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Hedge Accounting and Firms' Future Investment Spending

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Abstract

This study explores the effectiveness and consequences of hedge accounting rules under ASC 815 by investigating the relationship between derivative designation and future investments. Finance theory argues that hedging helps firms to overcome underinvestment problems, as it reduces the probability of liquidity shortfalls. We argue that this association holds only for derivatives designated for hedge accounting, which requires the fulfilment of strict effectiveness criteria. We find that only designated derivative assets are positively associated with future investments implying that the regulations under ASC 815 are generally implemented correctly and that the FASB has installed an effective signaling device about the success of firms' hedging programs. However, firms using portfolio hedging strategies seemingly cannot designate some of their successful derivatives due to the often criticized restriction of hedge accounting to hedges at transaction-level. Our findings should interest researchers, practitioners and financial standard-setters, particularly in times when derivative use becomes increasingly important.

Keywords: derivatives, hedging, hedge accounting, underinvestment; investment spending

Data Availability: All data are publicly available from sources identified in the manuscript.

JEL Classifications: G30, M40, M41

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1. INTRODUCTION

To confine unjustified earnings volatility resulting from mark-to-market accounting for derivatives, the FASB allows a special type of accounting treatment to achieve its objective of a faithful presentation of firms' underlying economics, namely hedge accounting (Ryan 2012). The accounting choice to designate derivatives for hedge accounting under ASC 815, though, is available only to those derivatives, for which the effectiveness in offsetting risk exposures can be proven. Should this criterion not be fulfilled, derivatives cannot be designated for hedge accounting and must be recorded under common accounting principles (Manchiraju, Pierce, and Sridharan 2018). This study explores whether, and if so how, the designation of derivatives reveals information about the success of firms' hedging programs to derive conclusions on the consequences and effectiveness of hedge accounting rules under ASC 815. It does so by analyzing the relation between (non-)designated derivatives and firms' future investments.

Prior studies have investigated the effect of financial hedging on several firm and capital market outcomes (e.g., future investments (Campello, Lin, Ma, and Zou 2011), firm value (e.g., Jin and Jorion 2006; Panaretou 2014), analyst forecasts (e.g., Dadalt, Gay, and Nam 2002), cost of capital (Gay, Lin, and Smith 2011; Chen and King 2014)), but they do not take into account that the effect of hedging may differ based on the derivatives' accounting designation. This, though, is important to derive conclusions on the effectiveness of hedge accounting rules and whether the accounting standards are implemented correctly, because from an accounting perspective only designated derivatives can be considered as highly successful.

Studies examining the consequences of hedge accounting are scarce and those that do exist focus almost exclusively on capital market consequences (e.g., Anbil, Saretto, and Tookes 2019; Pierce 2020). By investigating the effect of the derivative designation on firms' future investment spending, we focus on the 'real' or 'first-order' effects of accounting. Froot, Scharfstein, and Stein (1993) provide analytical evidence that financial hedging increases firms' future investment spending. The basis for their framework is that firms are exposed to risks, which might lead to left-tail outcomes of their future earnings and cash flows that threaten their ability to conduct operations efficiently with investment in all positive NPV (net-present-value) projects (Stulz 2013). Hedging offsets these risk positions (Aretz and Bartram 2010) and thus reduces the probability of liquidity bottlenecks, so that companies can carry out attractive investment projects. Furthermore, successful financial hedging and lower risk exposure should also be valued by capital market participants, resulting in an easier and more favorable access to capital markets and in turn reduced underinvestment problems.

To the best of our knowledge, the study by Campello et al. (2011) is alone in providing empirical evidence that financial hedging has positive effects on firms' future investment spending. However, they consider the period 1996-2002 before the introduction of SFAS 161 which does not allow them to differentiate between derivatives regarding their accounting designation. We argue that this differentiation is crucial, as only designated derivatives fulfil highly successful hedges' restrictive criteria. For hedge-accounting designation, firms have to provide evidence that a given derivative is "highly effective" (ASC 815-20-25-75) in offsetting risk exposures both at the outset and on an ongoing basis. As such, designated derivatives should include firms' most effective hedges and thus reveal the success of firms' hedging programs. Accordingly, we hypothesize that designated derivatives compared to their non-designated counterparts form a major driver of firms' future investment spending, as those should be particularly successful in reducing risks that may force firms to bypass attractive investments. Hence, while Campello et al. (2011) show that the extent of hedging affects the ability of future investments, we focus on the effectiveness of hedging strategies.

However, there is also some tension in our assumption since the criteria governing the application of hedge accounting are often criticized by the accounting practice as being too simplistic (e.g., effectiveness criterion) or strict (restriction of hedge accounting to hedges at transaction-level) (e.g. Comiskey and Mulford 2008), possibly preventing firms from designating successful hedges that could contribute positively to firms' future investments.

To test our hypothesis, we make use of changes in derivative disclosures. Only since SFAS 161 was introduced in 2008 are firms required to present fair values of derivative assets and liabilities based on their accounting designation (Hairston and Brooks 2019), which restricted prior studies in their opportunities to analyze the effects of hedge accounting (Campbell, Mauler, and Pierce 2019). We make use of the disclosures introduced by SFAS 161 and hand-collected the fair value of outstanding (non-)designated derivative assets and liabilities for all non-financial S&P 500 firms during the years 2010 to 2013.

Consistent with our hypothesis, we find that only derivative assets designated for hedge accounting are positively associated with future investments. This suggests that hedge accounting rules are implemented correctly and that the FASB has installed an effective signaling device with SFAS 161.

These results are robust to various sensitivity tests. For example, we run regressions for samples: (1) including both hedging and non-hedging firms, (2) including hedging firms only, and (3) excluding firms using derivatives for speculative purposes. Furthermore, we (4) include additional control variables that might affect firms' future investment level and (5) apply different methods to alleviate concerns of omitted variable bias and endogeneity. Lastly, we (6) apply alternative proxies for measuring firms' future investment spending. We also conduct several additional tests that support our underlying notions (e.g., cross-sectional analyses, over vs. underinvestment, capital market effects).

While our main analyses point out the positive aspects of applying hedge accounting, other literature has criticized these accounting regulations (e.g., Ahmed, Kilic, and Lobo 2011; Comiskey and Mulford 2008; Manchiraju et al. 2018). Besides generally criticizing the rules on the effectiveness criterion as well as the high level of hedge accounting implementation costs, this criticism particularly focuses on the fact that hedge accounting is limited to hedges at transaction-level. That is, hedge accounting can be applied only to hedges where one derivative instrument is used to hedge the specific risk arising from one precisely specified hedged item (Ahmed et al. 2011, Manchiraju et al. 2018, Ryan 2012). In line with this notion, we find a significant effect of designated derivative assets on future investments only for firms with non-portfolio hedging strategies, while non-designated derivative assets become significantly more important for future investment spending in firms with portfolio hedges. Apparently, firms with such hedging strategies cannot designate some of their most successful hedges due to the often criticized strict criteria for applying hedge accounting under ASC 815.

Our paper provides important contributions to the literature examining the implications of derivative use. In particular, using our detailed hand-collected data on outstanding derivatives based on their accounting designation, we answer a recent call for research by Campbell et al. (2019, 55): "We recommend that future research could use better data now available from SFAS 161 to revisit these important questions of the relation between derivative use and firm risk/cost of capital […]. Other potential areas for future research could include an examination of the effect of derivative use on firms' investment efficiency." Accordingly, we extend the findings of Campello et al. (2011) that financial hedging in general (i.e., the extent of hedging) has an impact on firms' future investments and show that is also important to consider derivatives' accounting designation (i.e., the effectiveness of hedging programs).

Our study also contributes to recent studies investigating the effect of increased derivative disclosures by SFAS 161. Most of these studies, though, investigated the effects of SFAS 161 from a more general perspective (e.g. Pierce 2020; Campbell, Khan, and Pierce 2020). For instance, Campbell et al. (2020) find that SFAS 161 disclosures in general appear to have improved stock market efficiency. We extend this research and provide evidence about the first-order or 'real-effects' of accounting designation. This in turn allows us to assess the conditions under which derivatives' designation can be considered as an effective signaling device that is able to reduce information asymmetry.

Beyond the academic contributions, our results should also be of utmost interest to practitioners and financial standard-setters. Derivative use has increased exponentially over recent decades and derivatives nowadays are highly relevant in firms' risk management (Bartram, Brown, and Conrad 2009; Millo and MacKenzie 2009; Campbell et al. 2019).[5] Effective and transparent hedge accounting rules are crucial, since derivatives are regarded as the most complex types of financial contracts (Chang, Donohoe, and Sougiannis 2016) which is why even for sophisticated users of financial statements, future earnings from users of derivatives are particularly difficult to forecast (Kawaller 2004). Accordingly, hedge accounting regulations have been discussed continuously not only under US-GAAP, but also under IFRS (Ryan et al. 2002; Glaum and Klöcker 2011; Hairston and Brooks 2019).[6] The FASB, for example, has in recent years issued multiple standards and amendments governing derivative accounting under US-GAAP so as to align in a better way risk management practice and financial reporting.[7] Similarly, the IASB recently issued the new IFRS 9, that revised the former hedge accounting rules under IAS 39 in order to eliminate existing inconsistencies and weaknesses present under the former regime. Our study allows fruitful insights about the advantages and disadvantages of current accounting rules for derivatives, which also supports standard-setters in the development of high quality accounting standards.

[5] The total global notional amount of outstanding derivatives increased from $72 trillion in 1998 to almost $600 trillion in 2018 and thus by more than 700%. See Bank for International settlement (https://www.bis.org/statistics/derstats.htm?m=6%7C32%7C71) and Campbell et al. (2019).
[6] Rules to designate derivatives for hedge accounting under IFRS are similar to those under US-GAAP. See in detail PwC (2019a), 11-12.
[7] Indeed, more recently the FASB issued ASU 2017-12 to improve the financial reporting of hedging relationships (FASB 2017, 1), as "stakeholders note that the effect of hedge accounting on an entity's reported results often is difficult to understand and interpret." Accounting standards that were recently issued by the FASB that altered the reporting for derivatives are, for example, 105, 107, 119, 126, 133, 137, 138, 149 and 161 (Pierce 2020). Further the FASB issued several Accounting Standards Updates in respect of derivative accounting, including 2013-10, 2014-03, 2015-13, 2016-05, 2017-11 and 2017-12 (see in detail: EY 2019, 1-6).

The remainder of this study is outlined as follows. Section 2 presents the institutional background. Section 3 develops our hypotheses. Section 4 describes our sample selection and research design. Section 5 discusses the results. Section 6 concludes.

2. INSTITUTIONAL BACKGROUND

The Concept of Hedge Accounting

A financial hedging relationship generally comprises two components, namely the hedged item (the asset or liability that is exposed to a specific risk) and the hedging instrument (the derivative instrument used to hedge the risk exposure). Hedging enables firms to protect their earnings and cash flows against possible changes in risk exposures (Aretz and Bartram 2010). However, when common accounting principles are applied, the gains and losses from hedging instruments and hedged items may affect firms' profit/loss in different time periods or by different amounts, bringing about a misrepresentation of the hedging relationship in firms' net income. As a consequence, under common accounting principles financial hedging generates volatility in firms' net income which is not economically justified, as it does not exist from a firms' risk management perspective. This would ultimately contradict FASB's objective of achieving a faithful presentation of firms' underlying economics (Ryan 2012).

To confine such unjustified volatility in firms' net income, the FASB allows a special type of accounting treatment, namely *hedge accounting*. This enables firms to recognize gains and losses of derivative instruments and hedged items in net income for the same periods, which reduces earnings volatility resulting from the mark-to-market accounting of derivatives.[8] However, to have the possibility of applying hedge accounting, firms must fulfil strict criteria.

As noted by Ryan (2012, 271), those criteria are "intended to ensure that hedge accounting is used only for hedging relationships that are clearly documented and determined to be effective on an ongoing basis". Thus, the FASB links firms' opportunities to designate

[8] This is accomplished by designating derivatives based on the risk being hedged to one of the following three hedge accounting relationships. (i) For derivatives designated as a *fair-value hedge*, the unrealized gains and losses resulting from changes in the fair value of the derivative instrument are immediately recognized in current earnings. Similarly, also changes in the fair value of the hedged item must be immediately recognized in earnings, offsetting the changes in the fair value of the derivative instrument. (ii) For derivatives designated as a *cash-flow hedge*, the effective portion of gains and losses from fair value changes are recognized in accumulated other comprehensive income (AOCI), and subsequently reclassified into earnings when also the related hedged item or forecasted transaction affects earnings. (iii) For a *hedge of a foreign currency exposure, of a net investment in a foreign operation, an unrecognized firm commitment, an available-for-sale security, or a foreign currency-denominated forecasted transaction*, the accounting treatment equals either that of a fair-value hedge or a cash-flow hedge conditional on the nature of the underlying item being hedged. For a detailed description of the different hedging relationships see in detail: PwC (2019b, Chapter 5).

derivatives for hedge accounting only to those hedges for which a reduction in earnings volatility is also reasonable from an economic perspective. Hedge accounting is, therefore, available only to those firms which can verify that a hedging relationship fulfils all of the following characteristics (ASC 815-20-25-1 (a-d)): (1) At hedge inception there needs to be a formal designation and documentation of the hedging relationship; (2) the hedging relationship includes only eligible hedged items and hedging instruments; (3) the hedging relationship must be highly effective.

Key among those criteria is firms' requirement to provide evidence that their chosen derivatives are highly effective in offsetting hedged items' risk exposure (Ryan 2012; Pierce 2020). More specifically, firms must document that derivative instruments are expected to be highly effective in offsetting changes in the fair value or cash flows of hedged items at initiation and on an ongoing basis (ASC 815-20-25-75). This effectiveness testing is required on at least a three-monthly basis and must be performed both prospectively and retrospectively (ASC 815-20-25-79). To assess the effectiveness of derivatives, firms commonly rely on the dollar-offset method (Ryan 2012; Pierce 2020; Manchiraju et al. 2018).[9] Under this method, derivatives are expected to be effective when the cumulative changes in the fair value of the hedging derivative offsets between 80% and 125% of the cumulative changes in the fair value of the hedged item (Manchiraju et al. 2018; Pierce 2020; PwC 2019b). In the event that these criteria are not met or firms do not select to apply hedge accounting, the chosen derivatives cannot be considered as highly effective and hence cannot be designated for hedge accounting. Designated derivatives, therefore, should include firms' most effective hedges and thus can be considered as signals of firms' success in financial hedging (Manchiraju et al. 2018).

Considering this aspect, hedge accounting can be regarded as an accounting choice that is able to lower information asymmetry levels. Despite this, there are also critics who argue that hedge accounting rules cannot portray firms' financial risk management adequately, as some of the most effective hedges are not designated for hedge accounting (Comiskey and Mulford 2008). Firstly, even though hedge accounting is linked to strict criteria, it remains an accounting choice. It is, therefore, not mandatory for firms to designate their most effective derivatives for hedge accounting. In fact, prior literature (Glaum and Klöcker 2011) notes that the application

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[9] Another method proposed by the FASB is the regression analysis. In practice, hedge effectiveness under this method is assumed when the following key metrics are fulfilled: The dependent (independent) variable should be the change in the fair value of the derivative (hedged item); the R-squared should be 80% or higher; the slope coefficient should be statistically significant at least at the 5%-level and be within a range of -0.8 and -1.25 (see in detail: PwC 2019b, Chapter 9.11.4.2). Consequently, effectiveness requirements under the regression analysis are similar to the dollar-offset method.

of hedge accounting leads to higher fixed costs, following the necessary involvement of accounting experts who are familiar with the complex set of rules and ongoing assessment of hedge effectiveness. Thus, firms may be reluctant to accept these costs and decide not to apply hedge accounting, even though they possess highly effective derivatives (Glaum and Klöcker 2011; Comiskey and Mulford 2008). Secondly, hedge accounting is permitted only at transaction-level (Ryan 2012). That is, a firm must document which hedging instrument is used to hedge the risk arising from a single, precisely specified hedged item. However, for portfolio hedges where firms manage multiple risks at an aggregate-level using one or many derivatives to hedge different items, such a requirement is inherently difficult to fulfil. As such, derivatives involved in portfolio hedges cannot be designated for hedge accounting, even though they may be highly effective in offsetting risk exposures (Ahmed et al. 2011; Manchiraju et al. 2018; Pierce 2020). Indeed, in this context prior literature has found several examples, where firms state that the non-designated derivatives they use are effective "economic hedges", which, nevertheless, cannot be designated, as hedge accounting must be applied only at transaction-level (Comiskey and Mulford 2008; Leone 2008, Pierce 2020; Manchiraju et al. 2018).

Disclosure of Firms' Derivative Use

The concept of hedge accounting along with its disclosure requirements for firms' derivative use was firstly introduced by SFAS 133 'Accounting for Derivative Instruments and Hedging Activities' (effective date: June 2000) (EY 2019). Under these specific disclosure requirements firms were not required to disclose the fair value or notional amount of their outstanding derivatives. In fact, firms were allowed to net all derivative assets and liabilities on the balance sheet, making it almost impossible to analyze the extent of derivatives designated for hedge accounting (Steffen 2016; Campbell et al. 2020). Only through the amount of unrealized gains and losses from cash flow hedges disclosed in accumulated other comprehensive income (AOCI) is one able to estimate, under SFAS 133, the extent of firms' uses of hedge accounting. As noted by Pierce (2020), these unrealized gains/losses, though, are a highly noise proxy for firms' overall derivative and hedge accounting use as they identify just one and potentially only small portion of firms' outstanding derivatives. Hence, SFAS 133 has been criticized by practitioners and academics for not providing adequate information about derivative instruments and hedging activities (Campbell et al. 2020).

In response to this criticism, the FASB reconsidered disclosures under SFAS 133 and issued SFAS 161 'Disclosures about Derivative Instruments and Hedging Activities' (effective date: November 2008). Whilst this standard did not change the accounting concept for derivatives, it did require enhanced derivative disclosures as "existing disclosure requirements…[did] not provide adequate information about how derivative and hedging activities affect an entity's financial position, financial performance, and cash flows" (FASB 2008). Under this new standard, firms are required to inform investors about "(a) how and why an entity uses derivatives, (b) how derivative instruments and related hedged items are accounted for under Statement 133 and its related interpretations and (c) how derivative instruments and related hedged items affect an entity's financial position, financial performance, and cash flows" (FASB 2008). In addition, following SFAS 161 firms are now required to present in a tabular format fair values of derivative based on their accounting designation (either designated or non-designated derivatives), position (assets or liabilities), and for each risk exposure category (e.g. foreign exchange rate risk, interest rate risk, commodity price risk). The concept of derivative accounting (as issued by SFAS 133) and its disclosure requirements (as issued by SFAS 161) are now codified under ASC 815 'Derivatives and Hedging'.

3. HYPOTHESIS DEVELOPMENT

The focus of this study is on the effectiveness and consequences of hedge accounting rules under ASC 815 by investigating the relationship between the designation of derivatives and future investments. In their seminal paper, Froot et al. (1993) show analytically that corporate hedging is a value-increasing firm strategy, as through hedging firms may overcome underinvestment problems. The basis for their contention is that underinvestment problems arise from risk exposures that affect firms' ability to function normally, in other words to operate efficiently and conduct all investments with positive NPV (Stulz 2013). Specifically, in situations where internal funds drop to levels where there are no longer sufficient cash flows to invest in value enhancing projects, firms need to cut back on attractive investment opportunities. Indeed, Minton and Schrand (1999) provide empirical evidence that firms do not use external capital markets to cover liquidity bottlenecks fully but rather permanently cut back on investment opportunities. Hedging makes it possible for firms to protect against unfavorable changes in risk exposures (Aretz and Bartram 2010), which in turn reduces the probability of there being liquidity shortfalls in internal capital. Although external financing is more costly than internal financing (Myers and Majluf 1984), firms might still access capital markets to overcome underinvestment problems. In this context, corporate hedging is expected to reduce the costs of capital since capital market participants appreciate the resulting lower risk exposure which enables them to evaluate and forecast the amount and uncertainty of firms' future earnings more accurately. In sum, financial hedging not only reduces the likelihood that a firm will need to access capital markets but it is also decreases the costs of doing so (Minton and Schrand 1999). As such, it is generally considered as a mechanism that prevents left-tail outcomes that may force firms to bypass attractive projects and thus should ultimately be positively related to firms' future investments (Stulz 1996; Minton and Schrand 1999; Graham and Rogers 2002; Lin, Phillips, and Smith 2008).

Campello et al. (2011) provide initial empirical evidence that financial hedging has indeed a positive effect on firms' future expenditures, in line with theoretical evidence from Froot et al. (1993). However, they do not differentiate between derivatives based on their accounting designation. This, though, is important to derive conclusions on the effectiveness of hedge accounting rules and whether the accounting standard is implemented correctly, because from an accounting perspective only designated derivatives can be considered as highly successful.

In this study, we therefore focus on the designation of derivatives. Information about firms' designated and non-designated derivatives along with other relevant derivative disclosures are only available since the introduction of SFAS 161. As such, only more recent studies have been able to investigate whether the adoption of SFAS 161 and the new derivatives disclosures in general convey value-relevant information for investors, analysts and other financial statement users (e.g., Steffen 2016; Manchiraju et al. 2018; Anbil et al. 2019; Pierce 2020). For instance, using textual analysis to explore the extent to which firms' financial statements are affected by SFAS 161, Steffen (2016) finds reduced bid-ask spreads after the adoption of this standard. Campbell et al. (2020) note that enhanced mandatory disclosures required by SFAS 161 have improved investors' understanding of firms' financial hedging activities, as they find that SFAS 161 has improved stock market efficiency. Pierce (2020) shows that only designated derivatives increase firm value. In sum, these studies support the notion that designated and non-designated derivatives differ in regard to their effectiveness to reduce volatility and the signals they convey to capital market participants.

We argue that this difference is also evident in firms' future investment spending and thus in the 'real' or 'first-order' effects of accounting. If firms opt for designating derivatives and apply the hedge accounting rules under ASC 815 correctly, particularly designated hedges should be efficient in reducing volatility and protecting against unfavorable changes in risk exposures. Accordingly, effectiveness requirements ensure that, when compared with their non-designated counterparts, designated derivatives are more likely to prevent liquidity shortfalls in internal capital. Only designated derivatives are therefore successful in reducing left-tail outcomes that may force firms to bypass attractive investment opportunities. Similarly, based on the criterion that firms need to verify that the derivative is highly effective in offsetting risk exposures, the designation of derivatives can also be regarded as a signaling device to financial statement users and capital market participants that is able to mitigate uncertainties surrounding firms' derivative use. Derivatives are regarded as the most complex types of financial contracts (Chang et al. 2016) which is why even for sophisticated users of financial statements, future earnings from users of derivatives are particularly difficult to forecast (Kawaller 2004). Accordingly, the designation of derivatives might help investors and analysts to better evaluate the firms' risk structure and to forecast future earnings more accurately, resulting in an easier and more favorable access to external capital markets. This ultimately reduces the likelihood of liquidity shortfalls and enables future investment spending. Hence, the above considerations lead to the following hypothesis:

H: Amongst firms' outstanding derivatives, only designated derivatives are positively associated with firms' future investments.

However, there is also some tension in this conjecture. Firstly, this assumption postulates that managers make use of the accounting choice to designate derivatives and apply the accounting rules correctly. Secondly, the criteria governing the application of hedge accounting may be too strict. Specifically, rules under ASC 815 have been criticized for the fact that hedge accounting is limited to hedges at transaction-level (e.g. Comiskey and Mulford 2008). According to the FASB, only for those specific hedges is clear documentation and effectiveness testing possible (Ryan 2012). This might prevent firms from designating successful hedges that could contribute positively to future investments. Finally, the effectiveness criterion (i.e., dollar-offset method) can be regarded as simplistic and allows for discretion, which is why the hedge accounting designation not necessarily properly identifies the truly effective hedges (e.g., Chen, Liu, Seow, and Xie 2020).

4. SAMPLE SELECTION AND RESEARCH DESIGN

Sample Selection

As a starting point, our sample selection process considers all non-financial firms in the S&P 500 from 2010 to 2013. We focus on S&P 500 firms for the same reasons as prior studies (Gay and Nam 1998; Guay and Kothari 2003; Pierce 2020; Anbil et al. 2019), in that they represent a significant portion of the US economy and are due to their size more likely to use derivatives (Chang et al 2016; Anbil et al. 2019; Pierce 2020). The sample period begins in 2010, as SFAS 161 had an effective date of November 2008. A lag of two financial years has been imposed to guard against any effects due to low familiarity with the new standard (Kvaal and Nobes 2012). Since data about the fair value of firms' designated and non-designated derivatives is not available in databases, we had to hand-collect this information.[10] Whilst our sample selection period ends in 2013, it nevertheless constitutes a fully representative sample time-span for which firms' derivative use would be expected to have achieved its peak and thus should be of high economic relevance. After eliminating those firms without sufficient derivatives' disclosure and data for controls[11], our final sample consists of 1,213 firm-years, of which 225 firm-years (19%) are from firms with no outstanding derivatives ('non-hedging firms'), while 988 firm-years (81%) are from firms with outstanding derivatives ('hedging firms'). Of those hedging firms, 801 firm-years are from firms who have designated some or all of their derivatives for hedge accounting. Table 1 summarizes the sample selection.

[Insert Table 1 about here]

Table 2 Panel A presents our sample distribution by industry and year. Panel B portrays the use of hedge accounting for each industry, as it presents the number of observations where: (1) no financial hedging is conducted ('no hedge'), (2) financial hedging is conducted but no hedge accounting is applied ('hedging but no hedge accounting'), and (3) financial hedging is conducted and hedge accounting is applied ('hedging and hedge accounting'). Hedge accounting seems to be of particular relevance in the 'manufacturing – consumer goods industry'. Here, hedge accounting is applied in 221 of the 267 observations and thus in 83% of the firm-years. The lowest application rate can be found in the 'wholesale and retail trade' industry, albeit hedge accounting is still applied in 70 (42%) of the 168 firm-years here. In total, the designation of derivatives for hedge accounting can be regarded as considerably relevant for our sample firms, as in 66% of our observations hedge accounting is applied.

[Insert Table 2 about here]

[10] Appendix B gives an example of derivative disclosures. We hand-collected data on firms' outstanding designated and non-designated derivative assets and liabilities. Further, following Chang et al. (2016), we hand-collected the number of risks a firm hedged as well as the number of derivative instruments it used.

[11] Due to insufficient disclosures we had to exclude 242 firm-years (15%) from our initial sample. This number of excluded firm-years is similar to prior studies. Pierce (2020), for example, also hand-collected data on designated and non-designated derivatives and eliminated approximately 23% of his initial sample due to insufficient derivative disclosures (Pierce 2020, table 1).

Research Design

In order to test the effect of derivatives' designation on firms' future investments, we estimate the following two empirical models, which are based on Campello et al. (2011):

$$F\_INVEST_{i,t+1} = b_0 + b_1 DES\_DER_{i,t} + b_2 NDES\_DER_{i,t} + Controls_{i,t} + Industry\ fixed\ effects_{i,t} + Year\ Fixed\ effects_{i,t} + e_{i,t} \quad (1)$$

$$F\_INVEST_{i,t+1} = b_0 + b_1 DES\_DER\_A_{i,t} + b_2 NDES\_DER\_A_{i,t} + b_3 DES\_DER\_L_{i,t} + b_4 NDES\_DER\_L_{i,t} + Controls_{i,t} + Industry\ fixed\ effects_{i,t} + Year\ Fixed\ effects_{i,t} + e_{i,t} \quad (2)$$

The dependent variable is a firm's total future investment ($F\_INVEST_{i,t+1}$) which is measured as the sum of research and development, capital, as well as acquisition expenditures less the sale of property, plant, and equipment (all measured in t+1) scaled by lagged total assets (i.e. measured in t0) (Biddle, Hilary, and Verdi 2009; Cheng, Dhaliwal, and Zhang 2013; Garcia Lara, Osma, and Penalva 2016).

To examine the effect of derivative designation in model 1, we follow Pierce (2020) by measuring the extent of derivatives' designation using a firm's outstanding designated derivatives ($DES\_DER_{i,t}$) and non-designated derivatives ($NDES\_DER_{i,t}$). $DES\_DER_{i,t}$ ($NDES\_DER_{i,t}$) is calculated as the sum of absolute values from the fair value of (non-)designated derivative assets and liabilities scaled by total assets. In model 2, we expand Pierce's (2020) model by additionally taking into account whether the designated and non-designated derivatives hedged gains or losses. In the event of a firm hedging away possible gains (losses) from the hedged item, the derivative's fair value is negative (positive), and as such reported as a liability (asset) in financial statements. Accordingly, only designated derivative assets should reflect successful and economically reasonable hedging whereas derivative liabilities can be considered as value-destroying. Accordingly, in model 2 designated derivative assets (liabilities) ($DES\_DER\_A_{i,t}$ ($DES\_DER\_L_{i,t}$)) are measured as the absolute value of the fair value of a firm's designated derivative assets (liabilities) scaled by total assets. Non-designated derivative assets (liabilities) ($NDES\_DER\_A_{i,t}$ ($NDES\_DER\_L_{i,t}$)) are calculated as the as the absolute value of the fair value of a firm's non-designated derivative assets (liabilities) scaled by total assets. In line with Pierce (2020), we consider fair values of the derivative positions because SFAS 161 requires firms to report fair values only. Only few firms voluntarily report notional values, particularly separated for their accounting classification (Campello et al. 2011; Anbil et al. 2019; Pierce 2020) which is why using notional values would significantly reduce our sample.[12]

In both models we include several firm-specific controls that prior literature has shown to be associated with firms' future investment spending (Kaplan and Zingales 1997; Biddle et al. 2009; Campello et al. 2011; Cheng et al. 2013; Jung, Lee, and Weber 2014; Garcia Lara et al. 2016; Khurana, Moser, and Raman 2018; Dinh, Sidhu, and Yu 2019). Specifically, we control for cash balances ($NET\_CASH_{i,t}$), leverage ($LEVERAGE_{i,t}$), profitability ($ROA_{i,t}$), size ($SIZE_{i,t}$), operating cash flows ($OCF\_SALES_{i,t}$), sales growth ($SALES\_GROWTH_{i,t}$), issued dividends ($DIV_{i,t}$), negative earnings ($LOSS_{i,t}$), prior years' revenue- ($REV\_VOLA_{i,t-1}$), cash flow- ($OCF\_VOLA_{i,t-1}$), investment- ($INVEST\_VOLA_{i,t-1}$) and returns volatility ($RET\_VOLA_{i,t-1}$), as well as the number of analysts following ($ANALYSTS_{i,t}$), firm age ($AGE_{i,t}$) and institutional ownership ($CLOSELY_{i,t}$).

Furthermore, to isolate the effect of derivatives' designation, we include control variables that prior literature has shown to be related to firms' risk management (Gay et al. 2011; Beatty, Petacchi, and Zhang 2012; Choi, Mao, and Upadhyay 2013; Chen and King 2014; Pierce 2020; Manchiraju et al. 2018; Anbil et al. 2019). To control for firms' operational hedging activity, we include a dummy variable indicating whether a firm reports foreign income ($FORGN_{i,t}$), and firms' amount of convertible debt ($CDEBT_{i,t}$). We also include dummy variables to control for whether firms employ complex portfolio hedging strategies ($PORTFOLIO_{i,t}$), and use derivatives for speculative or trading purposes ($TRADER_{i,t}$). Lastly, as we have hedging and non-hedging firms in our sample, we include a dummy variable which is equal to one if a firm has outstanding derivatives, and zero otherwise ($HEDGE_{i,t}$).

In all our equations, we add industry dummy variables based on one-digit sic codes and control for cross-sectional and time series correlations by including year fixed effects and clustering by firm (Petersen 2009).[13]

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[12] More precisely, Anbil et al. (2019) observe voluntary notional values in only two third of the S&P 500 observations with information on derivative usage. Furthermore, not all of those firms then reports information on the accounting classification.

[13] We winsorize all continuous variables at the 1% level on both tails of the distribution. All variables used in our main analyses are described including their sources in Appendix A.

5. RESULTS

Descriptive Statistics and Univariate Results

Table 3 shows descriptive statistics for variables used in our main analyses. We find that for our sample firms the fair value of outstanding designated derivatives ($DES\_DER_{i,t}$) is on average equivalent to 0.4% of total assets, while the fair value of non-designated derivatives ($NDES\_DER_{i,t}$) is slightly higher in representing 0.6% of total assets. After separating designated and non-designated items additionally into assets and liabilities, we observe that the fair value of designated derivative assets ($DES\_DER\_A_{i,t}$) forms on average 0.2% of total assets. By comparison, non-designated derivative assets ($NDES\_DER\_A_{i,t}$) are estimated at about 0.3% of total assets. For derivative liabilities we find the same distribution.

[Insert Table 3 about here]

Table 4 presents correlations among our main variables which bear out our hypothesis. Designated derivatives ($DES\_DER_{i,t}$) are significantly positively associated with firms' future investments ($p < 0.05$), while non-designated derivatives ($NDES\_DER_{i,t}$) are not significantly related to firms' future investment spending. When we differentiate between assets and liabilities, we find that only designated derivative assets ($DES\_DER\_A_{i,t}$) have a significant positive relationship with firms' future investments ($p < 0.01$). The effect of our control variables is in line with expectations and prior literature (e.g. Biddle et al. 2009; Garcia Lara et al. 2016). For example, firms' cash holdings ($NET\_CASH_{i,t}$), size ($SIZE_{i,t}$), cash flows ($OCF\_SALES_{i,t}$) and sales growth ($SALES\_GROWTH_{i,t}$) are significantly correlated with firms' future investments. Leverage ($LEVERAGE_{i,t}$) and the issuance of dividends ($DIV_{i,t}$) reduce firms' future investment spending.

[Insert Table 4 about here]

Multivariate Results

Table 5 reports multivariate results using 4 different model specifications. Column (1) includes the full sample, differentiating between designated and non-designated derivatives. Column (2) reports the results for model (2), which additionally differentiates between assets and liabilities. In Column (3) we follow prior studies (Pierce 2020; Anbil et al. 2019) by excluding firms which use derivatives for speculative purposes to ensure that (non-)designated derivatives capture only those hedges undertaken for risk management purposes.[14] Column (4) controls for firms' investment policies and alleviates concerns about omitted variable bias by including firms' current year's investment spending ($INVEST_{i,t}$) as an additional control variable (Cook, Romi, Sánchez, and Sánchez 2019). We repeat these regressions for columns (5) to (8) after excluding firms without any outstanding derivatives (i.e., for hedgers only).

[Insert Table 5 about here]

In column (1) we find a positive but slightly insignificant (p-value < 0.11) coefficient for *DES_DER*, and a negative but insignificant coefficient for $NDES\_DER_{i,t}$. Thus, the difference in the sign of the two coefficients weakly indicates that designated and non-designated derivatives impact firms' future investment spending differently. When we take into account whether designated or non-designated derivatives are reported as assets or liabilities in column (2), we find a positive and highly significant coefficient for $DES\_DER\_A_{i,t}$ (p-value < 0.05), indicating that designated derivatives assets are positively associated with firms' future investments, probably because they are more positively valued by capital market participants, whereas derivative liabilities can be considered as value-destroying. Conversely, all other derivative variables in column (2) are not significantly associated with firms' future investments. The positive effect of designated derivatives on future investments holds when we reduce our sample by excluding firms which use some of their derivatives for trading purposes in column (3) and when we include current years' investments as an additional control variable in column (4). In comparison to the full sample, we find a positive and significant association with firms' future investments (p-value < 0.1) even for *DES_DER* in column (5). This positive association is again driven by designated derivative assets, as for all model specifications in columns (6) to (8) the relationship between $DES\_DER\_A_{i,t}$ and $F\_INVEST_{i,t+1}$ is positive and highly significant (p-value < 0.05).

In sum, we find a significant positive impact on future investments for designated derivatives, but not for their non-designated counterparts. This supports the notion that particularly these derivatives can be considered as effective in preventing liquidity shortfalls. This suggests that the hedge accounting rules are effective in identifying effective derivatives

[14] ASC 815 requires firms to disclose their objective for using derivatives, which allowed us to identify firms which employed derivatives speculatively. For example, DTE Energy (2012, 69) reported that it holds derivatives "with the intent of taking a view, capturing market price changes, or putting capital at risk […] this activity is speculative in nature". In the event of firms not employing derivatives for trading, in the most cases they explicitly stated that they do not hold derivatives "for trading purposes" (e.g. Baxter International Inc. 2012; 3M Company 2011). See for the 10-K file of DTE Energy: https://d18rn0p25nwr6d.cloudfront.net/CIK-0000936340/367d5add-6167-4e59-8f7f-70f828658793.pdf.

that are truly intended for hedging purposes, which has often been questioned. Moreover, this also implies that hedge accounting rules are implemented correctly in practice. Hence, the FASB has seemingly installed an effective signaling device with SFAS 161 that enables managers to reveal information about the success of their derivative programs.

Sensitivity Tests

We examine the robustness of our main findings using various sensitivity analyses. For the sake of brevity, we do not tabulate the results of these tests.

One major issue evident from our main analyses is that the identified positive association between designated derivative assets and firms' future investments may be affected by a self-selection bias. More specifically, our results might be biased in that firms either (1) selecting to invest in derivatives or (2) selecting to designate their derivatives for hedge accounting may in general have lower risk exposures (or possess other unobservable firm-specific factors), which in turn would allow them to have higher investment levels in the future. We have attempted to alleviate these concerns in our prior analyses by running our regressions for both our full sample and hedging firms only and we followed Cook et al. (2019) in including firms' current years' investment spending as additional control. To alleviate any remaining concerns about firms' self-selection, we additionally implement two different two-step Heckman selection models, where we control for firms' decisions to invest in derivatives and additionally the decisions to apply hedge accounting. For both tests, we still find a positive and significant association only between designated derivative assets and firms' future investments.

Next, we repeat our analyses with three alternative proxy measures for firms' future investment spending to ensure that our results are not driven by measurement errors. Firstly, we follow Khurana et al. (2018) in additionally considering firms' depreciation and amortization in our measurement of firms' future investments. Arguably, firms with higher depreciation and amortization may also have higher investment levels. Secondly, Garcia Lara et al. (2016) note that acquisition expenditures are extremely visible and easily monitored when compared with more opaque investments, such as capital and R&D expenditures. Accordingly, we alternatively measure future investments as the sum of firms' future capital expenditures and R&D investments scaled by lagged total assets. Thirdly, again in line with Garcia Lara et al. (2016), we scale firms' future expenditures with sales instead of total assets. Our main inferences remain unchanged for these modifications.

Lastly, we include additional control variables that prior literature has shown to be associated with future investments (Campello 2011; Jung et al. 2014; Cook et al. 2019; Kim and Kung 2017). More precisely, we include a measure for firm value (Tobin's q), tangibility, default risk (z-score), and asset redeployability, firstly step by step and then altogether in our base model and the results are again unaffected.

Cross-Sectional Analyses

Next, we conduct additional cross-sectional analyses to better understand the relationship between hedge accounting and firms' future investments. More specifically, we investigate for which firms this effect is most pronounced. Arguably, those firms for which derivative use is particularly important should employ the designation of derivatives to signal their success in financial hedging. We expect, therefore, that the effect of designated derivatives is stronger when their use also seems to be most important, namely when firms: (1) suffer high underinvestment problems, (2) are liable to high environmental uncertainty, and (3) operate in industries that more heavily use derivatives.

Our expectations are based on several studies which have investigated the determinants of firms' derivative use (Nance, Smith Jr., and Smithson 1993; Mian 1996; Gay and Nam 1998; Haushalter 2000; Graham and Rogers 2002). These studies argue that particularly those firms which suffer underinvestment problems employ financial hedging to minimize the risks of further liquidity shortfalls that may threaten them to bypass attractive investment opportunities (Froot et al. 1993). Furthermore, we draw on Anbil et al. (2019), who show that environmental uncertainty (proxied by firms' stock return volatility) is a channel that explains the negative association between designated derivatives and CDS spreads. Finally, we rely on Campbell et al. (2020), who show that SFAS 161 reduces mispricing of cash flow hedges particularly for industries with heavier use of derivatives.

We expand model 2 by including interaction terms of our derivative variables with a variable X ($VAR\_X_{i,t}$) that either reflects firms' underinvestment problems ($UINV_{i,t}$), returns volatility ($R\_VAR\_RANK_{i,t}$), or derivative sensitive industries ($DERIV\_SENS\_IND_{i,t}$). Specifically, we estimate the following empirical model:[15]

$$F\_INVEST_{i,t+1} = b_0 + b_1 DES\_DER\_A_{i,t} + b_2 NDES\_DER\_A_{i,t} + b_3 DES\_DER\_L_{i,t} + b_4 NDES\_DER\_L_{i,t} + \boldsymbol{b_5 DES\_DER\_A_{i,t} * VAR\_X_{i,t}} + \tag{3}$$

[15] In these cross-sectional tests, we use the same control variables as in our main analysis (table 5). Variables that are additionally generated for these analyses are explained in detail in Appendix A.

$\boldsymbol{b_6 NDES\_DER\_A_{i,t} * VAR\_X_{i,t} + b_7 DES\_DER\_L_{i,t} * VAR\_X_{i,t} +}$
$\boldsymbol{b_8 NDES\_DER\_L_{i,t} * VAR\_X_{i,t}} + Controls_{i,t} + Industry\ fixed\ effects_{i,t} +$
$Year\ Fixed\ effects_{i,t} + e_{i,t}$

To construct a variable that proxies firms' underinvestment problems ($UINV_{i,t}$), we follow prior studies (Biddle et al. 2009; Cheng et al. 2013) which suggest that firms with low cash levels and high leverage are more likely to suffer liquidity shortfalls, preventing them from increasing future investment. To measure firms' environmental uncertainty ($R\_VAR\_RANK_{i,t}$), we first rank firms according to their respective industries into deciles based on stock returns' volatility within their past financial year and then re-scale the decile ranks. To identify derivative-sensitive industries ($DERIV\_SENS\_IND_{i,t}$), we first calculate the mean of outstanding derivatives (*DER*) for each single industry. In line with prior studies (Pierce 2020; Campbell et al. 2020), we find that firms in the transportation & public utilities industry and in the mining & construction industry have particularly high derivative usage. Accordingly, we construct an indicator for derivative sensitive industries, which equals 1 if a firm operates in these two industries, and 0 otherwise.

[Insert Table 6 about here]

Table 6 shows our results from estimating equation (3), for the full-sample (columns 1, 3 and 5) and for hedging firms only (columns 2, 4 and 6). As expected, we find the interaction terms of designated derivative assets with underinvestment problems, returns' volatility, and derivative sensitive industries to be positive and highly significant in all regressions. This indicates that the effect of designated derivatives on firms' future investment is stronger when the use of derivatives also seems to be more important.

Over vs. Underinvestment

In our previous analyses, we investigated how the designation of derivatives impacts future investment spending. The main underlying notion is that successful hedging should prevent liquidity shortfalls and thus alleviate underinvestment issues (Froot et al. 1993). However, prior literature argues that hedging might also affect future investments by promoting opportunistic overinvestment activities (Tufano 1998; Kumar and Rabinovitch 2013; Lobo, Ranasinghe, and Yi 2020). Successful hedging allows firm to rely less on external capital which enables opportunistic managers to circumvent the scrutiny imposed by external capital providers facilitating empire building activities. In this additional test, we explore which scenario dominates in our setting. To differentiate between over- and underinvestment, we follow prior literature and measure deviations from optimal investment levels with the following investment model 4 (Biddle et al. 2009; Chen et al. 2011):

$$INVEST_{i,t} = b_0 + b_1 NEG + b_1\ SALES\_GROWTH_{i,t-1} + b_3\ NEG * SALES\_GROWTH_{i,t-1} + e_{i,t} \quad (4)$$

Positive residuals reflect overinvestments (projects with negative NPV being carried out), while negative residuals denote underinvestment problems (positive NPV opportunities omitted). We then repeat our main analyses in Table 7 with these two more specific investment efficiency measures as dependent variables (negative residuals are multiplied by minus one to facilitate the interpretation).

[Insert Table 7 about here]

While we do not find any significant estimates for our derivative measures for *OVER_INVEST,* only designated derivative assets significantly reduce underinvestment issues (*UNDER_INVEST*). This corroborates our inherent assumption that effective hedging particularly increases future investments by alleviating underinvestment problems.

Role of the Strict Hedge Accounting Criteria

Our prior results show that particularly designated derivatives have a positive impact on future investments suggesting that managers make use of the accounting choice to designate effective hedges and that they apply these rules correctly. Accordingly, this also implies that through hedge accounting the FASB has installed a signaling device about the success of firms' hedging programs. However, the hedge accounting rules have also been criticized (e.g. Comiskey and Mulford 2008). This criticism focuses on the fact that hedge accounting is limited to hedges at transaction-level. That is, hedge accounting can be applied to hedges only where one derivative instrument is used to hedge the specific risk arising from one precisely specified hedge item (Manchiraju et al. 2018, Ryan 2012). According to the FASB, only for those specific hedges is clear documentation and effectiveness testing possible (Ryan 2012).

Conversely, for portfolio hedging strategies, where firms use derivatives to manage multiple risks from a number of hedged items at an aggregate-level, documentation requirements as well as hedge effectiveness testing are "inherently more difficult to attain" (Ryan 2012, 286).[16] Ahmed et al. (2011, 773) noted, therefore, that "most macro hedging derivatives do not qualify for hedge accounting […] as there is no objective method of gauging the effectiveness of the

[16] More specifically, in a portfolio hedge (which is also sometimes called a macro hedge), several risk positions with opposing risk changes are combined (aggregate-level) and only the resulting net position is hedged.

hedging derivative without linkage to a single, identifiable asset or liability". Consequently, several studies have stated that the main disadvantage of hedge accounting is its limitation to hedges at a transaction-level, which prevents firms from designating some highly successful hedges (Manchiraju et al. 2018; Pierce 2020; Campbell et al. 2020). Indeed, Comiskey and Mulford (2008) provide anecdotal evidence from business practice for a US-GAAP context where firms have reported that whilst some of their derivatives are effective "economic hedges", they could not be designated due to the strict criteria. Moreover, in an IFRS context where hedge accounting is also limited to hedges at transaction-level, firms also criticize the regulations. For example, the SIEMENS AG states in its annual report 2017 (p. 91):[17]

"The Company manages its risks […] primarily through a Company-wide portfolio approach. Under this approach the Company-wide risks are aggregated centrally, and various derivative financial instruments […] are utilized to minimize such risks. Such a strategy does not qualify for hedge accounting treatment."

Based on these various pieces of evidence, we expect that particularly in firms with portfolio hedging strategies, non-designated derivatives capture a considerable number of successful hedges, as the limitation of hedge accounting to hedges at transaction-level prevents these firms from designating them. We rely on Chang et al. (2016) and classify a firm as using a portfolio hedging strategy (*PORTFOLIO*), when it: (1) hedges at least two types of risk exposures (foreign exchange risk, interest rate risk, commodity price risk, other), and (2) uses at least two types of different instruments (swaps, future/forwards, options, other).[18]

Descriptive statistics support our assumption. For firms applying no portfolio hedging strategies, designated derivative assets are 0.17% of total assets and thus higher than non-designated derivative assets, which are only 0.03% of total assets. For firms applying portfolio hedging strategies, a shift in relevance from designated derivative assets towards non-designated derivative assets becomes evident. Here designated derivative assets are 0.23% of total assets, while non-designated derivatives are as much as 0.38% of total assets. Furthermore, when we directly compare the hedging strategies, we find non-designated derivatives to be around 13-times higher for firms applying portfolio hedging strategies.

[17] The annual report of the SIEMENS AG can be accessed under: https://www.siemens.com/investor/pool/en/investor_relations/Siemens_AR2017.pdf.
[18] As a robustness test we also apply a wider measure of hedging complexity to consider all possible firms which might hedge aggregate risk exposures. Here we classify a firm as using a high-complex hedging strategy, when it hedges at least two types of risk exposures (foreign exchange risk, interest rate risk, commodity price risk, other). Our results are largely the same for both measures.

To test whether the restriction of hedge accounting to hedges at transaction-level also has implications for the effect of designated derivatives on future investments, we both conduct a subsample test and estimate a new model 5 that extends model 2 by interacting *PORTFOLIO* with the derivative variables:

$$F\_INVEST_{i,t+1} = b_0 + b_1 DES\_DER\_A_{i,t} + b_2 NDES\_DER\_A_{i,t} + b_3 DES\_DER\_L_{i,t} + b_4 NDES\_DER\_L_{i,t} + \boldsymbol{b_5 DES\_DER\_A_{i,t} * PORTFOLIO_{i,t}} + \boldsymbol{b_6 NDES\_DER\_A_{i,t} * PORTFOLIO_{i,t}} + \boldsymbol{b_7 DES\_DER\_L_{i,t} * PORTFOLIO_{i,t}} + \boldsymbol{b_8 NDES\_DER\_L_{i,t} * PORTFOLIO_{i,t}} + Controls_{i,t} + Industry\ fixed\ effects_{i,t} + Year\ Fixed\ effects_{i,t} + e_{i,t} \quad (5)$$

Table 8 shows the results. For the subsample test reported in columns (1) and (2), we find a significant effect for $DES\_DER\_A_{i,t}$ on future investment spending for the non-portfolio hedge sample whereas we find no significant associations between derivatives and future investments for the portfolio hedge sample. Moreover, it becomes evident that the sign for $NDES\_DER\_A_{i,t}$ is different for both subsamples. Although statistically insignificant, it is positive for firms with a portfolio hedge strategy but negative for their counterparts without portfolio hedges. This is also corroborated by the results for model 5 reported in columns (3) and (4). The interaction effect between $NDES\_DER\_A_{i,t}$ and $PORTFOLIO_{i,t}$ is positive and significant both for the full and hedging sample suggesting that non-designated derivate assets are significantly more efficient in preventing left-tail outcomes for firms with portfolio hedge strategies. Apparently, these firms cannot designate some of their most successful hedges due to the strict criteria for applying hedge accounting under ASC 815.

[Insert Table 8 about here]

Capital Market Effects of Derivatives' Designation

Our results so far reveal that particularly designated derivate assets are positively associated with future investment spending. This is reasonable since particularly these derivatives should be effective in protecting against unfavorable changes in risk exposures (Aretz and Bartram 2010), which in turn reduces the probability of there being liquidity shortfalls in internal capital. However, the designation of derivatives might also serve as a signal to capital market participants which then facilitates the access to capital markets and reduces the corresponding cost of capital to finance future investment projects. Against the background of prior results, it remains an open question as to whether the designation of derivatives is able to reduce information asymmetry levels, thus enabling investors to make better informed investment decisions. To be considered as an effective signaling device, hedge accounting should enable capital market participants to forecast the amount, timing and uncertainty of firms' future earnings more accurately, which would also result in lower costs of capital for reporting firms.

Prior literature documents that even for sophisticated financial statements users such as sell-side analysts, future earnings of derivatives users are particularly difficult to forecast (Kawaller 2004). Both Guay (1999) and Chang et al. (2016) find higher forecast errors for firms once they initiate derivative programs. However, there exist some studies which reveal that financial reporting standards are able to reduce analysts' difficulties in assessing firms' derivative use (Panaretou, Shackleton, and Taylor 2013). We therefore examine whether the designation of derivatives can be regarded as a signaling device that is able to reduce the uncertainty surrounding firms' derivative use and risk structure. Based on our prior results, however, we expect positive capital market effects only for those firms without portfolio hedging strategies.

To test these assumptions, we analyze the effect of derivatives on analysts' forecast dispersion ($F\_DISP_{i,t}$), forecast error ($F\_ERROR_{i,t}$) and implied cost of capital ($ICC\_AVG_{i,t}$), separately for firms with portfolio hedging strategies or not.[19] Results are documented in table 9 panels A-C.[20] In line with our expectations, we find for the subsample of firms with no portfolio hedges a negative effect of $DES\_DER\_A_{i,t}$ on analysts' forecast dispersion, forecast error, and firms' implied cost of capital in all model specifications. By comparison, for the subsample of firms applying portfolio hedging strategies, we do not find any of the derivative variables to be significantly related to one of the capital market outcomes.

[Insert Table 9 about here]

Hence, these results indicate that the designation of derivatives also secures future investments due to capital market effects because designated derivatives reflect their underlying economics and thus provide a signal that reduces information asymmetry levels. Furthermore, these results again reveal the often criticized weaknesses of ASC 815. For firms relying on portfolio hedging strategies the strict restriction of hedge accounting to hedges at a transaction-level prevents firms from designating successful hedges, resulting in a distorted signal that is unable to help capital market participants.

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[19] The measurement of $F\_DISP_{i,t}$ and $F\_ERROR_{i,t}$ is in line with prior literature (Lang and Lundholm 1996; Chang et al. 2016) and described in Appendix A. $ICC\_AVG_{i,t}$ are calculated as the average of the implied cost of capital measures from Claus and Thomas (2001), Gebhardt, Lee, and Swaminathan (2001) and Easton (2004).

[20] To alleviate endogeneity concerns, analyses for table 8 are restricted to hedging firms only.

6. CONCLUSIONS

This study analyses the relationship between the designation of derivatives for hedge accounting and firms' future investments to derive conclusions about the often criticized hedge accounting rules under ASC 815. Using hand-collected disclosures, we are able to find that only derivative assets designated for hedge accounting are positively associated with firms' future investments. Particularly those seem to be successful in hedging against possible risks of drops in internal funds that induce underinvestment problems, in line with the effectiveness criterion of ASC 815. This implies that hedge accounting regulations are generally applied correctly and that the FASB has seemingly installed an effective signaling device with SFAS 161 that allows managers to reveal information about the success of firms' hedging programs. This is also corroborated by our additional tests indicating that the designation of derivatives entails positive capital market effects. However, these findings do not apply to firms using portfolio hedging strategies, for which, due to the restriction of hedge accounting to hedges at a transaction-level, some of their most successful derivatives cannot be designated. As often criticized in theory and practice, this apparently results in a distorted signal.

Nevertheless, this study is of course also subject to certain caveats. With our empirical archival approach of considering derivative disclosures, we cannot observe the actual managerial accounting choice to designative derivatives. That is, we cannot say for sure whether non-designated derivatives do not qualify for hedge accounting or whether managers decided not to designate them for other reasons. Moreover, we consider fair values of the derivative positions because SFAS 161 requires firms to report fair values only. This, however, has been criticized by prior literature because, unlike notional values, they reveal only limited information on the extent of a firm's derivative usage (e.g., Graham and Rogers 2002). Specifically, at the date a derivative contract is signed, the fair value would be expected to be essentially zero, yet they could still represent a significant hedging activity. However, voluntary disclosures of derivatives' notional values separated by their accounting designation would not be consistently available for our sample (Anbil et al. 2019; Pierce 2020). Having said that, this should be a less severe concern for our study since our focus is not on the extent of hedging but the differentiation regarding their accounting designation. Economic consequences of financial hedging both depend on the extent of hedging activities and their success. While notional values rather reflect the former, we provide evidence that designated derivatives are more successful than their non-designated counterparts (both measured at fair value). Hence, despite these limitations, our study should entail important implications both for standard-setters and practitioners, particularly in times when derivative use is becoming increasingly important.

APPENDIX A: DEFINITION OF VARIABLES

Name	Description	Source
Future investments *($F\_INVEST_{i,t+1}$)*	The sum of firm *i*'s R&D expenditure, capital expenditure, and acquisition expenditure, less cash receipts from the sale of PPE (all in year *t*+1) scaled by total assets (in t0)	Compustat: xrd, capx, aqc, sppe, at
Designated derivatives *($DES\_DER_{i,t}$)*	Fair value of a firm's outstanding designated derivatives, calculated as the absolute fair values of designated derivative assets and liabilities scaled by total assets	Hand-collected from footnotes in firms' 10K files
Non-designated derivatives *($NDES\_DER_{i,t}$)*	Fair value of a firm's outstanding non-designated derivatives, calculated as the absolute fair values of non-designated derivative assets and liabilities scaled by total assets	Hand-collected from footnotes in firms' 10K files
Designated derivative assets *($DES\_DER\_A_{i,t}$)*	Fair value of a firm's outstanding designated derivative assets, calculated as the fair values of designated derivative assets scaled by total assets	Hand-collected from footnotes in firms' 10K files
Non-designated derivative assets *($NDES\_DER\_A_{i,t}$)*	Fair value of a firm's outstanding non-designated derivative assets, calculated as the fair values of non-designated derivative assets scaled by total assets	Hand-collected from footnotes in firms' 10K files
Designated derivative liabilities *($DES\_DER\_L_{i,t}$)*	Fair value of a firm's outstanding designated derivative liabilities, calculated as the absolute fair values of designated derivative liabilities scaled by total assets	Hand-collected from footnotes in firms' 10K files
Non-designated derivative liabilities *($NDES\_DER\_L_{i,t}$)*	Fair value of a firm's outstanding non-designated derivative liabilities, calculated as the absolute fair values of non-designated derivative liabilities scaled by total assets	Hand-collected from footnotes in firms' 10K files
Net cash ($NET\_CASH_{i,t}$)	Cash minus current liabilities divided by total assets	Compustat: ch, lct, at
Leverage ($LEVERAGE_{i,t}$)	Long-term debt divided by total assets	Compustat: dltt, at
Return on assets *($ROA_{i,t}$)*	EBIT divided by lagged total assets	Compustat: ebit, at
Market value of equity *($SIZE_{i,t}$)*	Natural logarithm of the product of the stock price at the fiscal-year end date and outstanding shares	Compustat: prcc_f, csho
Operating cash flow *($OCF\_SALES_{i,t}$)*	Operating cash flow scaled by sales	Compustat: oancf, revt
Sales Growth *($SALES\_GROWTH_{i,t}$)*	Sales scaled by lagged sales minus 1	Compustat: revt

Dividend issued *($DIV_{i,t}$)*	1 if the firm paid a dividend, 0 otherwise	Compustat: dvt
Loss *($LOSS_{i,t}$)*	1 if the firm reports negative income, 0 otherwise	Compustat: ib
Revenue volatility *($REV\_VOLA_{i,t-1}$)*	Standard deviation of the ratio of sales and total assets from t-3 to t-1	Compustat: revt, at
Operating cash flow volatility *($OCF\_VOLA_{i,t-1}$)*	Standard deviation of the ratio of operating cash flow and total assets from t-3 to t-1	Compustat: oancf, at
Investment volatility *($INVEST\_VOLA_{i,t-1}$)*	Standard deviation of the ratio of investment and lagged total assets from t-3 to t-1	Compustat: xrd, capx, aqc, sppe, at
Returns volatility *($RET\_VOLA_{i,t-1}$)*	Standard deviation of a firm's daily stock returns over the last fiscal year. Firm's daily stock returns are calculated using Datastream's total return index.	Worldscope: RI
Number of analysts *($ANALYSTS_{i,t}$)*	Natural logarithm of the number of sell-side analysts covering the firm as provided by IBES.	EIKON: TR.NumberOfAnalysts
Age *($AGE_{i,t}$)*	Firm age measured as the natural logarithm of the difference between the fiscal year and the first year when the firm is included in Datastream	Worldscope: BASEDATE
Closely Held shares *($CLOSELY_{i,t}$)*	Shares held by insiders divided by total common shares outstanding	Worldscope: WC05475, WC05301
Foreign income *($FORGN_{i,t}$)*	1 if the foreign income or loss is not equal to 0, 0 otherwise	Compustat: pifo
Convertible debt *($CDEBT_{i,t}$)*	Convertible debt divided by total assets	Compustat: dcvt, at
Portfolio hedging strategy ($PORTFOLIO_{i,t}$)	1 if the firm hedges at least two different types of risk (foreign exchange risk, interest rate risk, commodity price risk, other risk) and uses at least more than two different types of hedging instruments (swap, future/forward, option, other)	Hand-collected from footnotes in firms' 10K files
Trading firm *($TRADER_{i,t}$)*	1 if the firm reports in its 10K files that it employs some of its outstanding derivatives for trading purposes, 0 otherwise	Hand-collected from footnotes in firms' 10K files
Financial hedging firm *($HEDGE_{i,t}$)*	1 if the firm has outstanding derivative assets or liabilities	Hand-collected from footnotes in firms' 10K files
Firms' tendency to underinvest *($UINV_{i,t}$)*	In the spirit of Biddle et al. (2009) and Cheng et al. (2013) this is a ranked variable that identifies settings in which underinvestment at the firm-level is most likely. The ranking is based on the average of a ranked (industry deciles) measure	Compustat: ch, ddlt, at

	of cash and leverage. Cash is multiplied by minus one before ranking so that both variables are increasing in the likelihood of underinvestment.	
Ranked returns variability (*$R\_VAR\_RANK_{i,t}$*)	Ranked deciles of daily stock returns' variability of firms in the same industry	Worldscope: RI
Derivative sensitive industries (*$DERIV\_SENS\_IND_{i,t}$*)	1, if the one-digit-sic code of the firm is either 1 (Mining & Construction) or 4 (Transportation & Public Utilities), 0 otherwise	Compustat: sic
Negative sales growth (*NEG)*	1 if the firm's prior year's sales have decreased, 0 otherwise	Compustat: revt
Overinvestment (*OVER_INVEST)*	Level of overinvestment, measured as the positive residuals from estimating the investment model 4 for each industry-year	Biddle et al. 2009; Chen et al. 2011
Underinvestment (*OVER_INVEST)*	Level of underinvestment, measured as the negative residuals from estimating the investment model 4 for each industry-year, multiplied by minus 1	Biddle et al. 2009; Chen et al. 2011
Cost of capital *($ICC\_AVG_{i,t}$)*	Average of the implied cost of capital estimates from the models of Claus and Thomas (2001), Gebhardt et al. (2001) and Easton's (2004) MPEG-ratio.	Various sources
Forecast error (*$F\_ERROR_{i,t}$*)	Absolute value of the difference between the consensus annual earnings forecast directly prior to the earnings announcement date and the actual earnings scaled by stock price at end of year t, multiplied by 100	Eikon: TR.EPSMean (IBES summary estimates), TR.EPSActValue, TR.EPSActReportDate (IBES actuals) Datastream: P
Forecast dispersion *($F\_DISP_{i,t}$)*	Analyst earnings forecast dispersion, defined as the inter-analyst standard deviation of annual earnings forecasts deflated by stock price at end of year t, multiplied by 100.	Eikon: TR.EPSStdDev (IBES summary estimates) Datastream: P

APPENDIX B. EXAMPLE OF DERIVATIVE DISCLOSURES REQUIRED AFTER SFAS 161

The following tables summarize the fair value of 3M's derivative instruments, excluding nonderivative instruments used as hedging instruments, and their location in the consolidated balance sheet. Additional information with respect to the fair value of derivative instruments is included in Note 12.

December 31, 2013 (Millions) Fair Value of Derivative Instruments	Assets Location	Assets Amount	Liabilities Location	Liabilities Amount
Derivatives designated as hedging instruments				
Foreign currency forward/option contracts	Other current assets	$ 24	Other current liabilities	$ 35
Commodity price swap contracts	Other current assets	1	Other current liabilities	—
Interest rate swap contracts	Other assets	8	Other liabilities	7
Total derivatives designated as hedging instruments		$ 33		$ 42
Derivatives not designated as hedging instruments				
Foreign currency forward/option contracts	Other current assets	$ 51	Other current liabilities	$ 68
Total derivatives not designated as hedging instruments		$ 51		$ 68
Total derivative instruments		$ 84		$ 110

December 31, 2012 (Millions) Fair Value of Derivative Instruments	Assets Location	Assets Amount	Liabilities Location	Liabilities Amount
Derivatives designated as hedging instruments				
Foreign currency forward/option contracts	Other current assets	$ 39	Other current liabilities	$ 85
Commodity price swap contracts	Other current assets	—	Other current liabilities	1
Interest rate swap contracts	Other assets	23	Other liabilities	—
Total derivatives designated as hedging instruments		$ 62		$ 86
Derivatives not designated as hedging instruments				
Foreign currency forward/option contracts	Other current assets	$ 10	Other current liabilities	$ 20
Total derivatives not designated as hedging instruments		$ 10		$ 20
Total derivative instruments		$ 72		$ 106

94

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TABLE 1. SAMPLE SELECTION PROCESS

	# of firm-years
The sample selection process considers as a starting point all non-financial firms included in the S&P 500 (January 2010-December 2013)	1,581
Less observations with insufficient derivative disclosure	1,339
Less observations with missing firm-specific variables	1,213
Final sample (including firms with no outstanding derivatives)	***1,213 [=354 firms]***
Observations, where firms do not have any outstanding derivatives ('no hedging')	225
Observations, where firms have only non-designated derivatives outstanding ('hedging but no hedge accounting')	187
Observations, where firms designated some or all of their outstanding derivatives ('hedging and hedge accounting')	801

TABLE 2. SAMPLE DISTRIBUTION

Panel A: Sample distribution by industry and year						
Sic code	Industry	2010	2011	2012	2013	Total
1	Mining & Construction	26	28	30	31	115
2	Manufacturing – consumer goods	66	69	67	65	267
3	Manufacturing – capital goods	79	79	87	82	327
4	Transportation & Public Utilities	54	55	55	57	221
5	Wholesale and retail trade	42	43	44	39	168
7	Other Services (Accomodation, Repair, Leisure)	30	29	26	30	115
	Total	**297**	**303**	**309**	**304**	**1,213**

Panel B: Sample distribution – hedging activity				
Industry	*n*	*no hedge*	*hedging but no hedge accounting.*	*hedging and hedge accounting*
Mining & Construction	115	21 (18%)	38 (33%)	56 (49%)
Manufacturing – consumer goods	267	24 (9%)	22 (8%)	221 (83%)
Manufacturing – capital goods	327	35 (11%)	31 (9%)	261 (80%)
Transportation & Public Utilities	221	30 (14%)	55 (25%)	136 (62%)
Wholesale and retail trade	168	81 (48 %)	17 (10%)	70 (42%)
Other Services	115	34 (30%)	24 (21%)	57 (50%)
Total/Mean	**1,213**	**225 (19%)**	**187 (15%)**	**801 (66%)**

TABLE 3: DESCRIPTIVE STATISTICS

	N	Mean	St.Dev	Min	Median	Max
$F\_INVEST_{i,t+1}$	1,213	0.105	0.085	0.008	0.082	0.485
$DES\_DER_{i,t}$	1,213	0.004	0.007	0.000	0.001	0.046
$NDES\_DER_{i,t}$	1,213	0.006	0.021	0.000	0.000	0.148
$DES\_DER\_A_{i,t}$	1,213	0.002	0.005	0.000	0.000	0.033
$NDES\_DER\_A_{i,t}$	1,213	0.003	0.010	0.000	0.000	0.074
$DES\_DER\_L_{i,t}$	1,213	0.002	0.004	0.000	0.000	0.028
$NDES\_DER\_L_{i,t}$	1,213	0.003	0.011	0.000	0.000	0.073
$NET\_CASH_{i,t}$	1,213	-0.121	0.119	-0.482	-0.110	0.174
$LEVERAGE_{i,t}$	1,213	0.224	0.144	0.000	0.212	0.744
$ROA_{i,t}$	1,213	0.136	0.085	-0.010	0.116	0.449
$SIZE_{i,t}$	1,213	9.582	1.008	7.233	9.417	13.348
$OCF\_SALES_{i,t}$	1,213	0.185	0.125	-0.001	0.159	0.615
$SALES\_GROWTH_{i,t}$	1,213	0.088	0.151	-0.303	0.065	0.741
$DIV_{i,t}$	1,213	0.793	0.405	0.000	1.000	1.000
$LOSS_{i,t}$	1,213	0.045	0.208	0.000	0.000	1.000
$REV\_VOLA_{i,t-1}$	1,213	0.094	0.098	0.005	0.064	0.525
$OCF\_VOLA_{i,t-1}$	1,213	0.026	0.022	0.002	0.020	0.112
$INVEST\_VOLA_{i,t-1}$	1,213	0.045	0.067	0.001	0.020	0.392
$RET\_VOLA_{i,t-1}$	1,213	0.017	0.006	0.008	0.016	0.036
$ANALYSTS_{i,t}$	1,213	3.022	0.546	0.000	3.091	4.043
$AGE_{i,t}$	1,213	9.108	0.617	6.016	9.391	9.624
$CLOSELY_{i,t}$	1,213	0.049	0.092	0.000	0.007	0.473
$FORGN_{i,t}$	1,213	0.761	0.427	0.000	1.000	1.000
$CDEBT_{i,t}$	1,213	0.007	0.027	0.000	0.000	0.172
$PORTFOLIO_{i,t}$	1,213	0.403	0.491	0.000	0.000	1.000
$TRADER_{i,t}$	1,213	0.082	0.274	0.000	0.000	1.000
$HEDGE_{i,t}$	1,213	0.815	0.389	0.000	1.000	1.000

TABLE 4: PEARSON'S CORRELATION COEFFICIENT'S

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1)	$F\_INVEST_{i,t+1}$	1.000						
(2)	$DES\_DER_{i,t}$	0.064**	1.000					
(3)	$NDES\_DER_{i,t}$	0.011	0.174***	1.000				
(4)	$DES\_DER\_A_{i,t}$	0.079***	0.808***	0.180***	1.000			
(5)	$NDES\_DER\_A_{i,t}$	0.017	0.159***	0.980***	0.163***	1.000		
(6)	$DES\_DER\_L_{i,t}$	0.003	0.769***	0.098***	0.301***	0.092***	1.000	
(7)	$NDES\_DER\_L_{i,t}$	0.006	0.184***	0.981***	0.192***	0.923***	0.101***	1.000
(8)	$NET\_CASH_{i,t}$	0.223***	0.011	-0.029	0.024	-0.022	-0.013	-0.035
(9)	$LEVERAGE_{i,t}$	-0.150***	0.041	0.111***	0.069**	0.090***	0.004	0.126***
(10)	$ROA_{i,t}$	0.046	0.026	-0.199***	0.051*	-0.186***	-0.016	-0.204***
(11)	$SIZE_{i,t}$	0.050*	0.043	-0.001	0.069**	0.013	-0.017	-0.016
(12)	$OCF\_SALES_{i,t}$	0.345***	0.063**	0.073**	0.116***	0.066**	-0.048*	0.078***
(13)	$SALES\_GROWTH_{i,t}$	0.177***	0.032	-0.011	0.019	-0.009	0.021	-0.011
(14)	$DIV_{i,t}$	-0.231***	-0.015	0.081***	0.024	0.081***	-0.036	0.079***
(15)	$LOSS_{i,t}$	0.010	-0.014	-0.005	-0.004	-0.008	-0.026	-0.002
(16)	$REV\_VOLA_{i,t-1}$	-0.029	-0.073**	0.008	-0.076***	0.014	-0.038	0.001
(18)	$OCF\_VOLA_{i,t-1}$	0.132***	-0.006	0.033	0.025	0.031	-0.035	0.034
(19)	$INVEST\_VOLA_{i,t-1}$	0.157***	0.060**	-0.026	0.080***	-0.018	0.033	-0.032
(20)	$RET\_VOLA_{i,t-1}$	0.171***	-0.017	-0.046	-0.015	-0.046	-0.026	-0.044
(21)	$ANALYSTS_{i,t}$	0.179***	-0.019	-0.087***	0.009	-0.087***	-0.060**	-0.084***
(22)	$AGE_{i,t}$	-0.032	0.014	0.087***	0.003	0.077***	0.014	0.094***
(23)	$CLOSELY_{i,t}$	-0.016	-0.025	-0.042	-0.016	-0.054*	-0.023	-0.029
(24)	$FORGN_{i,t}$	0.094***	-0.038	-0.218***	-0.091***	-0.192***	0.055*	-0.236***
(25)	$CDEBT_{i,t}$	0.129***	-0.017	0.047	-0.037	0.046	0.016	0.047
(26)	$PORTFOLIO_{i,t}$	0.003	0.264***	0.220***	0.213***	0.227***	0.223***	0.204***
(27)	$TRADER_{i,t}$	0.024	0.005	0.583***	0.017	0.573***	-0.008	0.572***
(28)	$HEDGE_{i,t}$	-0.017	0.253***	0.147***	0.216***	0.139***	0.195***	0.151***

		(8)	(9)	(10)	(11)	(12)
(1)	$F\_INVEST_{i,t+1}$					
(2)	$DES\_DER_{i,t}$					
(3)	$NDES\_DER_{i,t}$					
(4)	$DES\_DER\_A_{i,t}$					
(5)	$NDES\_DER\_A_{i,t}$					
(6)	$DES\_DER\_L_{i,t}$					
(7)	$NDES\_DER\_L_{i,t}$					
(8)	$NET\_CASH_{i,t}$	1.000				
(9)	$LEVERAGE_{i,t}$	-0.032	1.000			
(10)	$ROA_{i,t}$	0.113***	-0.129***	1.000		
(11)	$SIZE_{i,t}$	-0.015	-0.125***	0.168***	1.000	
(12)	$OCF\_SALES_{i,t}$	0.431***	0.037	0.059**	0.201***	1.000
(13)	$SALES\_GROWTH_{i,t}$	0.097***	-0.127***	0.233***	0.058**	0.117***
(14)	$DIV_{i,t}$	-0.082***	0.147***	-0.103***	0.136***	-0.063**
(15)	$LOSS_{i,t}$	-0.041	0.091***	-0.243***	-0.162***	-0.073**
(16)	$REV\_VOLA_{i,t-1}$	-0.106***	-0.111***	0.123***	-0.095***	-0.304***
(18)	$OCF\_VOLA_{i,t-1}$	0.098***	-0.098***	0.165***	-0.086***	0.037
(19)	$INVEST\_VOLA_{i,t-1}$	0.153***	-0.007	-0.023	0.022	0.127***
(20)	$RET\_VOLA_{i,t-1}$	0.065**	-0.182***	-0.037	-0.361***	-0.009
(21)	$ANALYSTS_{i,t}$	0.101***	-0.185***	0.047	0.347***	0.244***
(22)	$AGE_{i,t}$	-0.115***	-0.048*	-0.192***	0.060**	-0.087***
(23)	$CLOSELY_{i,t}$	-0.014	-0.030	0.102***	-0.071**	-0.080***
(24)	$FORGN_{i,t}$	0.046	-0.247***	0.139***	0.105***	-0.116***
(25)	$CDEBT_{i,t}$	0.080***	0.034	0.057**	-0.083***	0.089***
(26)	$PORTFOLIO_{i,t}$	-0.091***	0.093***	-0.127***	0.210***	-0.026
(27)	$TRADER_{i,t}$	0.016	0.109***	-0.222***	0.110***	0.135***
(28)	$HEDGE_{i,t}$	0.038	0.205***	-0.161***	0.134***	0.099***

		(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
(13)	*SALES_GROWTH*$_{i,t}$	1.000											
(14)	*DIV*$_{i,t}$	-0.230***	1.000										
(15)	*LOSS*$_{i,t}$	-0.028	-0.123***	1.000									
(17)	*REV_VOLA*$_{i,t-1}$	0.208***	-0.084***	0.016	1.000								
(18)	*OCF_VOLA*$_{i,t-1}$	0.222***	-0.146***	0.046	0.384***	1.000							
(19)	*INVEST_VOLA*$_{i,t-1}$	0.172***	-0.144***	0.021	0.104***	0.147***	1.000						
(20)	*RET_VOLA*$_{i,t-1}$	0.262***	-0.328***	0.284***	0.275***	0.348***	0.123***	1.000					
(21)	*ANALYSTS*$_{i,t}$	0.114***	-0.177***	0.034	-0.025	0.033	0.029	0.099***	1.000				
(22)	*AGE*$_{i,t}$	-0.170***	0.325***	-0.031	-0.097***	-0.113***	-0.094***	-0.215***	-0.052*	1.000			
(23)	*CLOSELY*$_{i,t}$	0.055*	-0.001	-0.008	0.006	0.035	-0.050*	0.068**	-0.033	-0.109***	1.000		
(24)	*FORGN*$_{i,t}$	0.056*	-0.076***	0.020	0.100***	0.109***	0.113***	0.158***	-0.022	0.028	0.020	1.000	
(25)	*CDEBT*$_{i,t}$	0.087***	-0.168***	0.057**	0.026	0.142***	0.049*	0.176***	0.035	-0.030	0.018	0.100***	1.000
(26)	*PORTFOLIO*$_{i,t}$	-0.040	0.221***	-0.034	-0.011	-0.031	-0.018	-0.143***	-0.114***	0.130***	-0.065**	0.134***	-0.068**
(27)	*TRADER*$_{i,t}$	-0.018	0.152***	0.007	0.019	-0.028	-0.047	-0.112***	-0.046	0.085***	-0.115***	-0.271***	-0.032
(28)	*HEDGE*$_{i,t}$	-0.050*	0.154***	0.033	-0.095***	-0.028	0.065**	-0.072**	-0.122***	0.011	-0.098***	0.125***	0.004

		(26)	(27)	(28)
(26)	*PORTFOLIO*$_{i,t}$	1.000		
(27)	*TRADER*$_{i,t}$	0.160***	1.000	
(28)	*HEDGE*$_{i,t}$	0.392***	0.142***	1.000

Notes: *, **, and *** indicate significance at the 0.10, 0.05 and 0.01 levels, respectively.

TABLE 5. THE EFFECT OF DERIVATIVES' DESIGNATION ON FUTURE INVESTMENTS.

	Full Sample				*Hedging firms only*			
	(1) Full Sample	(2) Full Sample – Base model	(3) No trading firms	(4) Prior year's investment	(5) Hedger only	(6) Hedger only – Base model	(7) No trading firms	(8) Prior year's investment
DES_DER$_{i,t}$	**0.524**				**0.605***			
	(1.63)				**(1.87)**			
NDES_DER$_{i,t}$	-0.055				-0.074			
	(-0.41)				(-0.57)			
DES_DER_A$_{i,t}$		**1.088****	**0.921***	**0.681***		**1.219****	**1.070****	**0.828****
		(2.19)	**(1.74)**	**(1.74)**		**(2.43)**	**(1.99)**	**(2.02)**
NDES_DER_A$_{i,t}$		0.427	0.229	0.250		0.456	0.305	0.263
		(0.88)	(0.23)	(0.62)		(0.95)	(0.32)	(0.65)
DES_DER_L$_{i,t}$		-0.276	-0.634	-0.001		-0.245	-0.604	0.028
		(-0.50)	(-1.23)	(-0.00)		(-0.43)	(-1.13)	(0.05)
NDES_DER_L$_{i,t}$		-0.558	-0.363	-0.389		-0.631	-0.474	-0.410
		(-1.13)	(-0.47)	(-0.96)		(-1.29)	(-0.62)	(-1.00)
INVEST$_{i,t}$				0.271***				0.254***
				(5.70)				(5.18)
NET_CASH$_{i,t}$	0.037	0.037	0.038	0.052**	0.032	0.031	0.033	0.050*
	(1.24)	(1.23)	(1.23)	(2.02)	(0.92)	(0.89)	(0.90)	(1.66)
LEVERAGE$_{i,t}$	-0.048**	-0.049**	-0.050**	-0.051***	-0.035	-0.036	-0.036	-0.034*
	(-2.13)	(-2.13)	(-2.12)	(-2.66)	(-1.49)	(-1.50)	(-1.48)	(-1.75)
ROA$_{i,t}$	-0.020	-0.023	-0.024	-0.028	-0.018	-0.021	-0.022	-0.031
	(-0.40)	(-0.46)	(-0.46)	(-0.72)	(-0.32)	(-0.39)	(-0.39)	(-0.73)
SIZE$_{i,t}$	-0.001	-0.002	-0.001	-0.001	-0.002	-0.003	-0.003	-0.002
	(-0.27)	(-0.37)	(-0.27)	(-0.24)	(-0.66)	(-0.81)	(-0.65)	(-0.53)
OCF_SALES$_{i,t}$	0.208***	0.205***	0.213***	0.152***	0.218***	0.214***	0.223***	0.164***
	(5.93)	(6.01)	(5.75)	(5.20)	(5.42)	(5.47)	(5.15)	(4.93)
SALES_GROWTH$_{i,t}$	0.031	0.032	0.038	-0.009	0.040*	0.041*	0.050**	0.004
	(1.41)	(1.48)	(1.64)	(-0.47)	(1.83)	(1.92)	(2.13)	(0.20)
DIV$_{i,t}$	-0.036***	-0.037***	-0.038***	-0.028***	-0.035***	-0.037***	-0.038***	-0.025***
	(-3.97)	(-4.07)	(-3.97)	(-3.70)	(-3.73)	(-3.89)	(-3.84)	(-3.14)
LOSS$_{i,t}$	-0.002	-0.003	-0.005	0.002	-0.017	-0.018	-0.022*	-0.011
	(-0.15)	(-0.20)	(-0.33)	(0.13)	(-1.44)	(-1.54)	(-1.76)	(-1.01)
REV_VOLA$_{i,t-1}$	-0.008	-0.008	-0.007	-0.006	0.006	0.007	0.011	0.014
	(-0.28)	(-0.29)	(-0.20)	(-0.23)	(0.21)	(0.22)	(0.33)	(0.53)

$OCF\_VOLA_{i,t-1}$	0.130	0.125	0.059	0.138	0.100	0.092	0.016	0.110
	(0.88)	(0.84)	(0.39)	(1.10)	(0.63)	(0.58)	(0.10)	(0.80)
$INVEST\_VOLA_{i,t-1}$	0.063	0.060	0.067	0.031	0.054	0.050	0.057	0.033
	(1.29)	(1.22)	(1.29)	(0.65)	(1.15)	(1.06)	(1.16)	(0.77)
$RET\_VOLA_{i,t-1}$	0.686	0.635	0.747	0.325	0.579	0.501	0.629	0.283
	(1.05)	(0.98)	(1.11)	(0.54)	(0.85)	(0.73)	(0.90)	(0.43)
$ANALYSTS_{i,t}$	0.007	0.007	0.007	0.004	0.001	0.001	0.000	-0.001
	(0.88)	(0.88)	(0.79)	(0.52)	(0.13)	(0.14)	(0.03)	(-0.11)
$AGE_{i,t}$	0.008	0.009	0.009	0.008**	0.012**	0.012**	0.013**	0.011**
	(1.52)	(1.59)	(1.57)	(1.99)	(2.10)	(2.19)	(2.20)	(2.57)
$CLOSELY_{i,t}$	0.021	0.022	0.021	0.013	0.007	0.009	0.008	-0.000
	(0.68)	(0.72)	(0.68)	(0.51)	(0.24)	(0.30)	(0.25)	(-0.01)
$FORGN_{i,t}$	0.008	0.009	0.007	0.006	0.010	0.011	0.009	0.010
	(0.94)	(1.00)	(0.77)	(0.87)	(1.11)	(1.25)	(1.07)	(1.36)
$CDEBT_{i,t}$	0.131	0.139	0.148	0.097	0.065	0.073	0.080	0.056
	(0.89)	(0.95)	(0.98)	(0.86)	(0.39)	(0.45)	(0.47)	(0.43)
$PORTFOLIO_{i,t}$	0.010*	0.010*	0.012*	0.009*	0.009	0.009	0.011*	0.008
	(1.66)	(1.68)	(1.88)	(1.68)	(1.56)	(1.57)	(1.82)	(1.52)
$TRADER_{i,t}$	0.019	0.019		0.014	0.017	0.017		0.013
	(1.59)	(1.64)		(1.56)	(1.38)	(1.46)		(1.40)
$HEDGE_{i,t}$	-0.012	-0.011	-0.011	-0.008				
	(-1.15)	(-1.09)	(-1.03)	(-1.07)				
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,213	1,213	1,114	1,213	988	988	889	988
Adjusted *R2*	0.22	0.22	0.22	0.29	0.22	0.22	0.22	0.28
F	5.425	5.351	5.338	9.765	4.968	5.218	5.733	8.438

Notes: Table 5 reports results of tests examining the effect of the use of derivative assets designated for hedge accounting (*DES_DER_A*) on future investments (F_INVEST_{t+1}) using the following regression model:

$$F\_INVEST_{t+1} = b_0 + b_1\ DES\_DER\_A + Controls + Fixed\ Effects + \varepsilon_t$$

Variable definitions are in Appendix A. All firm-specific continuous variables have been winsorized at the 1st and 99th percentiles (except *SIZE, ANALYSTS* and *AGE* which are expressed as natural logarithm). *, **, and *** indicate significance at the 0.10, 0.05 and 0.01 levels (two-tailed), respectively. t-statistics are presented in parentheses and are based on standard errors clustered at the firm level.

TABLE 6. CROSS-SECTIONAL TESTS

	VAR_X = UINV		*VAR_X = R_VAR_RANK*		*VAR_X = DERIV_SENS_IND*	
	(1) Full Sample	(2) Hedger only	(3) Full Sample	(4) Hedger only	(5) Full Sample	(6) Hedger only
$DES\_DER\_A_{i,t}$	-1.631	-1.073	-1.446	-1.385	0.190	0.271
	(-1.61)	(-1.06)	(-1.05)	(-1.01)	(0.32)	(0.44)
$NDES\_DER\_A_{i,t}$	0.878	1.053	-0.505	-0.277	0.433	0.611
	(0.63)	(0.77)	(-0.45)	(-0.25)	(0.23)	(0.33)
$DES\_DER\_L_{i,t}$	0.284	0.659	1.323	1.117	-0.004	0.049
	(0.26)	(0.57)	(0.65)	(0.55)	(-0.01)	(0.08)
$NDES\_DER\_L_{i,t}$	-0.532	-0.784	0.089	-0.289	-0.952	-1.177
	(-0.47)	(-0.70)	(0.07)	(-0.24)	(-0.51)	(-0.62)
$DES\_DER\_A_{i,t}*VAR\_X_{i,t}$	**4.845*** **	**4.091*** **	**3.668** **	**3.749** **	**1.719** **	**1.705** **
	(3.20)	**(2.68)**	**(2.01)**	**(2.04)**	**(2.11)**	**(2.02)**
$NDES\_DER\_A_{i,t}*VAR\_X_{i,t}$	-0.842	-1.043	0.161	0.135	0.089	-0.052
	(-0.41)	(-0.52)	(0.93)	(0.78)	(0.05)	(-0.03)
$DES\_DER\_L_{i,t}*VAR\_X_{i,t}$	-0.821	-1.557	-0.278	-0.234	-1.059	-1.347
	(-0.38)	(-0.70)	(-0.96)	(-0.81)	(-0.94)	(-1.22)
$NDES\_DER\_L_{i,t}*VAR\_X_{i,t}$	0.121	0.364	-0.110	-0.068	0.393	0.578
	(0.07)	(0.22)	(-0.62)	(-0.38)	(0.20)	(0.29)
$UINV_{i,t}$	-0.050***	-0.035**				
	(-3.16)	(-1.97)				
$R\_VAR\_RANK_{i,t}$			0.001	0.000		
			(0.89)	(0.40)		
$DERIV\_SENS\_IND_{i,t}$					-0.009	-0.006
					(-1.09)	(-0.65)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	No	No
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,213	988	1,213	988	1,213	988
Adjusted $R2$	0.22	0.22	0.22	0.22	0.21	0.21
F	5.627	5.937	5.274	5.025	8.003	7.236

Notes: Table 6 reports results for some cross-sectional tests, where we interact the derivative variables with the respective variable of interest. Variable definitions are in Appendix A. All firm-specific continuous variables have been winsorized at the 1st and 99th percentiles (except *SIZE, ANALYSTS* and *AGE* which are expressed as natural logarithm). *, **, and *** indicate significance at the 0.10, 0.05 and 0.01 levels (two-tailed), respectively. t-statistics are presented in parentheses and are based on standard errors clustered at the firm level.

TABLE 7. OVER VS. UNDERINVESTMENT

	UNDER_INVEST		*OVER_INVEST*	
	(1) Full Sample	(2) Hedger only	(3) Full Sample	(4) Hedger only
$DES\_DER\_A_{i,t}$	-1.178**	-1.108**	1.400	1.289
	(-2.51)	(-2.27)	(0.89)	(0.83)
$NDES\_DER\_A_{i,t}$	-1.360	-1.381	0.058	0.152
	(-1.32)	(-1.27)	(0.03)	(0.07)
$DES\_DER\_L_{i,t}$	0.846	0.822	0.153	0.463
	(1.33)	(1.32)	(0.08)	(0.24)
$NDES\_DER\_L_{i,t}$	1.401	1.424	-0.690	-1.006
	(1.43)	(1.37)	(-0.37)	(-0.50)
Firm controls	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	567	467	609	496
Adjusted $R2$	0.17	0.17	0.25	0.22
F	3.76	3.65	2.40	2.36

Notes: Table 7 reports results for our additional test, where we regress a underinvestment and overinvestment proxy on our derivative measures. Variable definitions are in Appendix A. All firm-specific continuous variables have been winsorized at the 1st and 99th percentiles (except *SIZE, ANALYSTS* and *AGE* which are expressed as natural logarithm). *, **, and *** indicate significance at the 0.10, 0.05 and 0.01 levels (two-tailed), respectively. t-statistics are presented in parentheses and are based on standard errors clustered at the firm level.

TABLE 8. EFFECT OF PORTFOLIO HEDGING STRATEGIES ON THE RELATIONSHIP BETWEEN DERIVATIVES AND FUTURE INVESTMENTS

	Subsample Test		Interaction Terms	
	(1)	(2)	(3)	(4)
	PORTFOLIO=0	*PORTFOLIO*=1	*Full Sample*	*Hedger Only*
DES_DER_A $_{i,t}$	**1.358****	**0.601**	**1.452****	**1.518****
	(2.04)	**(0.82)**	**(2.08)**	**(2.09)**
NDES_DER_A $_{i,t}$	-0.513	0.892	-0.483	-0.549
	(-0.75)	(1.37)	(-0.78)	(-0.92)
DES_DER_L $_{i,t}$	-0.154	0.129	-0.320	-0.248
	(-0.16)	(0.19)	(-0.35)	(-0.27)
NDES_DER_L $_{i,t}$	0.298	-0.932	0.279	0.204
	(0.46)	(-1.45)	(0.49)	(0.38)
DES_DER_A $_{i,t}$ **PORTFOLIO* $_{i,t}$			-0.607	-0.450
			(-0.62)	(-0.45)
NDES_DER_A $_{i,t}$ ****PORTFOLIO*** $_{i,t}$			**1.521***	**1.640***
			(1.78)	**(1.91)**
DES_DER_L $_{i,t}$ **PORTFOLIO* $_{i,t}$			0.105	0.039
			(0.09)	(0.03)
NDES_DER_L $_{i,t}$ **PORTFOLIO* $_{i,t}$			-1.433*	-1.451*
			(-1.88)	(-1.94)
PORTFOLIO $_{i,t}$			0.012	0.010
			(1.60)	(1.43)
Firm controls	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	724	489	1,213	988
Adjusted R^2	0.26	0.19	0.22	0.22
F	5.54	4.30	5.31	5.06

Notes: Table 8 reports results for testing the effect of the firm's hedging strategy on the relationship between derivatives and future investments. In columns (1) and (2), we conduct a subsample test. In columns (3) and (4), we interact our strategy variable *PORTFOLIO* with each derivative variable. Variable definitions are in Appendix A. All firm-specific continuous variables have been winsorized at the 1st and 99th percentiles (except *SIZE, ANALYSTS* and *AGE* which are expressed as natural logarithm). *, **, and *** indicate significance at the 0.10, 0.05 and 0.01 levels (two-tailed), respectively. t-statistics are presented in parentheses and are based on standard errors clustered at the firm level.

TABLE 9. CAPITAL MARKET EFFECTS OF DERIVATIVES' DESIGNATION

Panel A: Analysts' Forecast Dispersion

	PORTFOLIO=0				*PORTFOLIO*=1			
	(1) Hedger only	(2) Hedger only – Base model	(3) No trading firms	(4) Prior year's investment	(5) Hedger only	(6) Hedger only – Base model	(7) No trading firms	(8) Prior year's investment
$DES\_DER_{i,t}$	-1.869				1.061			
	(-1.23)				(0.60)			
$NDES\_DER_{i,t}$	-0.093				1.182			
	(-0.08)				(1.25)			
$DES\_DER\_A_{i,t}$		**-6.075*****	**-7.052*****	**-5.967****		**2.448**	**2.046**	**2.023**
		(-2.64)	**(-2.92)**	**(-2.59)**		**(1.19)**	**(0.90)**	**(0.97)**
$NDES\_DER\_A_{i,t}$		2.138	-2.839	2.171		2.783	-0.311	2.483
		(0.75)	(-0.73)	(0.77)		(0.89)	(-0.13)	(0.80)
$DES\_DER\_L_{i,t}$		5.260	5.491	5.208		0.377	0.738	0.577
		(1.26)	(1.39)	(1.24)		(0.15)	(0.28)	(0.23)
$NDES\_DER\_L_{i,t}$		-2.247	-4.913	-2.321		-0.581	-0.611	-0.288
		(-0.83)	(-1.17)	(-0.86)		(-0.25)	(-0.23)	(-0.13)
$INVEST_{i,t}$				-0.088				0.297**
				(-0.72)				(2.16)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	488	488	455	488	480	480	416	480
Adjusted *R*2	0.31	0.32	0.34	0.32	0.25	0.25	0.23	0.27
F	2.834	3.089	2.710	3.046	5.311	5.042	5.653	5.135

Panel B: Analysts' Forecast Error								
	PORTFOLIO=0				*PORTFOLIO*=1			
	(1) Hedger only	(2) Hedger only – Base model	(3) No trading firms	(4) Prior year's investment	(5) Hedger only	(6) Hedger only – Base model	(7) No trading firms	(8) Prior year's investment
$DES\_DER_{i,t}$	-2.920				1.904			
	(-1.30)				(0.48)			
$NDES\_DER_{i,t}$	-1.829				3.125			
	(-1.00)				(0.96)			
$DES\_DER\_A_{i,t}$		**-5.900***	**-7.351****	**-6.164***		**3.254**	**1.043**	**2.942**
		(-1.81)	**(-2.10)**	**(-1.81)**		**(0.65)**	**(0.21)**	**(0.60)**
$NDES\_DER\_A_{i,t}$		-10.185	-17.891*	-10.266		5.827	-4.479	5.606
		(-1.31)	(-1.71)	(-1.32)		(0.65)	(-0.90)	(0.63)
$DES\_DER\_L_{i,t}$		4.375	5.475	4.503		1.966	4.170	2.112
		(0.81)	(1.04)	(0.83)		(0.37)	(0.76)	(0.41)
$NDES\_DER\_L_{i,t}$		5.007	4.823	5.188		0.181	-1.256	0.396
		(0.61)	(0.41)	(0.63)		(0.03)	(-0.25)	(0.07)
$INVEST_{i,t}$				0.215				0.218
				(0.61)				(1.06)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	488	488	455	488	480	480	416	480
Adjusted $R2$	0.18	0.19	0.20	0.19	0.15	0.15	0.14	0.15
F	2.001	1.760	1.915	1.693	2.797	2.662	3.313	2.817

Panel C: Cost of Capital

	PORTFOLIO=0				*PORTFOLIO*=1			
	(1) Hedger only	(2) Hedger only – Base model	(3) No trading firms	(4) Prior year's investment	(5) Hedger only	(6) Hedger only – Base model	(7) No trading firms	(8) Prior year's investment
$DES\_DER_{i,t}$	-0.152				-0.051			
	(-1.25)				(-0.35)			
$NDES\_DER_{i,t}$	0.057				0.115***			
	(0.73)				(3.24)			
$\boldsymbol{DES\_DER\_A_{i,t}}$		**-0.491****	**-0.518****	**-0.474****		**-0.152**	**-0.166**	**-0.166**
		(-2.36)	**(-2.48)**	**(-2.28)**		**(-0.64)**	**(-0.65)**	**(-0.73)**
$NDES\_DER\_A_{i,t}$		-0.047	-0.042	-0.036		-0.033	0.087	-0.083
		(-0.14)	(-0.13)	(-0.11)		(-0.13)	(0.24)	(-0.34)
$DES\_DER\_L_{i,t}$		0.269	0.265	0.265		-0.013	-0.023	-0.006
		(1.61)	(1.59)	(1.58)		(-0.07)	(-0.11)	(-0.03)
$NDES\_DER\_L_{i,t}$		0.119	-0.230	0.108		0.274	0.287	0.326
		(0.44)	(-0.78)	(0.40)		(0.99)	(0.77)	(1.24)
$INVEST_{i,t}$				-0.011				0.035***
				(-0.76)				(2.98)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	397	397	378	397	422	422	375	422
Adjusted $R2$	0.46	0.46	0.44	0.46	0.47	0.47	0.46	0.48
F	8.652	8.457	8.256	8.690	14.191	14.105	12.311	13.873

Notes: Table 9 reports results of tests examining the capital market effects of the use of derivatives designated for hedge accounting (*DES_DER_A*). More precisely, we investigate the effect on analysts' forecast dispersion (*F_DISP;* Panel A), analysts' forecast error (*F_ERROR*; Panel B), and firm's implied cost of capital (ICC_{avg}; Panel C). We again report the results separately for firms without (columns 1-4) and with portfolio (columns 5 to 8) hedging strategies. We use the same control variables as in our main tests (table 5). All variables' definitions can be found in Appendix A. Further, all firm-specific continuous variables have been winsorized at the 1st and 99th percentiles (except *SIZE, ANALYSTS* and *AGE* which are expressed as natural logarithm). *, **, and *** indicate significance at the 0.10, 0.05 and 0.01 levels (two-tailed), respectively. t-statistics are presented in parentheses and are based on standard errors clustered at the firm level.