the past

[18] See for example Lang and Lundholm (1996), Hope (2003), Irani and Karamanou (2003), Ernstberger et al (2008).

[19] Market value of equity plus book value of debt plus preferred stock

five years. The lower the number, the more uniform growth has been.[20] Hence, we expect a positive coefficient.

3. *Leverage:* Capital structure can be related to earnings volatility. One the one hand, more levered firms have incentives to smooth earnings. On the other hand, highly levered firms are likely to have more pronounced cyclical effects. As a proxy we use the ratio of the book value of long term debt to the market value of the firm (*Leverage*). The sign of the *Leverage* coefficient is not clear *a priori*.

4. *Market to book value:* Firm with higher growth opportunities may have earnings that are less predictable. To control for growth opportunities we include the ratio of market to book value (*MarkettoBook*).

5. *Analyst following:* Number of analysts following (*Numest*).

6. *Negative earnings:* Dummy that equals 1 if the firm had negative EPS for the last reporting year and 0 otherwise (*Loss*). Previous research documents that is more difficult for analysts to forecast earnings for firms that show losses.

7. *Level of earnings:* To control for the level of earnings we use actual earnings per share divided by the stock price at the beginning of the reporting year (*Earnings*). Eames and Glover (2003) document association between earnings level and forecast error.

8. *Time effect:* To control for time effect we use year dummies.

9. *Industry effect:* To control for industry effect we construct industry dummies, based on the Fama and French 17-industry classification.

(Insert Table 4 here.)

[20] *EarnStab* is calculated as the mean absolute percentage difference between the actual EPS and a five-year historical EPS growth trend line, expressed as a percentage of trend line EPS.

Table 4 provides summary statistics for the main control variables. Panel A describes the distribution of firm characteristics for the whole sample. Panel B describes the subgroup without hedging activity and Panel C describes the subgroup with hedging activity. From Panel B and C we can see that non hedgers have considerably lower market value than hedgers, supporting empirical evidence that larger firms hedge more. In line with the studies that argue that firms hedge in order to increase debt capacity, hedgers are more levered.

5.3 Models

To test our hypotheses, we estimate the models

$$\begin{aligned} FError = \alpha + \beta_1 \text{IFRSdummy} + \beta_2 \text{Hedge} + \beta_3 \text{IFRSHedge} \\ + \Sigma_j \gamma_j \text{Control Variable}_j + \varepsilon \end{aligned} \tag{3}$$

$$\begin{aligned} FDisp = \alpha' + \beta'_1 \text{IFRSdummy} + \beta'_2 \text{Hedge} + \beta'_3 \text{IFRSHedge} \\ + \Sigma_j \gamma'_j \text{Control Variable}_j + \varepsilon' \end{aligned} \tag{4}$$

The dependent variable is *FError* in the first model and *FDisp* in the second model. In both models we use three dummy variables. The first dummy variable indicates the application of IFRS (*IFRSdummy*). The second dummy variable indicates the use of derivatives for risk management (*Hedge*). The third dummy variable (*IFRSHedge*) is the interaction of *IFRSdummy* and *Hedge*. Hence, the coefficient β_1 captures the general impact of IFRS on forecast accuracy; the coefficient β_2 give us the impact of hedging on forecast accuracy; the incremental effect of hedging under IFRS is captured by β_3. Finally, we include the control variables described in subsection 5.2.

A negative *IFRSHedge* coefficient indicates that hedge accounting under IFRS increases the predicability of earnings. Therefore, the positive effects of the increase

in transparency of derivatives use dominate the negative effects arising from potential increase in earnings' volatility and/or deviation from optimal hedging behavior. A positive *IFRSHedge* coefficient indicates that hedge accounting under IFRS increases the level of asymmetric information faced by derivative users.

6 Results

Descriptive statistics indicate that *FError* and *FDisp* are lower when derivative instruments are reported under IFRS. To test whether this difference is statistically significant, we firstly employ univariate analysis. Table 5 compares the mean and median *FError* and *FDisp* of two groups of hedgers. In the first group we include observation years that derivatives instruments are reported under UK GAAP. In the second group we include observation years that derivatives usage is reported according to IFRS.

(Insert Table 5 here.)

The univariate analysis indicates lower forecast error and dispersion for firm years that derivative usage is reported according to IFRS. These differences are significant at 1% level using two-tailed p-values. The findings support the argument that the new financial reporting standards make the use of derivatives more transparent, improving the informativeness of corporate earnings. However, these differences may not be due to hedge accounting but to a number of other characteristics that influence forecast accuracy, including size, capital structure, stability and level of earnings.

In order to isolate the effect of hedge accounting we use multivariate analysis. The next table presents regression results for the two models. To control for the

panel data structure we include year dummies in the regressions and report standard errors clustered by firm. Two-tailed p-values are reported.

(Insert Table 6 here.)

For both models the *IFRSHedge* coefficient is negative and significant at the 5% level. These findings suggest that hedge accounting under IFRS increases the predictability of the earnings. Hence, the positive effects of the increase in the transparency of derivatives usage dominates any negative effects arising from the increase in earnings' volatility and/or deviation from optimal hedging policy. The R-square is 30.03% and 16.37% for *FError* and *FDisp* respectively, indicating that the models have good explanatory power, compared to other studies[21] on forecast accuracy.

The coefficient of the dummy variable (*IFRSdummy*), that captures the general impact of IFRS implementation on forecast accuracy, is insignificant. This is not surprising, as overall the evidence on the association between IFRS adoption and forecast accuracy is mixed. Gassen and Sellhorn (2006) show that voluntary adopters of IFRS have less predictable earnings, where, Ernstberger et al (2008) and Ashbaugh and Pincus (2007) document improvements in forecast accuracy following voluntary IFRS adoption. The extent to which we could expect the same results for firms that mandatory adopt IFRS is much less clear.

Using a European sample of publicity traded companies Byard et al (2008) provide evidence that the effect of mandated IFRS adoption on analysts' forecast error is influenced by the difference between domestic GAAP and IFRS. Our results are in line with the above argument. In other words, we do not expect to see an overall positive impact on forecast accuracy in countries, as for example the UK, where the

[21] Dadalt et al (2002) with adjusted R^2 between 7.4% and 11.5% depending on the model, Hope (2003) with R^2 between 7.4% and 11.5% depending on the model.

local GAAP do not differ substantially from IFRS. Any impact on forecast accuracy, after the IFRS introduction, is expected to be driven by these specific standards that introduce important changes in accounting treatment and/or financial reporting.

Contrary to the findings of Dadalt et al (2002), the coefficient of *Hedge* dummy is not significant. This suggests that before the introduction of IFRS hedging activity did not serve as a means to reduce information asymmetry in the UK market. However, the high percentage of derivative users, indicates that firms derived some other benefits from hedging activity, such as reduction of financial distress costs, tax benefits and reduction of under-investment costs.

As expected, the coefficients of the control variables *Loss* and *EarnStab* have a positive sign, implying that forecast accuracy is lower for firms with losses in the previous year and higher earnings volatility. The multivariate analysis indicates that forecast accuracy decreases with leverage. In line with earlier studies, analyst following is significantly negatively related to forecast error. The coefficients of *MarketValue* and *MarkettoBook* are insignificant.

In the next stage of the analysis we include an additional dummy variable indicating whether a firm's derivatives position qualifies for hedge accounting treatment under IFRS. The dummy *NQHA* equals 1 if some or all derivatives do not qualify for hedge accounting treatment and 0 otherwise. Derivatives that do not qualify for hedge accounting treatment have to be measured at fair value. This generates additional gains and/or losses for the firm, increasing earnings' volatility. Therefore we expect *NQHA* to increase forecast error and dispersion.

The information as to whether derivatives qualify for hedge accounting or not may be directly given in annual reports. In some cases however, it is deduced from the way financial instruments are categorized. For example a firm may state that it does not use derivatives for trading but has the following categories of derivatives

in the annual report: cash flow hedge, fair value hedge, hedge of net investment, derivatives classified as held for trading. Under the fourth category, the firm discloses the derivatives that are used for financial risk management but do not qualify for hedge accounting. Furthermore, some firms state that they choose not to apply hedge accounting, mainly due to the workload and other costs associated with the qualification process. Of the hedgers that report under IFRS, 59.92% indicate that some or all derivatives do not qualify for hedge accounting treatment.

(Insert Table 7 here.)

Consistent with our hypothesis, in both models the *NQHA* dummy is positively related to forecast error and dispersion, however, its coefficients are not significant. This can be largely due to the noise in our measure for hedge accounting qualification. The dummy variable does not capture the size of derivatives position that does not qualify for hedge accounting treatment and therefore the magnitude of the impact on firm's earnings. However, due to non-availability of data[22], we cannot use a more precisely measured variable.

Studies in corporate risk management focus largely on interest rate and currency hedging. This is due to a number of reasons. Among others, interest rate and currency hedging are employed more often by firms, more detailed data is available on currency and interest rate hedging and it is potentially easier to measure the magnitude of the underling exposure. In order to keep the results of this study comparable to other studies, we present regression results based only on currency and interest rate hedgers. Table 8 presents regression results for models 1 and 2. The *Hedging* dummy equals 1 if currency or interest rate hedging is reported and 0 otherwise.

[22]Firms are not required to report the notional value of derivatives position under IFRS.

(Insert Table 8 here.)

The results are in line with the results presented in Table 6 where all derivative users are considered as hedgers. The signs of the independent and control variables remain unchanged. Moreover, the size and significance of the *IFRSHedge* coefficient increase in both regressions.

6.1 Controlling for endogeneity

In this subsection we attempt to control for the endogeneity of the firm's decision to hedge in evaluating the effect of hedge accounting on asymmetric information. If the firms that choose to hedge after the introduction of IFRS are not a random sample of firms, the OLS estimate of the coefficient of *IFRSHedge* will be biased. To control for the self-selection bias we use Heckman's (1979) correction.[23] Specifically, we assume that a firm's decision to hedge is determined by

$$\begin{aligned} Hedge^* &= \alpha_i Z_i + \mu \\ Hedge = 1 \quad &\text{if} \quad Hedge^* \geq 0 \\ Hedge = 0 \quad &\text{if} \quad Hedge^* < 0 \end{aligned} \tag{5}$$

where Z_i is a set of variables that affect the decision to hedge, and μ is an error term. We firstly estimate equation 5 using a probit model. The consistent estimates are used to estimate λ_{Hedge} and λ_{NHedge}. In particular, $\lambda_{Hedge} = \frac{\phi(\alpha_i Z_i)}{\Phi(\alpha_i Z_i)}$ and $\lambda_{NHedge} = -\frac{\phi(\alpha_i Z_i)}{1-\Phi(\alpha_i Z_i)}$, where $\phi(.)$ and $\Phi(.)$ are, respectively, the density and cumulative distribution functions of standard normal distribution.

[23]The panel structure of our data enable us to introduce fixed effects as an alternative way to control for unobservable firm characteristics that affect the decision to hedge. However, the fixed effect model does not necessarily alleviate the self-selection issue. In order for fixed effect models to rule out unobservables, the unobservables must be time invariant (Li and Prabhala (2005)). Here, the drivers of the decision to hedge are not only time varying but also related to the event under consideration, the adoption of IFRS.

In the second step, we estimate the following models

$$\begin{aligned} FError = &\ \alpha + \beta_1 \text{IFRSdummy} + \beta_2 \text{Hedge} + \beta_3 \text{IFRSHedge} \\ &+ \Sigma_j \gamma_j \text{Control Variable}_j \\ &+ \delta_\lambda [\lambda_{Hedge} Hedge + \lambda_{NHedge}(1 - Hedge)] + \eta \\ = &\ \alpha + \beta_1 \text{IFRSdummy} + \beta_2 \text{Hedge} + \beta_3 \text{IFRSHedge} \\ &+ \Sigma_j \gamma_j \text{Control Variable}_j + \delta_\lambda \lambda + \eta \end{aligned} \tag{6}$$

$$\begin{aligned} FDisp = &\ \alpha' + \beta'_1 \text{IFRSdummy} + \beta'_2 \text{Hedge} + \beta'_3 \text{IFRSHedge} \\ &+ \Sigma_j \gamma'_j \text{Control Variable}_j \\ &+ \delta'_\lambda [\lambda_{Hedge} Hedge + \lambda_{NHedge}(1 - Hedge)] + \eta' \\ = &\ \alpha' + \beta'_1 \text{IFRSdummy} + \beta'_2 \text{Hedge} + \beta'_3 \text{IFRSHedge} \\ &+ \Sigma_j \gamma'_j \text{Control Variable}_j + \delta'_\lambda \lambda + \eta' \end{aligned} \tag{7}$$

where $\delta_\lambda = \rho_{\eta\varepsilon}\sigma_\varepsilon$ and $\delta'_\lambda = \rho_{\eta\varepsilon'}\sigma_{\varepsilon'}$. The sign of δ_λ is determined by the correlation between the error terms in equations 3 and 5. The sign of δ'_λ is determined by the correlation between the error terms in equations 4 and 5.

Based on corporate risk management theories, we build the empirical model to explain the hedging decision.[24] The cost of financial distress hypothesis implies that firms with lower interest cover, less liquidity and smaller size are more likely to use derivatives. To control for these we include the ratio EBIT to total interest expenses (*EBITtoInterest*), the current ratio (*CurrentRatio*) and the natural log of total assets (*LogAssets*). *LogAssets* is also used to control for informational and transactional scale economies argument, according to which larger firms are more likely to hedge. The tax hypothesis suggests that the benefits of hedging are greater if the firm has tax credits. The dummy *TaxCredits*, which equals 1 if the firm has

[24]For similar empirical models see Nance et al. (1993), Mian (1996).

income tax credits and 0 otherwise. Agency cost arguments suggest that hedging incentives are greater the higher the investment opportunities. We control for this using the ratio of capital expenditures to sales (*CapExptoSales*). Considering hedging substitutes, the probability of hedging is lower the more liquid the firm assets and the lower the dividend payout ratios. We control for hedging substitutes by including *CurrentRatio* and dividend yield (*DividendYield*). All variables used to explain hedging decision are obtained from Thomson Worldscope database.

The results from estimating the probit model are presented in Table 9. In line with the financial distress hypothesis, the coefficient of size has a positive sign and the coefficients of *EBITtoInterest* and *CurrentRatio* have negative signs. The coefficient of *TaxCredits* is positive though not significant. Consistent with the underinvestment framework of Froot et al (1993), the coefficient of *CapExptoSales* has a positive sign.

(Insert Table 9 here.)

In the second stage, we include the self-selection parameter (λ) calculated from the probit regression. The results are presented in Table 10. Due to additional data requirements the number of observation years reduces to 651 for model four (equation 6) and 628 for model five (equation 7).

(Insert Table 10 here.)

For both models the coefficient of the correction for self-selection (λ) is insignificant, indicating that there is no correlation between the choice of the firm to hedge and the forecast accuracy. The *IFRSHedge* coefficient continues to be negative and significant at the 5% level in both models. These findings show that the reduced

asymmetric information for hedgers after the introduction of IFRS is not a result of self-selection.

6.2 Further sensitivity analyses

To test the sensitivity of our results to dependent variables, we re-estimate the first model using median as a consensus forecast instead of mean. The inference of our results does not change. As it can be seen from Table 11 the interaction term indicating derivative use under IFRS is significantly negative.

(Insert Table 11 here.)

As forecast dispersion based on two estimates only could be biased, we re-estimate the second model excluding observations with a number of analysts following smaller than three. This process restricts our sample to 601 observation years. Regression results are presented in Table 12. The coefficients in the regressions are similar to those estimated before, while we find lower R-square (between 14.93% and 14.85%).

(Insert Table 12 here.)

We also perform regression analysis winsorizing the dependent variables at the 99^{th} percentile. As it can be seen from Table 13 we get higher R-square for both models (32.49% and 32.31% respectively). The sign of *IFRSHedge* coefficient is negative and statistically significant both for forecast error and forecast dispersion. We also get very similar results in terms of sign and significance when we delete observations where the dependent variable is higher than the 99th percentile.

(Insert Table 13 here.)

We also evaluate whether our results hold when using forecasted earnings reported four months rather than one month before the actual earnings announcement. The coefficients of the independent and control variables are very similar to those of the main analysis in terms of sign and significance. Furthermore, we re-estimate our model dividing the sample to medium and large size firms. The results do not indicate any differences between the effect of hedge accounting experienced by medium and large size firms. We also identify no differences in the effect of IFRS introduction and hedging activity.

In summary the sensitivity analyses indicate that the results are not driven by the definition of the dependent variable, outliers, the use of forecast data one month prior to the earnings' announcement or self-selection issues.

7 Conclusions

Accounting for derivatives as prescribed by International Financial Reporting Standards stirred important debate regarding its effect on corporate risk management. On the one hand, it is argued that better quality of information regarding derivative instruments reduces the noise contained in earnings and thus decreases information asymmetry. On the other hand, concerns are expressed regarding the ability of the corporations to achieve hedge accounting treatment, leading to a reduction of hedging benefits associated with smooth earnings.

Investigating the periods surrounding the adoption of IFRS, we provide evidence that under the new hedge accounting regime, earnings are more predictable. Specifically, for firms that measure and report derivatives under IFRS, we find that analysts' forecast error and dispersion are significantly lower. Hedge accounting benefits are more pronounced for currency and interest rate hedgers, whereas non-eligibility

for hedge accounting treatment does not significantly influence forecast accuracy. The sensitivity analyses show that our results hold when we change the definition of dependent variables, control for outliers, use forecast data of different periods prior to the earnings' announcement and control for self-selection. The above results contributes to prior research on the effects of accounting for derivatives and on the adoption of IFRS.

Whether changes in hedge accounting have a positive effect on firm's valuation is a question to be answered by future research. As our sample only covers the period 2003-2006, the results may capture the early reaction to hedge accounting standards. It is therefore possible to change as soon as the market becomes more familiar with the new financial reporting regime. Future research in this area should focus on evaluating the long-term effect of hedge accounting under IFRS. It would be also interesting to further explore firm-specific factors that may influence the magnitude of the effect.

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Table 1: The sample

Firm-years with annual reports available (2003-2006)	845
Less: Firm years with missing forecast data	178
Firm years with annual reports and analyst data	667
Less: Firm years with missing data on control and explanatory variables	2
Number of observations for multivariate test of forecast error	**665**
Less: Firm years with less than two analyst forecasts	23
Number of observations for multivariate test of forecast dispersion	**642**

The table presents data on sample selection. In the sample we include all FTSE350 non-financial firms for the period 2003 to 2006 that have available data. This process leads to 665 observation years for multivariate test of forecast error and to 642 observation years for multivariate test of forecast dispersion.

Table 2: Derivative users by year and industry

	Number of firms	**Derivative Users (%)**
Year		
2003	144	88.19%
2004	161	86.34%
2005	177	89.83%
2006	183	87.98%
Industry		
Food	36	88.89%
Mines	19	100.00%
Oil	20	90.00%
Consumer durables	12	75.00%
Chemicals	4	100.00%
Drugs, soap, tobacco	29	89.66%
Construction	89	82.02%
Steel works	8	62.50%
Fabricated products	8	100.00%
Machinery and business equip	57	89.47%
Automotive	12	100.00%
Transportation	51	92.16%
Utilities	22	100.00%
Retail Stores	73	95.89%
Other	225	84.44%
Total	**665**	**88.12%**

The table reports the percentage of firms that use derivatives by year and industry group. In our sample we include all FTSE350 non-financial firms for the period 2003 to 2006. The sample consists of 665 year observations. The firms are allocated into the Fama-French 17 industry classifications based on their four-digit SIC code.

Table 3: Descriptive statistics on forecast accuracy

	Mean	**Median**	**Std Dev**	**10th Pctl**	**90th Pctl**	**Min.**	**Max.**
Panel A: All firms (n=665)							
FError	0.0124	0.0044	0.0276	0.0006	0.0290	0.0000	0.4151
FDisp	0.1081	0.0525	0.2496	0.0161	0.2162	0.0000	3.6750
Panel B: Hedgers under UK GAAP (n=349)							
FError	0.0179	0.0070	0.0357	0.0009	0.0442	0.0000	0.4151
FDisp	0.1467	0.0650	0.3342	0.0176	0.2694	0.0000	3.6750
Panel C: Hedgers under IFRS (n=237)							
FError	0.0052	0.0026	0.0096	0.0003	0.0112	0.0000	0.1239
FDisp	0.0654	0.0422	0.0740	0.0151	0.1315	0.0000	0.7365

The table provides descriptive statistics on forecast error (FError) and dispersion (FDisp). Panel A describes the distribution of the dependent variables for the whole sample. Panel B and C provide descriptive statistics for the subgroups of hedgers under UK GAAP and IFRS respectively. FError is defined as the absolute difference between actual EPS and mean forecasted EPS scaled by the stock price at the beginning of the reporting period. FDisp is defined as the standard deviation of the analysts' forecasted EPS, scaled by the mean forecasted EPS.

Table 4: Descriptive statistics on firm characteristics

	Mean	Median	Std Dev	10th Pctl	90th Pctl	Min.	Max.
Panel A: All firms (n=665)							
MarketValue (mil)	4934.63	1510.82	11911.32	379.62	8708.39	66.16	102923.45
EarnStab	24.24	13.15	61.78	3.26	43.70	1.34	1015.00
Leverage	0.21	0.18	0.16	0.01	0.43	0.00	0.96
MarkettoBook	1.59	1.29	1.01	0.74	2.92	0.31	7.72
Numest	9.29	8.00	6.10	3.00	17.00	1.00	42.00
Loss	0.05	0.00	0.22	0.00	0.00	0.00	1.00
Earnings	0.08	0.08	0.04	0.04	0.13	-0.12	0.30
Panel B: Non hedgers (n=79)							
MarketValue (mil)	929.16	572.26	841.53	280.53	2285.38	66.16	3912.45
EarnStab	24.59	9.45	91.88	2.42	34.18	1.35	819.20
Leverage	0.07	0.03	0.09	0.00	0.20	0.00	0.41
MarkettoBook	1.85	1.67	1.13	0.82	3.73	0.54	7.60
Numest	6.72	6.00	4.68	1.00	13.00	1.00	21.00
Loss	0.11	0.00	0.32	0.00	1.00	0.00	1.00
Earnings	0.09	0.08	0.05	0.05	0.16	0.00	0.25
Panel C: Hedgers (n=586)							
MarketValue (mil)	5474.62	1730.68	12589.14	427.71	9963.79	96.10	102923.45
EarnStab	24.19	13.86	56.63	3.64	43.75	1.34	1015.00
Leverage	0.23	0.20	0.16	0.04	0.45	0.00	0.96
MarkettoBook	1.55	1.25	0.99	0.74	2.91	0.31	7.72
Numest	9.63	8.00	6.19	3.00	18.00	1.00	42.00
Loss	0.04	0.00	0.20	0.00	0.00	0.00	1.00
Earnings	0.08	0.08	0.04	0.04	0.13	-0.12	0.30

The table provides descriptive statistics on firm characteristics. Panel A describes the distribution of the control variables for the whole sample. Panel B and C provide descriptive statistics of the control variables for the subgroups of non hedgers and hedgers. The market value (MarketValue) is given in million sterling.

Table 5: Univariate results

Panel A: differences in mean	UK GAAP		IFRS				
	N	Mean	N	Mean	Difference	t-value	p-value
FError	349	0.0179	237	0.0052	0.0126	6.28	<.0001
FDisp	334	0.1467	237	0.0654	0.0813	4.30	<.0001
Panel B: differences in median							
	N	Median	N	Median	Difference	z-score	p-value
FError	349	0.0070	237	0.0026	0.0044	-7.88	<.0001
FDisp	334	0.0650	237	0.0422	0.0228	-4.83	<.0001

Panel A compares the mean and Panel B the median of the forecast error and dispersion for hedgers under UK GAAP and hedgers under IFRS. The mean is compared using t-test and the median is compared using Wilcoxon rank-sum z-test. Two-tailed p-values are reported.

Table 6: Impact of hedge accounting on forecast accuracy

	Model 1: FError			Model 2: FDisp		
Variable	**Estimate**	**t Value**	**Pr > |t|**	**Estimate**	**t Value**	**Pr > |t|**
Intercept	-0.0467	-1.09	0.28	-0.3181	-0.94	0.35
IFRSdummy	0.0050	1.24	0.22	0.0156	0.49	0.62
Hedge	0.0020	0.59	0.56	0.0053	0.21	0.83
IFRSHedge	-0.0083	-1.98	0.05	-0.0648	-2.20	0.03
LogMarketValue	0.0016	0.87	0.39	0.0182	1.00	0.32
Loss	0.0315	2.37	0.02	0.0809	1.46	0.15
LogEarnStab	0.0038	2.39	0.02	0.0381	3.52	0.00
Leverage	0.0372	1.63	0.10	0.2895	2.15	0.03
Numest	-0.0003	-2.01	0.05	-0.0024	-0.98	0.33
Earnings	0.1012	1.12	0.27	-0.9794	-3.63	0.00
MarkettoBook	-0.0010	-0.89	0.38	-0.0072	-0.82	0.41
Year dummies	Yes			Yes		
Industry dummies	Yes			Yes		
R-square	*30.03%*			*16.37%*		

The table presents regression results of the impact of hedge accounting under IFRS on forecast accuracy. Dependent variables are Forecast Error (FError) and Forecast Dispersion (FDisp). FError is calculated as the absolute difference between actual EPS and mean forecasted EPS scaled by the stock price at the beginning of the financial year. FDisp is calculated as the standard deviation of the analysts' forecasted EPS, scaled by the absolute mean analyst forecast. Industry and year dummies are used to all regressions to control for industry and time effect but are not reported here. Standard errors are corrected for firm effects and two-tailed p-values are reported.

Table 7: Impact of hedge accounting on forecast accuracy: hedge accounting treatment

	Model 1: FError			Model 2: FDisp		
Variable	**Estimate**	**t Value**	**Pr > |t|**	**Estimate**	**t Value**	**Pr > |t|**
Intercept	-0.0463	-1.06	0.29	-0.3103	-0.90	0.37
IFRSdummy	0.0050	1.24	0.22	0.0155	0.49	0.62
Hedge	0.0021	0.59	0.56	0.0056	0.22	0.82
IFRSHedge	-0.0086	-1.99	0.05	-0.0694	-2.31	0.02
NQHA	0.0004	0.25	0.80	0.0076	0.49	0.63
LogMarketValue	0.0016	0.85	0.40	0.0178	0.96	0.34
Loss	0.0315	2.37	0.02	0.0809	1.45	0.15
LogEarnStab	0.0038	2.39	0.02	0.0382	3.52	0.00
Leverage	0.0372	1.63	0.10	0.2897	2.15	0.03
Numest	-0.0003	-2.01	0.05	-0.0024	-0.97	0.33
Earnings	0.1011	1.11	0.27	-0.9799	-3.65	0.00
MarkettoBook	-0.0010	-0.89	0.38	-0.0072	-0.82	0.41
Year dummies	Yes			Yes		
Industry dummies	Yes			Yes		
R-square	*30.03%*			*16.38%*		

The table presents regression results of the impact of hedge accounting under IFRS on forecast accuracy. Dependent variables are Forecast Error (FError) and Forecast Dispersion (FDisp). FError is calculated as the absolute difference between actual EPS and mean forecasted EPS scaled by the stock price at the beginning of the financial year. FDisp is calculated as the standard deviation of the analysts' forecasted EPS, scaled by the absolute mean analyst forecast. Industry and year dummies are used to all regressions to control for industry and time effect but are not reported here. Standard errors are corrected for firm effects and two-tailed p-values are reported.

Table 8: Impact of hedge accounting on forecast accuracy: Interest rate and currency hedgers

	Model 1: FError			Model 2: FDisp		
Variable	**Estimate**	**t Value**	**Pr > |t|**	**Estimate**	**t Value**	**Pr > |t|**
Intercept	-0.0459	-1.08	0.28	-0.3227	-0.95	0.34
IFRSdummy	0.0052	1.31	0.19	0.0222	0.71	0.48
Hedge	0.0028	0.87	0.39	0.0075	0.31	0.75
IFRSHedge	-0.0086	-2.14	0.03	-0.0730	-2.47	0.01
LogMarketValue	0.0015	0.84	0.40	0.0184	1.00	0.32
Loss	0.0317	2.39	0.02	0.0812	1.46	0.15
LogEarnStab	0.0037	2.38	0.02	0.0380	3.51	0.00
Leverage	0.0366	1.61	0.11	0.2889	2.15	0.03
Numest	-0.0003	-1.98	0.05	-0.0024	-0.96	0.34
Earnings	0.1007	1.11	0.27	-0.9855	-3.67	0.00
MarkettoBook	-0.0010	-0.94	0.35	-0.0081	-0.91	0.36
Year dummies	Yes			Yes		
Industry dummies	Yes			Yes		
R-square	30.07%			16.45%		

The table presents regression results of the impact of hedge accounting under IFRS on forecast accuracy for interest rate and currency hedgers. Dependent variables are Forecast Error (FError) and Forecast Dispersion (FDisp). FError is calculated as the absolute difference between actual EPS and mean forecasted EPS scaled by the stock price at the beginning of the financial year. FDisp is calculated as the standard deviation of the analysts' forecasted EPS, scaled by the absolute mean analyst forecast. Industry and year dummies are used to all regressions to control for industry and time effect but are not reported here. Standard errors are corrected for firm effects and two-tailed p-values are reported.

Table 9: Probit Estimates for Hedging

Parameter	Estimate	Expected Sign	p-Value
Intercept	-6.9518	+/−	0.00
LogAssets	0.3918	+/−	0.00
EBITtoInterest	-0.0005	−	0.04
TaxCredits	3.0997	+	0.99
CapExptoSales	2.8488	+	0.00
DividendYield	0.1361	+	0.01
CurrentRatio	-0.2215	−	0.00
Year Dummies	Yes		

The table presents probit estimates for hedging decision. The dependent variable (Hedge) takes the value 1 if the firm uses derivatives and 0 otherwise. Year dummies are used but are not reported here. Two-tailed p-values are reported.

Table 10: Impact of hedge accounting on forecast accuracy including self-selection parameter

	Model 4: FError			Model 5: FDisp		
Variable	**Estimate**	**t Value**	**Pr > |t|**	**Estimate**	**t Value**	**Pr > |t|**
Intercept	-0.0465	-1.08	0.28	-0.3374	-0.97	0.33
λ	0.0057	1.22	0.23	0.0233	0.70	0.49
IFRSdummy	0.0046	1.15	0.25	0.0152	0.47	0.64
Hedge	-0.0080	-0.83	0.41	-0.0371	-0.63	0.53
IFRSHedge	-0.0082	-1.95	0.05	-0.0648	-2.17	0.03
LogMarketValue	0.0020	1.07	0.29	0.0208	1.11	0.27
Loss	0.0316	2.37	0.02	0.0768	1.34	0.18
LogEarnStab	0.0036	2.24	0.03	0.0383	3.50	0.00
Leverage	0.0418	1.73	0.08	0.3192	2.33	0.02
Numest	-0.0003	-1.97	0.05	-0.0027	-1.05	0.30
Earnings	0.0976	1.07	0.29	-1.0025	-3.67	0.00
MarkettoBook	-0.0014	-1.16	0.25	-0.0056	-0.59	0.55
Year dummies	Yes			Yes		
Industry dummies	Yes			Yes		
R-square	*30.73%*			*16.89%*		

The table presents regression results of the impact of hedge accounting under IFRS on forecast accuracy including the self selection parameter (λ) calculated from the probit regression. Dependent variables are Forecast Error (FError) and Forecast Dispersion (FDisp). FError is calculated as the absolute difference between actual EPS and mean forecasted EPS scaled by the stock price at the beginning of the financial year. FDisp is calculated as the standard deviation of the analysts' forecasted EPS, scaled by the absolute mean analyst forecast. Industry and year dummies are used to all regressions to control for industry and time effect but are not reported here. Standard errors are corrected for firm effects and two-tailed p-values are reported.

Table 11: Impact of hedge accounting on Forecast Error (Median)

	All hedgers			Currency and Interest rate		
Variable	**Estimate**	**t Value**	**Pr > |t|**	**Estimate**	**t Value**	**Pr > |t|**
Intercept	-0.0477	-1.11	0.27	-0.0469	-1.10	0.27
IFRSdummy	0.0057	1.36	0.17	0.0060	1.49	0.14
Hedge	0.0021	0.60	0.55	0.0029	0.90	0.37
IFRSHedge	-0.0079	-1.86	0.06	-0.0084	-2.09	0.04
LogMarketValue	0.0015	0.85	0.39	0.0015	0.83	0.41
Loss	0.0318	2.32	0.02	0.0320	2.33	0.02
LogEarnStab	0.0037	2.38	0.02	0.0037	2.37	0.02
Leverage	0.0380	1.63	0.10	0.0374	1.61	0.11
Numest	-0.0003	-2.01	0.05	-0.0003	-1.97	0.05
Earnings	0.1075	1.19	0.24	0.1071	1.18	0.24
MarkettoBook	-0.0009	-0.81	0.42	-0.0010	-0.87	0.39
Year dummies	Yes			Yes		
Industry dummies	Yes			Yes		
R-square	*30.19%*			*30.24%*		

The table presents regression results of the impact of hedge accounting under IFRS on forecast accuracy. Dependent variable is forecast error, defined as the absolute difference between actual EPS and median forecasted EPS scaled by the stock price at the beginning of the financial year. The first three columns presents regression results for all hedgers. For the regression results presented in the last three columns we consider as hedgers only currency and interest rate derivatives users. Industry and year dummies are used to all regressions to control for industry and time effect but are not reported here. Standard errors are corrected for firm effects and two-tailed p-values are reported.

Table 12: Impact of hedge accounting on Forecast Dispersion (Numest >3)

	All derivative users			Currency and Interest rate		
Variable	**Estimate**	**t Value**	**Pr > |t|**	**Estimate**	**t Value**	**Pr > |t|**
Intercept	-0.3849	-1.16	0.25	-0.3885	-1.16	0.25
IFRSdummy	0.0029	0.09	0.93	0.0129	0.41	0.69
Hedge	0.0004	0.02	0.99	0.0045	0.18	0.86
IFRSHedge	-0.0524	-1.83	0.07	-0.0644	-2.27	0.02
LogMarketValue	0.0208	1.15	0.25	0.0209	1.14	0.25
Loss	0.0642	1.34	0.18	0.0643	1.34	0.18
LogEarnStab	0.0465	4.12	0.00	0.0463	4.12	0.00
Leverage	0.2345	1.75	0.08	0.2345	1.75	0.08
Numest	-0.0034	-1.32	0.19	-0.0034	-1.30	0.20
Earnings	-0.7491	-3.21	0.00	-0.7584	-3.24	0.00
MarkettoBook	-0.0071	-0.79	0.43	-0.0079	-0.87	0.39
Year dummies	Yes			Yes		
Industry dummies	Yes			Yes		
R-square	14.85%			14.93%		

The table presents regression results after excluding observations with a number of analysts following smaller than three. Dependent variable is forecast dispersion, defined as the standard deviation of analysts' forecast, scaled by the absolute mean analyst forecast. The first three columns presents regression results for all hedgers. For the regression results presented in the last three columns we consider as hedgers only currency and interest rate derivatives users. Industry and year dummies are used to all regressions to control for industry and time effect but are not reported here. Standard errors are corrected for firm effects and two-tailed p-values are reported.

Table 13: Impact of hedge accounting on forecast accuracy: Winsorized data

	Model 1: FError			Model 2: FDisp		
Variable	**Estimate**	**t Value**	**Pr > |t|**	**Estimate**	**t Value**	**Pr > |t|**
Intercept	-0.0240	-0.97	0.33	-0.1361	-1.01	0.31
IFRSdummy	0.0032	0.93	0.36	0.0174	0.71	0.48
Hedge	0.0013	0.44	0.66	0.0023	0.13	0.90
IFRSHedge	-0.0060	-1.91	0.06	-0.0428	-1.84	0.07
LogMarketValue	0.0008	0.64	0.52	0.0072	1.07	0.29
Loss	0.0183	2.69	0.01	0.0878	2.26	0.03
LogEarnStab	0.0032	3.32	0.00	0.0278	4.53	<.01
Leverage	0.0299	1.71	0.09	0.2082	2.72	0.01
Numest	-0.0004	-2.49	0.01	-0.0007	-0.72	0.47
Earnings	0.0656	1.60	0.11	-0.5718	-4.21	<.01
MarkettoBook	-0.0006	-0.70	0.49	-0.0006	-0.09	0.93
Year dummies	Yes			Yes		
Industry dummies	Yes			Yes		
R-square	*32.49%*			*32.31%*		

The table presents regression results after winsorizing the data at the 99th percentile. Dependent variables are Forecast Error (FError) and Forecast Dispersion (FDisp). FError is calculated as the absolute difference between actual EPS and mean forecasted EPS scaled by the stock price at the beginning of the financial year. FDisp is calculated as the standard deviation of the analysts' forecasted EPS, scaled by the absolute mean analyst forecast. Industry and year dummies are used to all regressions to control for industry and time effect but are not reported here. Standard errors are corrected for firm effects and two-tailed p-values are reported.