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Shedding light on foreign currency cash flow hedges: transparency and the hedging decision

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Abstract
Utilizing firms in the S&P 500, we study whether greater transparency in the reporting of other comprehensive income (OCI) items, as mandated by ASU 2011-05, resulted in a reduction in information asymmetry, a change in the value relevance of this information, or a change in hedging practice. Our results show that while transparent reporting reduced information asymmetry, firms that engage in cash flow hedging do have greater information asymmetry than their counterparts that do not hedge. We find evidence that investors penalize firm value for greater volatility of OCI relative to net income volatility when reported transparently. When permitted, managers were able to mitigate the negative impact by reporting OCI only in the Statement of Shareholders' Equity. We conclude that managers' concerns regarding potential confusion surrounding OCI volatility following more prominent reporting led to changes in hedging behavior. After transparent reporting, we find a reduced likelihood of foreign currency cash flow (FXCF) hedges and a reduced level of FXCF hedging among firms experiencing the greatest volatility of unrealized hedging gains and losses.

Keywords Cash flow hedging · Currency exposure · Other comprehensive income · Information asymmetry · Value relevance · Transparency · Accounting standards

JEL Classification F23 · G32 · M41

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1 Introduction

Accounting Standard Update (ASU) 2011-05[1] increased the financial statement prominence of Other Comprehensive Income (OCI) items by eliminating the option of displaying OCI items only within the Statement of Shareholders Equity (SSE) and requiring that they appear on the face of the income statement (IS) or in a separate Statement of Comprehensive Income (SCI). ASU 2011-05 did not change the nature of items recognized as OCI. Compared with reporting only within the SSE, prior literature suggests that the IS and SCI formats increase OCI disclosure transparency (Hirst and Hopkins 1998; Wang and Men 2013). While accounting authorities felt strongly that OCI information is valuable to investors and should have greater prominence in the financial statements, about 60 percent responding to the proposed mandate expressed concerns that greater prominence of this information would serve to increase investor confusion (Du, McEnroe, and Stevens, 2016). Firms that preferred opaque reporting when available had more OCI items and a larger absolute value of non-translation OCI (Lin, Martinez, Yang, and Wang 2018).

Has increased transparency of this information improved its usefulness or contributed to confusion? One potentially confusing OCI item for investors relates to unrealized gains and losses from hedging activities. Cash flow (CF) hedges, which are the focus of this study, are a "hedge of the exposure to variability in the cash flows of a recognized asset or liability or of a forecasted transaction" (FAS 133, para 4). Since a nonderivative instrument cannot be designated as the hedging instrument in a cash flow hedging relationship (ASC815), CF hedges must be derivative contracts and can include swaps. Gains or losses from the derivative position are reported in OCI until they are reclassified to net income upon the future realization of the underlying forecasted transaction. This accounting treatment results in an extreme mixed attribute problem as described in Gigler et al. (2007). Using a pre-ASU 2011-005 sample (2001–2006), Campbell (2015) finds that investors did not "immediately price in the cash flow information" and were subsequently "surprised by future realizations of gross margin." Campbell concluded that his findings were relevant to FASB and IASB policy makers attempting to "simplify the accounting and disclosure for derivatives and, in particular, cash flow hedges."

If managers' concerns over investor confusion dominate the benefits to investors of increased transparency, a change in hedging behavior could occur when transparency of hedging results becomes mandatory. In this study, we examine how the change in reporting transparency of unrealized cash flow hedging gains and losses impacts information asymmetry and firm value and whether managers alter their hedging practice accordingly. We make three contributions to the extant literature. The first contribution comes from whether greater financial statement prominence benefited investors by reducing information asymmetry. We document evidence that increased transparency is associated with a reduction in investor opinion divergence. However, regardless of reporting transparency, the levels of investor divergence are greater among CF hedgers than non-hedgers.

The second contribution comes from examining the value relevance of CF hedging and impact of OCI volatility on firm value before and after the mandated statement transparency. While we find support for investors placing value on a firm's hedging efforts, our results show that the volatility of OCI negatively impacts firm value when reported

[1] For public entities, ASU 2011–05 was effective for fiscal years and interim periods beginning after December 15, 2011.

transparently. Consistent with the implications of limited attention and processing power (Hirshleifer and Teoh 2003; Cao and Dong 2020), investors did not impound value when the firm presents less saliently. Once managers were no longer able to mitigate the negative impact of OCI volatility by reporting only in the SSE, a potential tradeoff between the benefits of CF hedging and investor response to more salient reporting of volatile hedging results could impact hedging behavior.

The third contribution comes from examining whether greater OCI prominence resulted in a change in foreign currency cash flow (FXCF) hedging practice despite its documented benefits. We examine the probability of FXCF hedging and level of hedging after controlling for reporting transparency. We find some evidence that increased transparency resulted in a reduced likelihood of FXCF hedging. Our results show firms with the greatest volatility of FXCF hedging gains and losses reduce their level of FXCF hedging when forced to report transparently. This finding is consistent with comment letters suggesting that many firms feared additional transparency would only confuse users. Although CF hedging may be value enhancing regardless of financial statement prominence, unrealized CF hedging results increase OCI volatility. Managers concerned about increased transparency appear to reduce the use of FXCF hedging to reduce OCI volatility and its potentially negative impact on firm value.

The remainder of the article proceeds as follows: the next section summarizes relevant literature; the third section provides the development of our hypotheses; the fourth section describes our research design, including data selection and variable construction; the fifth section presents the main results along with robustness tests; and the last section provides our concluding remarks.

2 Background and literature

We summarize the relevant literature on FXCF hedges specifically and CF hedges more broadly below. For a more thorough review of the accounting literature on derivatives research, we suggest Campbell et al. (2019). They point out that while there is vast research on why firms use derivatives, the level of disclosure under accounting standards limits the ability of researchers to measure a firm's derivative use. Most research has relied on indicator variables or other imperfect measures of hedging activity such as the fair value amounts or reported gains and losses. We identify the relevant streams of research as derivative use and firm value, information asymmetry and derivative disclosure (including studies on the consequences of changes in disclosure), value relevance of OCI, and determinants of derivative use.

2.1 Derivative use and firm value

Campbell et al. (2019) summarize the substantial research establishing that derivatives allow firms to reduce their cost of capital and increase firm value by smoothing cash flows and earnings. Allayannis and Weston (2001) find evidence of a value premium among well-governed large firms that engage in FXCF hedging. Examining hedging more broadly, Graham and Rogers (2002) find that hedging leads to increased debt capacity and hence tax benefits that accrue to the firm's value. Donohoe (2015) finds that initiating a derivatives program leads to a significant reduction in cash effective tax rates and Lee (2019) also finds weak evidence of a tax motivation for hedging. Chen and King (2014) provide evidence

that by reducing bankruptcy risk, agency costs, and information asymmetry, hedging is associated with a lower cost of debt. Similarly, Aretz et al. (2007) find an increase in firm value by nonfinancial corporations associated with hedging through its impacts on agency costs, costly external financing for funding of investment opportunities, bankruptcy and financial distress costs, and taxes.

These findings are consistent with Smith and Stulz (1985) who theorize that by reducing the probability of bankruptcy and negative cash flow shocks through derivative use, levered firms can increase their value. Similarly, using a sample of firms in the Canadian oil and gas industry, Gilje and Taillard (2017) provide direct empirical evidence that hedging value implications are concentrated among firms facing a higher probability of financial distress. Kanagaretnam et al. (2009) show that both the winning and losing hedging positions are positively priced by investors, suggesting that hedging is viewed as a signal of proactive risk management regardless of gains and losses.

Conversely, other studies find that either hedging has no significant effect on firm value or suggest it leads investors to view the firm as more risky than non-hedgers. Jin and Jorion (2006) find hedging by oil and gas producers reduces the sensitivity of their stock price to oil and gas prices, but it has no effect on firm value. In contrasting their findings with Allayannis and Weston (2001), they conclude that there is a crucial difference between the nature of commodity risk exposure and foreign currency (FX) risk exposure. Brown (2001) shows that FX hedging is effective in reducing reported earnings volatility and can help obtain competitive advantages. However, while they find it reduces the sensitivity of the stock price to exchange rate changes, they find the evidence is weak that FX hedging has an impact on firm value. Ullah et al. (2023) explore a channel through which hedging negatively affects the firm value. They find a reduction in firm value when capital expenditures are combined with hedging, although capital expenditures themselves generally have positive impact. This is particularly true for firms with foreign operations.

While the ex-ante literature documents many benefits to hedging, concerns over increased transparency of hedging results may serve as a deterrent for managers. Hirshleifer and Teoh (2003) using a limited attention approach suggest that investors may perceive hedging firms as riskier than non-hedgers in the case of CF hedges, where hedging profits are marked-to-market while the underlying long-term business risk is not marked-to-market.

2.2 Information asymmetry and derivative disclosure

As the use and complexity of derivative instruments has increased, accounting authorities have worked to address concerns regarding the financial reporting of hedging activities. Statement of Financial Accounting Standard (FAS) 133, issued in 1999, established the accounting rules for hedges but removed most derivative disclosure required by the superseded FAS 119. Tessema (2023) finds that the recognition of hedging activities mandated by FAS 133 results in greater investor uncertainty and opinion diversity for companies operating in more competitive industries. In response to concerns that there was not "adequate information about how derivative and hedging activities affect an entity's financial position, financial performance, and cash flows,[2]" FAS 161, issued in 2008, required additional derivative and hedging footnote disclosures but did not modify derivative

[2] Statement of Financial Accounting Standards No. 161, March 2008, an amendment to FASB 133, page 3.

accounting. Prior studies largely show that additional derivative disclosures help investors and are value relevant (Venkatachalam 1996; Wong 2000; Schrand 1997).

Steffen (2021) finds that FAS 161 disclosure changes reduced information asymmetry, as evidenced by reduced bid-ask spreads, but did not lead to reduced uncertainty about firm value. Campbell et al. (2015) examine whether FAS 161 implementation reduced or eliminated investor underreaction and find analysts fail to fully incorporate CF hedge information into their earnings forecasts. The authors show that when managers provide more transparent, complete, and forward-looking disclosures regarding CF hedges there is a reduction in the associated mispricing. Campbell et al. (2021) suggest that enhanced mandatory CF hedging disclosure following FAS 161 helped correct investors' previous mispricing of unrealized cash flow hedge gains/losses. They also find the correction is greater among firms in industries with heavier derivatives use, those that hedge multiple risk types, and those that did not provide voluntarily quantitative disclosure prior to the mandate.

While greater transparency may be beneficial, for cash flow hedgers that benefit may depend on the sophistication of investors using the information. Maines and McDaniel (2000) provide evidence that nonprofessional investor assessments of firm and managerial performance reflect the volatility of CI when reported in a separate statement. Investors reduce the use of information when it is complex (Plumlee 2003) as complexity hinders their ability to extract information (Rees and Shane 2012). Koonce et al. (2005) show that the labels firms use to describe financial instruments have a powerful effect on investors' risk judgements and only the loss label causes investors to make erroneous inferences about undisclosed gains. Their findings suggest that when confronted with an information item involving the derivatives label (i.e., hedge or swap) it triggers "specific mental associations that systematically affect risk assessment in ways not explained by economic analysis." They go on further to say that supplementary exposure information does not overcome this effect.

Previous research suggests that investors may draw incorrect inferences from hedging gains and losses. Campbell (2015) provides evidence that current period unrealized CF hedge gains/losses are negatively associated with future profitability and stock returns and that investors do not immediately price the implications of CF hedge gains and losses. He documents an abnormal return from buying firms with large unrealized losses and shorting those with large unrealized gains and concludes this explains why previous research has failed to document the value relevance of OCI and why managers are hesitant to embrace greater OCI transparency. Makar et al. (2013) also find that investors underestimate the relation between future cash flows and OCI unrealized CF hedging gains and losses. Richie et al. (2006) show that hedged firms exhibit less earnings predictability and conclude that the increased complexity of the financial statements made earnings more difficult to forecast. Even sophisticated investors incorrectly incorporate unrealized gains and losses into their earnings forecasts (Campbell et al. 2015).

2.3 Value relevance of OCI

Most prior literature suggests that OCI is value relevant to investors. Chambers et al. (2007) show that investors price OCI information post-SFAS 130 when most firms reported OCI only in the SSE. Kanagaretnam et al. (2009) provides important evidence on the value relevance of aggregated CI. They find net income is a better predictor of future net income, while aggregated CI is a better predictor of future cash flows. They conclude that the

components of OCI are value relevant but that due to their transitory nature they are poor predictors of future profitability.

More recent studies have examined the value relevance of OCI following increased reporting transparency. Lin et al. (2018) examine the value relevance of OCI before and after ASU 2011-05 and conclude that OCI information is consistently value relevant when reported in only the SSE. They find that the value relevance of OCI decreased among firms forced to switch to greater financial statement prominence and that it is only priced by investors when reported in the SCI if the magnitude of OCI volatility is significant. Kim (2017) also find that OCI information is more value relevant when reported in the SSE only, but show that after ASU 2011-05 OCI is only value relevant when reported in a separate statement (SCI format). Huang et al. (2021), on the other hand, show that the value relevance of OCI is higher when reported in the IS rather than SCI format following ASU 2011-05.

A stream of research examines the implications of investor inattention and the impact of reporting location. Hirshleifer and Teoh (2003) suggest that the location of reporting matters even if it is informationally equivalent. They conclude that information presented saliently receives more of investors' limited attention, while investors may fail to deal with some non-salient information such as footnotes. Inattention in their model influences prices and is consistent with regulators mandating enhanced prominence to mitigate efforts by firms to exploit investor inattention to relevant information. Using data in the period between 2005 and 2010, Khan and Bradbury (2014) find that the market did not price greater CI volatility incremental to net income volatility. More salient reporting of volatile OCI items could lead investors to change their perception of the firm's riskiness even though the information content has not changed.

Yen et al. (2007) find that managers believe greater OCI prominence could lead investors to use this information inappropriately and thus adversely affect their perceptions of performance. Bamber et al. (2010) find that CEOs with stronger equity-based incentives and less job security preferred opaque OCI reporting when they had the option. They suggest that managers act as if they believe CI location matters despite the traditional market view that reporting location does not matter. In the post-ASU 2011-05 period, Cao and Dong (2018) show that incremental CI volatility is significantly negatively priced by the market. They also show that for firms forced to report more transparently, the negative association is more pronounced when reported in the more prominent IS format instead of the more common SCI format, supporting Hirshleifer and Teoh (2003) and consistent with Huang et al. (2021).

2.4 Determinants of derivative use

FXCF derivative use has been shown to have a positive relation with a firm's foreign sales ratio (Allayannis and Ofek 2001; Lee 2019), geographic dispersion (Guay and Kothari 2003), and imbalance of foreign currency revenues versus expenses (Richie et al. 2006). Firms in less competitive industries are better able to maintain their profit margins by passing the exchange rate effect on to their customers (Allayannis and Ihrig 2001) and as a result unrealized CF hedging gains and losses convey less information for these firms (Campbell 2015).

Examining the use of derivates more broadly, previous literature suggests that hedging has costs in terms of needed staffing for implementation and monitoring (Brown 2001) consistent with a positive relation between the hedging decision and firm size and profitability.

Lee (2019) finds that derivative users are larger, more profitable (using ROA), more leveraged, have higher sales growth, and lower liquidity, while Géczy et al. (1997) find that firms with greater investment opportunities and tighter financial constraints tend to hedge more. Profitable firms may also have tax incentives associated with hedging. Graham and Smith (1999) show that profitable firms with net operating loss carryforwards (NOLs) can lower their expected tax liability by reducing the volatility of taxable income due to income tax convexity. However, Graham and Rogers (2002) find no evidence that firms hedge in response to tax convexity.

The extant literature provides evidence that given limited ability to eliminate risk on their own accounts, managers tend to moderate risk at the corporate level. Using a sample of gold mining firms, Tufano (1996) shows that managers' private exposure, captured by managerial stock and option holding, is associated with their choice of risk management. Graham et al. (2005) and Akron and Benninga (2013) conclude that as equity-linked compensation increases, managers tend to decrease their own risk by increasing hedging positions. Lee (2019) also finds evidence of a managerial ownership incentive for hedging. Barton (2001) finds a partial substitution effect between earnings smoothing and hedging as tools to reduce earnings volatility, while Choi et al. (2015) find that the substitution relation between CF hedges and discretionary accruals is lower following the issuance of FAS 133.

On the other hand, a heightened awareness of reported CF hedging gains and losses in OCI by investors may contribute to managers' decisions regarding hedging when reporting this information more transparently. Following the increased prominence of translation gains and losses in OCI, Marshall and Jin (2023) find that managers' net investment hedging decisions are impacted. Rees and Shane (2012) describe gains and losses from CF hedges as having a low degree of persistence and not being part of core operations or under management control. While they do not address the implications on the hedging decision, they point to the issue that CI combines both nonrecurring and more persistent OCI items, thus limiting the usefulness of CI in explaining future cash flows and income.

3 Hypotheses development

3.1 Information asymmetry

As previously discussed, additional disclosures mandated by accounting authorities in the past have led to reduced information asymmetry (Campbell et al. 2021). However, prior to ASU 2011-05, more than 70 percent of S&P 500 firms, reported OCI information only in the SSE rather than choosing a more transparent option. Accounting authorities believed ASU 2011-05 was necessary to bring greater visibility of OCI items and reduce information asymmetry. If accounting authorities are correct, then firms that previously buried OCI information only within the SSE should have higher levels of information asymmetry prior to ASU 2011-05. This leads to H1a:

H1a *Information asymmetry is greater when firms report OCI only in the SSE format.*

Firms that engage in CF hedging activities have more complex OCI items than nonhedgers and therefore a greater potential for investor divergence in valuation. This leads to H1b:

H1b *Firms that engage in CF hedging exhibit greater information asymmetry.*

If the accounting authorities are correct, we should expect information asymmetry associated with CF hedging to be higher under opaque reporting (H1c).

H1c *The information asymmetry associated with CF hedging is higher under opaque reporting (SSE only).*

Although we believe accounting authorities are correct, the polar responses to ASU 2011-05 suggest that overall firm managers did not embrace transparency. Their concern about the potential for investor confusion suggests that investors would not interpret the unrealized hedging gains and/or losses correctly. If managers are correct, then the elimination of the opaque reporting option (SSE only) would result in greater investor confusion. This leads to H1c (alternative).

H1c (alternative) *The information asymmetry associated with CF hedging is lower under opaque reporting (SSE only).*

We expect greater investor opinion divergence among firms with greater dispersion of investor sophistication levels. While sophisticated users of financial statements should have been able to find and use CF hedging information regardless of its reporting location, less-sophisticated investors may have previously been unaware of this value-relevant information. Thus, investor opinion divergence would be even greater when there is inattention to less visible information by less sophisticated investors.

H1d *Information asymmetry is greater among firms with lower investor sophistication, and particularly among firms reporting OCI only in the SSE format.*

3.2 Firm value

Hedging of forecasted transactions can reduce cash flow volatility, which is as an essential aspect of firm risk management. We expect the elimination of the opaque reporting option (SSE only) to enhance the notability of CF hedging and thus help investors recognize hedging benefits. However, according to Tufano (1996), managers make their hedging decision based on their private risk exposure and aversion rather than corporate risk management. If this is true, outside investors may not value hedging in that it contributes more to maximizing managerial utility rather than shareholder value. This leads to H2a and H2a (alternative):

H2a *CF hedgers exhibit higher firm value, but this relation is lower with opaque (SSE only) reporting.*
H2a (alternate) *There is no value benefit associated with CF hedging irrespective of reporting location.*

Based on Hirshleifer and Teoh (2003) and Yen et al. (2007), greater visibility of OCI volatility could adversely affect investor's perceptions of performance. Therefore, we expect lower valuations among firms reporting higher OCI volatility, but higher valuations by investors when OCI volatility was reported more opaquely (SSE only). This leads to H2b:

H2b *Firm value is lower in the presence of OCI volatility but higher when that OCI volatility is reported more opaquely (SSE only).*

3.3 FXCF hedging participation and level

We argue that firms previously preferring opaque reporting are those most concerned about the investor confusion associated with OCI information, including unrealized FXCF hedging gains and losses. These firms could attempt to mitigate the reporting of volatile hedging results by adjusting their hedging policy following the adoption (including early adoption) of ASU2011-05. In our examination of hedging practice, we focus on FXCF hedging only. This leads to H3a and H3b:

H3a *The likelihood of engaging in FXCF hedging is higher with opaque OCI reporting (SSE only).*
H3b *The level of FXCF hedging is higher with opaque OCI reporting (SSE only).*

For those already utilizing FXCF hedging, if managers' concern is primarily over reporting volatile hedging results, we expect managers of firms that experience the highest volatility of OCI items when reporting only within the SSE to be those most concerned that investors will be distracted by reported unrealized hedging gains and losses in OCI when they become transparent. Managerial concerns could lead to higher (lower) levels of FXCF hedging under opaque (transparent) reporting. This leads to H1c:

H3c *Those experiencing the highest volatility in OCI items under opaque reporting (SSE only) engaged in higher levels of FXCF hedging under opaque reporting (SSE only).*

4 Research design

4.1 Sample selection

We start with S&P 500 firms because most have both currency exposure and the necessary personnel to manage currency risk. We include all firms in the S&P 500 at any time during our sample period to avoid survivorship bias, resulting in 636 index constituents. We drop firms that have significant changes in ownership for any reason (IPO, spinoffs, significant mergers and/or acquisitions, etc.), resulting in 590 firms in our available sample. Our sample period runs from 2010 to 2015, including the year that the provisions of ASU 2011-05 became mandatory.

We use Compustat Segments data, which provides some accounting data by geographic segments, to identify firms with FX exposure. Of our initial sample of 590 firms, 403 firms show evidence of FX exposure, reporting either non-domestic or export sales. However, our preliminary Exposed sample is reduced to 240 firms, represented by 1,080 firm-year observations, due to missing data for 163 firms in constructing variables needed for the regressions. We hand collect data on each sample firm's hedging policy, notional value of FXCF hedging, and the impact on OCI using the footnotes to the financial statements, either narrative or tabular. Since only firms that cross the ASU 2011-05 effective date are relevant to our hypotheses, we exclude 27 firms, or 43 firm-year observations, that drop out from our sample immediately before or after ASU 2011-05. This leaves a final Exposed sample of 213 firms, represented by 1,037 firm-year observations, that cross the effective date of ASU 2011-05. Prior to ASU 2011-05, in addition to OCI reporting in the SSE, firms had a choice to also report OCI information more transparently in either the IS or a

separate SCI. We manually check the location used by our sample for reporting CI each year.

Before ASU 2011-05, most firms tended to display CI only in the SSE. For our sample, only 38 firms or 17.8% also reported CI in a transparent format, either on the IS or in a separate statement (SCI), prior to the mandated implementation of ASU2011-05. For the 175 firms in our sample forced to shift to more transparent reporting on the effective date, most had two years within the sample period of reporting in a less transparent manner and then four reporting years where OCI had greater financial statement visibility. Following mandated transparent reporting, most firms (90.8%) utilize the SCI format. This is consistent with the strong opposition to requiring the IS format clearly expressed by managers in their comment letters in response to FASC 220. While the IS approach enhances OCI value relevance compared with SCI reporting (Huang et al. 2021), managers expressed concern that investors would overreact to volatile OCI items when displayed with Net Income, resulting in CI as the new "bottom line" of the IS.

4.2 CF hedging transparency and information asymmetry

As discussed in Sect. 3.1, we expect that opaque reporting of CF hedge information contributes to information asymmetry between managers and investors and among different investors. We expect that reporting transparently will either reduce or eliminate this additional asymmetry. Similar to Campbell et al. (2021), we test these hypotheses using the following model:

$$\begin{aligned} \textit{Information Asymmetry} = {} & a + \beta_1 SSEonly + \beta_2 CFHedge + \beta_3 CFHedge * SSEonly \\ & + \beta_4 LowInst + \beta_5 LowInst * SSEonly + \beta_6 Lmval \\ & + \beta_7 Big4 + \beta_8 GrowCap + \beta_9 Loss \\ & + \beta_{10} Coverage + \beta_{11} Surprise + \beta_{12} VolEarn + \varepsilon \end{aligned} \tag{1}$$

The dependent variable, *Information Asymmetry*, is a measure of investor opinion divergence. Previous research utilizes a variety of proxies for investor opinion divergence. Campbell et al. (2015, 2021) use analyst earnings forecast error while other researchers use proxies based on stock price (ex. cumulative abnormal returns), trading activity (ex. abnormal volume, bid-ask spread), or earnings (ex. earnings volatility). Garfinkel (2009) compares these different proxies. His results suggest that spreads and unexplained trading volume are the best proxies for opinion divergence and that volatility of stock returns and dispersion of analysts' forecasts are weaker proxies. We therefore employ spread and abnormal volume as two proxies for investor diversion. *Spread* is the daily percentage bid-ask spread, calculated as

$$Spread = \frac{Ask - Bid}{(Ask + bid)/2} \times 100 \tag{2}$$

where ask and bid prices are daily closing prices on the date of annual report release. Unlike earnings information, which firms typically release before the annual report, hedging disclosure is available only in the complete annual financial statements. Therefore, investor opinion divergence to hedging information should arise with the release of the annual report. We also use daily high ask and daily low bid prices as an alternative measure for robustness. Since *Spread* is bounded at zero, we run a Tobit model using zero as

the lower limit to prevent the predicted value from falling below zero when *Spread* is the dependent variable.

Following Dorminey and Apostolou (2012), we calculate abnormal trading volume, *abVol*, as the difference between average daily trading volume for firm *i* during the information period (IP) and the normal period (NP), adjusted by the difference between average daily trading volumes for the S&P 500 over the same period. Firm daily trading volume, VOL_i divided by $SHROUT_i$, is the percentage of shares that trade each day for firm *i* of shares outstanding. S&P 500 daily trading volume, VOL_{mk} divided by $SHROUT_{mk}$, is the percentage of shares that trade each day for the S&P 500 firms as a percentage of S&P 500 shares outstanding.

$$abVol_i = \left[\left(\frac{VOLi}{SHROUTi}\right)_{IP} - \left(\frac{VOLi}{SHROUTi}\right)_{NP}\right] - \left[\left(\frac{VOLmk}{SHROUTmk}\right)_{IP} - \left(\frac{VOLmk}{SHROUTmk}\right)_{NP}\right] \tag{3}$$

We define the information period as starting with the annual report release date and ending on the seventh trading day after (7-day window). The normal period includes 40 trading days prior to the annual report release.

We create a dummy variable *SSEonly*, which equals one if the firm reports only in the SSE to capture reporting opacity. *SSEonly* is equal to zero for all firms after the implementation of ASU 2011-05 and for those that chose to report more transparently, either in the IS or a separate statement, prior to the mandate.[3] A positive coefficient on *SSEonly* would be consistent with greater information asymmetry associated with opaque reporting (H1a).

CFhedge takes the value of one if the firm engages in CF hedging, indicated by a non-zero value of CIHEDGE (Compustat), and zero otherwise. As an alternative to *CFhedge* we use *AOCIhedge*, the absolute value of accumulated CF hedge gains or losses (Compustat variable AOCIDERGL), scaled by total sales, following Campbell et al. (2021). If CF hedgers experience higher information asymmetry than non-hedgers (H1b), we would expect a positive coefficient on *CFhedge* and *AOCIhedge*.

A positive coefficient on the interaction of *CFhedge* (or alternatively *AOCIhedge*) and *SSEonly* would be consistent with greater information asymmetry under opaque reporting and would suggest that accounting authorities' arguments that this information is useful to investors were correct (H1c). If manager concerns that increased transparency of OCI items would lead to greater confusion among investors are justified (H1c alternate), then we expect a negative coefficient on the interaction of *CFhedge* and *SSEonly*.

LowInst, which a dummy variable that takes the value of one if the percentage of institutional ownership is below the sample median and zero otherwise (Thomson Reuters), is included in the model to test whether firms with potentially less sophisticated investors exhibit higher information asymmetry and the impact of opaque reporting through its interaction with *SSEonly* (H1d). A positive coefficient on *LowIst* and on *LowInst* interacted with *SSEonly* would be consistent with greater information asymmetry associated with lower investor sophistication and under opaque reporting (H1d) and would suggest that accounting authorities' arguments that this information is useful to investors were correct.

Control variables include *Lmval* (natural log of firm market value), *Big4* (equal to one if the firm is audited by a Big 4 accounting firm that year, and zero otherwise), *GrowCap*

[3] Since IASB issued a similar requirement earlier than FASB, and both IASB and FASB allow early adoption, using the effective time of ASU 2011–05 or any unified cutoff time to distinguish transparency level is not appropriate.

(the future growth rate of real capital expenditure (year 0 to year + 1) where real capital expenditure is the reported capital expenditure adjusted by the CPI inflation rate), *Loss* (equal to one if the firm experiences a loss in the year, and zero otherwise), and *Coverage* (the number analysts used to calculate the mean consensus forecast in the IBSE). We also control for earnings surprise (*Surprise*), the difference between current and previous year net income scaled by the previous year's price, and earnings volatility (*VolEarn)*, calculated as the standard deviation of a firm's quarterly earnings over the prior twelve quarters. We include industry and year fixed effects and cluster standard errors by firm to control for heteroscedasticity and the potential of serial correlation in errors terms.

4.3 CF hedging and firm value

We hypothesize that CF hedgers exhibit higher firm value in recognition of the benefits of hedging but that opaque reporting diminished the notability of CF hedging (H2a). Therefore, we expect a positive coefficient on *CFhedge* and a negative coefficient on the interaction of *CFhedge* and *SSEonly*. Alternatively, if managers engage in hedging primarily to reduce their personal risk exposure consistent with Tufano (1996), no value benefit may be associated with CF hedging regardless of reporting transparency (H2a alternate).

Regardless of the impact of hedging on firm value, we expect investors to perceive OCI volatility negatively in their valuations since OCI volatility can reduce CI predictability. Valuations for firms that report the information opaquely when it was an option (SSE only) would be less negatively impacted (H2b). We test the hypotheses utilizing the following model:

$$\begin{aligned} Firm\,Value = {} & a + \beta_1 SSEonly + \beta_2 CFhedge + \beta_3 CFhedge * SSEonly \\ & + \beta_4 VolOCI + \beta_4 VolOCI * SSEonly + \beta_5 FsaleRatio \\ & + \beta_6 Dividend + \beta_7 GrowCap + \beta_8 Leverage \\ & + \beta_9 Liquidity + \beta_{10} Size + \beta_{11} ROA + \varepsilon \end{aligned} \tag{4}$$

We measure firm value by the ratio of market value to book value of assets (*MVBA*). To calculate market value of assets, we use market value of equity on the annual report release date and add the book value of debt. *CFhedge, SSEonly,* and the interaction of *Cfhedge* and *SSEonly* are our variables of interest for testing hypothesis H2a. We use *AOCIhedge*, a continuous variable defined previously, as an alternative measure of *Cfhedge*, to capture the level of hedging results reported.

Following Bao et al. (2020) we measure the volatility of OCI (*VolOCI*) using the 3-year standard deviation of CI relative to total assets minus the 3-year standard deviation of NI relative to total assets. If managers' concerns are justified regarding increased transparency, we expect the negative impact on firm value from OCI volatility was lower when opaque reporting was an option. Under H2b, we expect a negative coefficient on *VolOCI* but a positive coefficient on the interaction of *VolOCI* and *SSEonly*.

Other controls include *FsaleRatio*, *Dividend, GrowCap, Leverage, Liquidity, Size,* and *ROA (*Allayannis and Weston 2001*)*. *FsaleRatio* is a measure of multinationality, calculated as the ratio of a firm's foreign sales to total sales. Foreign sales are the firm's non-domestic sales plus the portion of domestic sales identified as exports. *Dividend* is a dummy variable that equals one if the firm paid a dividend in the current year and zero otherwise. *GrowCap* is previously defined. *Leverage* is the ratio of total debt over total assets and *Liquidity* is cash and cash equivalents over current liabilities. We measure *Size* using the log of total

assets (*Tassets*) and *ROA* as net income divided by total assets. We include industry and year fixed effects and cluster standard errors by firm to control for heteroscedasticity and the potential of serial correlation in errors terms.

4.4 FXCF hedging participation

Our main purpose is to examine how reporting transparency in OCI affects managerial behavior regarding FXCF hedging. The decision to hedge or not is a participation decision, while how much to hedge is a level decision. We are interested in whether firms change their FXCF hedging practice when forced to report OCI in a more transparent format following ASU 2011-05. We model the probability of a firm engaging in FXCF hedging as a function of reporting transparency, FXCF exposure, and other control variables as documented in the literature with the following Probit model:

$$\begin{aligned} FXCFhedge = {} & a + \beta_1 SSEonly + \beta_2 FsaleRatio + \beta_3 Dispersion \\ & + \beta_4 Imbalance + \beta_5 VolDollar + \beta_6 GrowSale \\ & + \beta_7 Leverage + \beta_8 Liquidity + \beta_9 TaxConv \\ & + \beta_{10} HHI + \beta_{11} Size + \beta_{12} Manage \\ & + \beta_{13} ROA + \beta_{14} OtherHedge + \varepsilon \end{aligned} \tag{5}$$

The participation decision (*FXCFhedge*) takes the value of one if the firm engaged in FXCF hedging in the reporting period and zero otherwise. Firms that reported OCI only within the SSE prior to the reporting mandate have positive values of *SSEonly*. Based on our hypothesis H3a, we expect a positive relation between *SSEonly* and *FXCFhedge* indicative of a reduced likelihood of FXCF hedging when these firms must report the unrealized gains and losses from FXCF hedging in a more transparent format.

We measure the level of currency cash flow exposure using the foreign sales ratio *(FsaleRatio*), geographic dispersion (*Dispersion*), the degree to which a firm is *imbalanced* in terms of foreign revenues and foreign expenses (*Imbalance*), and recent dollar volatility (*VolDollar*). *FsaleRatio* is as previously defined. *Dispersion,* the entropy measure employed by Guay and Kothari (2003), should capture the multidimensional nature of geographic dispersion. We calculate *Dispersion* as $\Sigma A_i \ln(1/A_i)$, where A_i is the ratio of unit *i*'s foreign sales to the firm's total sales, suggesting the importance of each unit. *Imbalance* is the absolute value of the difference between a firm's foreign sales ratio and foreign assets ratio (Richie et al. 2006). The foreign asset ratio is identifiable non-domestic assets to total assets. For firms missing this item, we use non-domestic long-lived assets or non-domestic plant, property, and equipment (PPE) scaled by total long-lived assets or PPE. For each financial statement date, we calculate exchange rate volatility (*VolDollar*) as the standard deviation of the monthly trade-weighted U.S. Dollar index (broad, monthly) from Federal Reserve Economic Data (FRED) for the previous five years.

Firm characteristics shown in prior literature to be related to the hedging decision include a proxy for growth *(GrowSale)*, *Leverage*, *Liquidity*, income tax convexity (*TaxConv*), industry competitiveness (*HHI*), *ROA,* and *Size*. *GrowSale, Leverage, Liquidity,* and *ROA* are as previously defined. *TaxConv* is an indicator variable equal to one if a firm has positive net income and non-zero NOL tax carryforwards in a year, and zero otherwise (Nance et al. 1993). Following the prior literature, we use the Herfindahl-Herschmann index, *HHI*, to measure industry competition. *HHI* is the sum of the squared market share for each firm competing in the industry, as classified by two-digit

SIC code. Higher values of *HHI* indicate firms with lower industry competition and thus potentially higher pricing power. We measure *Size* using either 1) the log of total assets (*Tassets*) or 2) log of total employees (*Employees*).

Managers' private exposure and risk aversion (*Manage*) may contribute to hedging practice choices, as suggested by Tufano (1996). We use three proxies for *Manage*: the degree of earnings smoothing, CEO equity-based incentives, and job security. If managers are concerned that volatile corporate earnings will impact shareholder assessments of their performance, they may engage in earnings smoothing and similarly they may be motivated to reduce future volatility through hedging. Therefore, the presence of a high degree of earnings smoothing suggests managers that are more likely to be concerned about shareholder evaluations of volatility and engage in hedging to reduce their personal risk exposure. We follow Kothari et al. (2005) by computing the modified Jones-model discretionary accrual (*DA*) controlling for profit (*ROA*). Given that upward earnings management and downward earnings management may be motivated for different reasons, we split *DA* into positive and negative values to isolate the effect of upward versus downward earnings management on hedging. We examine *DA* by quartiles and define the upper quartile as high positive earnings management (*HP*) and the lowest quartile as negative earnings management (*HN*). *HP* equals *DA* if a firm abnormally manages its earnings upward (*DA* is in the upper quartile, extreme end of positive discretionary accruals), and zero otherwise; similarly, *HN* equals *DA* if a firm abnormally manages its earnings downward (*DA* is in the lowest quartile, extreme end of negative discretionary accruals), and zero otherwise. To avoid the possibility that the extreme observations of *DA* distort our results, we winsorize *HP* and *HN* at the first and 99th percentile.

Our second proxy for managers' private exposure, *Manage*, is CEO equity-based incentives. Managers with greater private exposure may be incentivized to manage cash flow risk at the corporate level where their company bears the cost of risk management. Following Bamber et al. (2010), we measure CEO equity-based incentives (*EquityInc*) as the sensitivity of the CEO's stock and stock option holdings to a change in stock price, calculated as the effect of a one percentage point increase in the firm's stock price on CEO's equity holding (1pct) scaled by total annual compensation (1pct + cash salary + bonus). Our third proxy for managerial risk aversion (*Manage*) is a measure of job security, *Jsecurity*, proxied by the sum of two indicator variables: CEO-chair duality and insider-dominated board. Therefore, *Jsecurity* takes a value of zero, one, or two. Due to missing data, we lose about one-third of our observation when we include *EquityInc* and *Jsecurity* in alternative specifications.

Almost half of the firms in our Exposed sample do not choose to participate in FXCF hedging, and 60 percent of those firms do not participate any type of hedging activity. There may be several explanations for the 46 percent with a zero value for *FXCFhedge*. Managers may not engage in hedging due to restrictions placed on them by firm policies, or they may choose not to hedge FXCF exposure in certain periods due to macroeconomic and/or firm specific reasons. If a firm engages in other types of hedging activities, such as commodity or interest rate hedging, then we can assume they have no policy restriction on hedging. Therefore, we include a proxy for firm hedging practice, *OtherHedge*, which equals one if a firm engages in non-FXCF hedges, and zero otherwise. We include industry and year fixed effects to control for differences in hedging activities between industries as well as macroeconomic variations over time. We also cluster standard errors at the firm level to control for heteroscedasticity and serial dependence.

4.5 FXCF hedging level decision

To test H3b, we examine whether the prominence of OCI reporting affects the level of FXCF hedging following increased transparency. At this stage, we limit our sample firms to those firms already choosing to hedge, FXCF hedgers. We could have a self-selection problem as firms may self-select to become a hedger for reasons both observed and unobserved. To address the potential for unobserved factors that affect the hedging choice, we use Heckman correction, that is, including the inverse mill ratio (*IMR*) calculated from the first stage Probit regression, Eq. (5), in the second stage OLS regression. *OtherHedge* serves as our exclusion variable because it influences a firm's decision to participate in FXCF hedging but does not have any impact on the level of FXCF hedging if the firm does choose to engage in FXCF hedging.

$$\begin{aligned} FXCFdegree = a &+ \beta_1 SSEonly + \beta_2 VolHedGL + \beta_3 VolHedGL * SSEonly \\ &+ \beta_4 FsaleRatio + \beta_5 Dispersion + \beta_6 Imbalance \\ &+ \beta_7 VolDollar + \beta_8 GrowSale + \beta_9 Leverage \\ &+ \beta_{10} Liquidity + \beta_{11} TaxConv + \beta_{12} HHI \\ &+ \beta_{13} Size + \beta_{14} Manage + \beta_{15} IMR + \varepsilon \end{aligned} \tag{6}$$

The degree of FXCF hedging (*FXCFdegree*) is the notional value of all outstanding contractual FXCF hedges, scaled by the firm's foreign gross profit. We use foreign gross profit as the scalar since the foreign cash flows protected by FXCF hedging can be either foreign sales or costs. For firms that report notional values only in foreign currency, we convert the amounts into US dollars based on the exchange rate in effect at the reporting date. For firms reporting notional value aggregately for several types of hedges, we cannot get the actual value for constructing *FXCFdegree*. While we must treat these observations as missing for *FXCFdegree,* we still assign a value of one for *FXCFhedge* if it is evident that the firm engaged in FXCF hedging activities in that period. The final sample of FXCF hedgers with actual data for computing *FXCFdegree* consists of 436 observations. We expect a positive relation between *SSEonly* and *FXCFdegree* if firms previously reporting OCI items only within the SSE reduce the level of FXCF hedging after the mandated reporting change (H3b).

As outlined in the development of Hypothesis H3c, we expect managers of firms with high OCI volatility in the past to have higher levels of FXCF hedging when they could report opaquely. Once volatile FXCF hedging results must be reported transparently, we expect these managers to be motivated to reduce high OCI volatility, and hence investor distraction, by reducing the level of FXCF hedging. To test this hypothesis, we include past volatility of reported unrealized CF hedging gains or losses relative to the 3-year standard deviation of net income (*VolHedGL*) and its interaction with *SSEonly*. We expect a negative coefficient on *VolHedGL* and a positive coefficient on *VolHedGL* interacted with *SSEonly*. Other variables are as previously defined. Again, we control for industry and year fixed effect and cluster standard errors at the firm level.

We provide a summary of our variables, their description, and source in the Appendix and the summary of hypotheses in Table 1.

Table 1 Summary of Hypotheses

Hypotheses	Variable of interest	Test EQUATION	Expected sign
H1a *Information asymmetry is greater when firms report OCI only in the SSE format*	*SSEonly*	(1)	+
H1b *Firms that engage in CF hedging exhibit greater information asymmetry*	*CFhedge*	(1)	+
H1c *The information asymmetry associated with CF hedging is higher under opaque reporting (SSE only)*	*CFhedge*SSEonly*	(1)	+
H1c (alternative) *The information asymmetry associated with CF hedging is lower under opaque reporting (SSE only)*	*CFhedge*SSEonly*	(1)	−
H1d *Information asymmetry is greater among firms with lower investor sophistication, and particularly among firms reporting OCI only in the SSE format*	*LowInst* *SSEonly*LowInst*	(1)	+ +
H2a *CF hedgers exhibit higher firm value, but this relation is lower with opaque (SSE only) reporting*	*CFhedge* *CFhedge*SSEonly*	(4) (4)	+ −
H2a (alternate) *There is no value benefit associated with CF hedging irrespective of reporting location*	*CFhedge* *CFhedge*SSEonly*	(4) (4)	No effect No effect
H2b *Firm value is lower in the presence of OCI volatility but higher when that OCI volatility is reported more opaquely (SSE only)*	*VolOCI* *VolOCI*SSEonly*	(4) (4)	− +
H3a *The likelihood of engaging in FXCF hedging is higher with opaque OCI reporting (SSE only)*	*SSEonly*	(5)	+
H3b *The level of FXCF hedging is higher with opaque OCI reporting (SSE only)*	*SSEonly*	(6)	+
H3c *Those experiencing the highest volatility in OCI items under opaque reporting (SSE only) engaged in higher levels of FXCF hedging under opaque reporting (SSE only)*	*HighVol* *HighVol*SSEonly*	(6) (6)	− +

5 Results

5.1 Descriptive statistics

Table 2 provides a full set of descriptive statistics for our Exposed sample of 213 firms (1,037 firm-year observations). Eighty-two percent of our sample firms reported opaquely before ASU 2011-05 and were forced to report OCI more prominently after the effective date, resulting in 315 firm-year observations have a valuing of one for *SSEonly*. These observations represent 30.4 percent of total firm-year observations for our sample, indicated by the mean value of *SSEonly* in Table 1. We observe 70.4 percent of firm-year observations (77.9 percent of firms) engage in some type of CF hedging, with 51.6 percent of firm-year observations (54.9 percent of firms) engaging in FXCF hedging, which constitutes our FXCF Hedger subsample.

5.2 Reporting transparency and CF hedging on information asymmetry

Previous research shows that increasing information content should reduce information asymmetry, all other things being equal. However, in our setting the information content has not changed—only the reporting prominence has changed. Therefore, we are interested if any reduction in information asymmetry occurred as measured by the investor opinion divergence, spread (*Spread*) or abnormal trading volumes (*abVol*). Table 3 presents the results of Eq. (1) testing of H1a through H1d.

In Table 3 column (1), we find some evidence that investors experience a higher level of information asymmetry when OCI is reported opaquely as suggested by the positive and significant coefficient on *SSEonly*. That is, transparent reporting helps reduce investor opinion divergence when proxied by *Spread*, supporting H1a. The significant positive coefficient on *CFhedge* suggests that hedging activities bring about complexity in financial reporting thereby introducing more divergence among investors, regardless of reporting location, supporting H1b.

When the FASB issued the exposure draft (FASC 220) leading to ASU 2011-05, they initially proposed a single IS with the "bottom line" being CI. Ultimately, the final reporting requirement allowed firms to report either on the IS or in a separate statement (SCI). To isolate potential differences in the two choices of reporting transparency, IS or SCI, we isolate the impact of IS format further by adding an IS indicator variable that takes the value of one when firms report OCI and CI on the face of the IS and zero otherwise in column (2). The results show no further investor information asymmetry reduction from IS reporting over the SCI format.

In column (3), we replace the dummy *CFhedge* in column (1) with the continuous measure *AOCIhedge*. Although this is not a clean measure for CF hedging degree, it should contain more information than just an indicator variable. Since firms can have positive values (gains), negative values (losses), or a value of zero (in the case of non-hedgers), we employ the absolute value of this variable. We find that the investor divergence associated with CF hedging is greater (lower) when firms report CF hedging results opaquely (prominently). This finding suggests that the accounting authorities were correct that transparent reporting helps reduce information asymmetry, in support of H1c.

While we expect less sophisticated investors to be more likely to miss information previously buried in the SSE, we find only limited evidence that firms with a lower percentage

Table 2 Summary statistics

	N	Mean	Min	p25	Median	p75	Max
Spread	1037	.306	.009	.152	.231	.352	1.907
abVol	1037	.496	−13.509	−1.657	.054	1.911	19.675
MVBA	1037	1.930	.402	1.166	1.648	2.249	12.733
FXCFhedge	1037	.516	0	0	1	1	1
SSEonly	1037	.304	0	0	0	1	1
CFhedge	1037	.704	0	0	1	1	1
AOCIhedge	1037	13.059	0	0	4.432	16.458	98.578
FsaleRatio	1037	.436	.003	.250	.427	.614	.990
Dispersion	1037	.716	.019	.359	.660	.959	2.255
Imbalance	1037	.161	0	.037	.105	.238	.867
VolDollar	1037	.835	.367	.538	.622	1.136	2.288
VolHedGL	1037	.168	0	0	.028	.127	12.083
HighVol	1037	.297	0	0	0	1	1
Lmval	1037	9.304	7.062	8.738	9.245	9.860	11.343
Big4	1037	.992	0	1	1	1	1
GrowCap	1037	.128	−.812	−.082	.076	.252	2.988
Loss	1037	.047	0	0	0	0	1
Coverage	1037	14.056	1	10	14	17	36
Surprise	1037	.008	−.583	−.005	.005	.016	.643
VolEarn	1037	.013	.001	.004	.008	.014	.153
LowInst	1037	.315	0	0	0	1	1
VolOCI	1037	2.185	.097	.995	1.256	2.273	34.338
Dividend	1037	.769	0	1	1	1	1
Leverage	1037	.244	0	.14	.229	.327	.793
Liquidity	1037	.856	.013	.246	.546	1.043	8.208
Tassets	1037	8.991	6.515	8.333	8.907	9.625	11.705
ROA	1037	.081	−.264	.048	.078	.115	.361
GrowSale	1037	.051	−.814	−.015	.045	.112	.803
TaxConv	1037	.694	0	0	1	1	1
HHI	1037	.116	.027	.05	.074	.128	.471
Employees	1037	2.879	−.233	2.028	2.836	3.668	6.29
HP	1037	.012	0	0	0	.018	.129
HN	1037	−.012	−.097	0	0	0	0
EquityInc	731	.188	.001	.078	.129	.209	1
Jsecurity	742	1.395	0	1	1	2	2
OtherHedge	1037	.575	0	0	1	1	1

Table presents summary statistics for our Exposed Sample, which includes S&P 500 firms with fiscal years ending from 2010 to 2015 representing 213 firms with foreign currency exposure across the effective date of ASU 2011–05 and available data for constructing most dependent variables. The Appendix provides a description of all variables

of institutional investors (*LowInst*) exhibit greater investor opinion divergence (H1d). We conclude ASU 2011-05 impacts sophisticated and non-sophisticated investors similarly and there is no evidence that transparent reporting leads to investor confusion.

Table 3 Information Asymmetry

$$Information\,Asymmetry = a + \beta_1 SSEonly + \beta_2 CFHedge + \beta_3 CFHedge * SSEonly + \beta_4 LowInst + \beta_5 LowInst * SSEonly + \beta_6 Lmval + \beta_7 Big4 + \beta_8 GrowCap + \beta_9 Loss + \beta_{10} Coverage + \beta_{11} Surprise + \beta_{12} VolEarn + \varepsilon \quad (1)$$

	(1)	(2)	(3)	(4)	(5)	(6)
	Spread	*Spread*	*Spread*	*abVOL*	*abVOL*	*abVOL*
SSEonly	0.075**	0.068*	0.061**	−0.858	−0.985	−0.711
	(0.037)	(0.038)	(0.028)	(0.667)	(0.676)	(0.564)
IS		−0.030			−1.792	
		(0.053)			(1.287)	
CFhedge	0.049*	0.051*		−0.218	−0.312	
	(0.025)	(0.026)		(0.456)	(0.458)	
*CFhedge*SSEonly*	0.017	0.017		0.922*	1.029*	
	(0.038)	(0.038)		(0.488)	(0.595)	
*CFhedge*IS*		−0.049			1.175	
		(0.050)			(1.259)	
AOCIhedge			−0.002			−0.168
			(0.004)			(0.108)
*AOCIhedge*SSEonly*			0.016**			0.405***
			(0.008)			(0.149)
LowInst	0.043	0.044	0.038**	−0.376	−0.409	−0.398
	(0.030)	(0.031)	(0.019)	(0.410)	(0.425)	(0.663)
*LowInst*SSEonly*	−0.026	−0.027	−0.021	0.216	0.243	0.249
	(0.035)	(0.036)	(0.032)	(0.568)	(0.565)	(0.651)
*LowInst*IS*		−0.009			0.906	
		(0.047)			(1.445)	
Lmval	−0.108***	−0.111***	−0.101***	−0.200	−0.212	−0.171
	(0.018)	(0.018)	(0.010)	(0.244)	(0.237)	(0.427)
Big4	−0.005	0.006	−0.004	−1.118*	−0.940	−1.034
	(0.035)	(0.036)	(0.080)	(0.564)	(0.688)	(0.631)
GrowCap	0.019	0.019	0.016	−0.203	−0.211	−0.263
	(0.031)	(0.032)	(0.019)	(0.484)	(0.485)	(0.424)
Loss	0.210**	0.204**	0.211***	0.228	0.177	0.227
	(0.085)	(0.084)	(0.037)	(1.544)	(1.541)	(1.594)
Coverage	0.004*	0.004*	0.004***	−0.045	−0.045	−0.044
	(0.002)	(0.002)	(0.001)	(0.032)	(0.032)	(0.050)
Surprise	−0.033	−0.035	−0.027	−0.107	−0.154	−0.073
	(0.103)	(0.104)	(0.102)	(4.518)	(4.522)	(3.310)
VolEarn	3.004***	3.032***	2.909***	−6.989	−6.189	−6.758
	(0.965)	(0.994)	(0.436)	(9.596)	(9.219)	(10.237)
Industry/Year	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1037	1037	1037	1037	1037	1037
R^2	0.304	0.307	0.300	0.119	0.121	0.123

Table presents the results of Eq. (1) with measures of information asymmetry as the dependent variable. Information asymmetry is proxied by bid-ask spread (*Spread*) in columns (1)—(3) and by abnormal trading volume (*abVol*) in column (4) to (6). In column (1)–(3) when *Spread* is the dependent variable, a Tobit

Table 3 (continued)

model using zero as the lower limit prevents the predicted value from falling below zero. For the independent variable of interest, CF hedging, there are two alternative measures: a dummy variables *CFhedge,* and a continuous variables *AOCIhedge.* The Appendix provides a description of all variables. Standard errors (clustered at the firm level) are in parentheses. $^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$

In columns (4) to (6), we use abnormal trading volume (*abVol*) as an alternative measure of investor opinion divergence. Although the overall impact of *SSEonly* is no longer significant, the significant and positive coefficients on *CFhedge*SSEonly* in columns (4) and (5) and *AOCIhedge*SSEonly* in column (6) suggest that the information asymmetry associated with CF hedging is higher under opaque reporting, supporting H1c. There is no evidence to support H1d that the greater presence of non-institutional investors (*LowInst* equal to one) contributes to greater information asymmetry using this alternative measure of opinion divergence.

In tests not reported in Table 3, we split *CFhedge* into *CFhedgeGain* and *CFhedgeLoss* to determine whether sensitivity to reporting hedging losses drives investor divergence associated with CF hedging. If investors are confused by the expected relationship between CF hedging losses and future profits, we expect firms reporting CF hedging losses to have higher levels of investor confusion (or opinion divergence). We find investor divergence related to hedging losses is positive and significant, however, investor divergence is not exclusive to losses. We similarly split *AOCIhedge* into *AOCIhedgeGain* (positive values of AOCIDERGL and zero otherwise) and *AOCIhedgeLoss* (absolute value of negative values to simplify interpretation and zero otherwise). Using this alternative measure, the evidence suggests that hedging losses trigger more investor divergence than gains when reported opaquely, consistent with prior research that investors pay more attention to losses than gains in processing financial information. The results further support H1c, that the accounting authorities were correct in mandating more transparent reporting of this information.

In summary, our results show that CF hedging leads to investor opinion divergence when the firm reports the information opaquely. Transparent reporting helps reduce the information asymmetry surrounding CF hedging activities. Hence, the accounting authorities were correct in that prominent OCI disclosure helps promote information transparency thereby reducing investor divergence rather than amplifying. While we find evidence that information asymmetry associated with CF hedging is attributed to reported hedging losses rather than gains, we do not find sufficient evidence to support managers' belief that greater prominence of this information would lead to investor confusion.

5.3 Reporting transparency and FXCF hedging on firm value

Column (1) of Table 4 presents the result of Eq. (4) with firm value (*MVBA*) as the dependent variable. The positive coefficient on *CFhedge* suggests that investors recognize the potential benefits of CF hedging when reported prominently. This value benefit is not significantly lower when reported opaquely (*CFhedge*SSEonly*). We interpret the result as investors appreciating risk management practices aimed at reducing cash flow volatility and supporting the first part of H2a but not the second part.

As expected, OCI volatility (*VolOCI*) contributes to a significantly lower firm value when reported transparently. The positive coefficient on the interaction of *SSEonly* and *VolOCI* also indicates that firms reporting only in the SSE prior to ASU 2011–005 were able to avoid a valuation penalty associated with OCI volatility. The insignificant sum of

Table 4 Firm Value

$$\begin{aligned} Firm\ Value = {} & a + \beta_1 SSEonly + \beta_2 CFhedge + \beta_3 CFhedge * SSEonly \\ & + \beta_4 VolOCI + \beta_4 VolOCI * SSEonly + \beta_5 FsaleRatio \\ & + \beta_6 Dividend + \beta_7 GrowCap + \beta_8 Leverage \\ & + \beta_9 Liquidity + \beta_{10} Size + \beta_{11} ROA + \varepsilon \quad (4) \end{aligned}$$

	(1)	(2)	(3)	(4)
SSEonly	0.364**	0.374**	0.196**	0.274**
	(0.149)	(0.154)	(0.094)	(0.109)
CFhedge	0.159*	0.230**		
	(0.097)	(0.108)		
*CFhedge*SSEonly*	−0.204	−0.267*		
	(0.151)	(0.155)		
AOCIhedge			0.057***	
			(0.018)	
*AOCIhedge*SSEonly*			0.014	
			(0.038)	
FXCFhedge				0.218**
				(0.085)
*FXCFhedge*SSEonly*				−0.164
				(0.123)
VolOCI	−3.429**	−3.068**	−3.252**	−3.146**
	(1.334)	(1.365)	(1.322)	(1.316)
*VolOCI*SSEonly*	5.213***	4.906***	4.942***	4.849***
	(1.845)	(1.856)	(1.786)	(1.814)
FsaleRatio	−0.070	−0.015	−0.063	−0.115
	(0.154)	(0.158)	(0.149)	(0.154)
Dividend	−0.175**	−0.180**	−0.147*	−0.150*
	(0.079)	(0.082)	(0.079)	(0.080)
GrowCap	0.004	0.010	−0.008	0.011
	(0.079)	(0.082)	(0.079)	(0.079)
Leverage	0.219	0.224	0.226	0.244
	(0.223)	(0.226)	(0.208)	(0.212)
Liquidity	0.092*	0.103*	0.084*	0.086*
	(0.052)	(0.054)	(0.051)	(0.051)
Tassets	−0.392***	−0.416***	−0.397***	−0.398***
	(0.052)	(0.054)	(0.050)	(0.052)
ROA	8.269***	7.786***	8.291***	8.177***
	(1.560)	(1.643)	(1.556)	(1.570)
Industry/Year	Yes	Yes	Yes	Yes
Observations	1037	985	1037	1037
R^2	0.424	0.429	0.431	0.427

Table presents the results of Eq. (4) with firm value as the dependent variable. Firm value is the market to book value of assets *(MVBA)*. The Appendix provides a description of all variables. In Column (2), the sample excludes observations associated with IS reporting. Standard errors (clustered at the firm level) are in parentheses. $^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$

coefficients of *VolOCI* and *VolOCI*SSEonly* suggests that managers benefited from investor inattention to value relevant information previously reported less saliently prior to ASU 2011–005. When investors are more aware of OCI volatility reported in IS or SCI formats (either voluntarily prior to the effective date of ASU 2011–005 or after mandated), they tend to increase their risk assessment and lower firm value, supporting H2b.

Huang et al. (2021) suggest investor valuations incorporate OCI information to a further extent when presented in a single IS. To test whether the effect is mainly driven by the IS sample, we run the same regression on the sample excluding observations associated with IS reporting in column (2). While for the full sample we find no evidence that the CF hedging benefit to firm value is lower under opaque reporting, when we exclude IS reporting firms, we find weak evidence that investors ascribe less value to CF hedging when reported only in the SSE format. Other results remain qualitatively the same.

In column (3), we replace the dummy variable *CFhedge* with the continuous variable *AOCIhedge* as we believe it captures more information about CF hedging and researchers often use it as the proxy for the degree of hedging in the literature. Using the continuous variable our results suggest not only that hedging is valuable but also that the value benefit is increasing with the level of hedging. Using the full Exposed sample, as in column (1), there is no evidence that the benefit is lower with opaque reporting. Other results remain unchanged.

We note that the Compustat item AOCIDERGL includes unrealized gains and losses from all cash flow hedging activities rather than just those related to FXCF hedges. Since we focus on FXCF hedging in the current study and the sample includes only firms with FX exposure, we replace *CFhedge* with *FXCFhedge,* an indicator variable that takes the value of one for engaging in FXCF hedging and zero otherwise, in column (4). The result suggests that investors recognize FXCF hedging benefits.

In summary, we find robust evidence that the volatility of reported OCI is detrimental to firm value when they report OCI transparently, and that previously when they were able to shield volatile OCI through opaque reporting they enjoyed a premium. The findings justify concerns expressed by managers over the downside of prominent OCI reporting. However, we do not find sufficient evidence to support differences in investor valuations of hedging due to the change in reporting prominence. Our results provide evidence that investors value CF hedging as a tool of firm's risk management, but there is limited evidence that more transparent reporting increased this value premium.

To control for time invariant firm characteristics more stringently, we utilize a difference-in-difference (DID) model, following Gilje and Taillard (2017), as an alternative method to test H2. We identify 175 firms that previously reported OCI only in the SSE and are subject to a more transparent format (IS or SCI) upon ASU 2011–005 implementation. These firms are considered the treatment sample since ASU 2011–005 forced them into a reporting change, while the remaining thirty-eight firms reporting transparently prior to ASU 2011-05 are used as the control sample. We estimate the following DID model to examine the effect of ASU 2011-05 on firm value.

$$\begin{aligned} Firm\,Value_{i,t} = a + \beta_1 Changer_i + \beta_2 Pre_t + \beta_3 Changer_i * Pre_t + \\ \beta_4 CFhedge_{i,t} + \beta_5 FirmFE_i + \varepsilon_{i,t} \end{aligned} \tag{7}$$

Changer is an indicator variable equal to one for firms forced to report more transparently (IS or SCI) in response to ASU 2011-05 and zero for firms reporting transparently throughout the sample period. We create an indicator variable *Pre*, equal to one for years when *Changer* firms reported only in the SSE and zero for any years they also report in

Table 5 Firm Value: Difference-in-Difference Analyses

$$Firm\ Value_{i,t} = a + \beta_1 Changer_i + \beta_2 Pre_t + \beta_3 Changer_i * Pre_t + \beta_4 CFhedge_{i,t} + \beta_5 FirmFE_i + \varepsilon_{i,t} \quad (7)$$

	(1) Full Sample	(2) HighVolOCI	(3) LowVolOCI	(4) Full
Changer	−0.195	−0.432	−0.192	−0.117
	(0.329)	(0.376)	(0.414)	(0.329)
Pre	−0.135	−0.272**	0.041	0.083
	(0.126)	(0.119)	(0.235)	(0.152)
*Changer*Pre*	0.098	0.286***	−0.173	−0.157
	(0.094)	(0.090)	(0.178)	(0.134)
CFhedge	0.255**	−0.087	0.556***	0.279***
	(0.102)	(0.111)	(0.176)	(0.103)
HighVolOCI				0.270*
				(0.140)
*Changer*HighVolOCI*				−0.240
				(0.154)
*Pre*HighVolOCI*				−0.458**
				(0.178)
*Changer*Pre*HighVolOCI*				0.520***
				(0.196)
FirmFE	Yes	Yes	Yes	Yes
Observations	1037	518	519	1037
R^2	0.843	0.916	0.847	0.844

Table presents the results of Eq. (7) with firm value as the dependent variable. Firm value is the market to book value of assets *(MVBA)*. In columns (2) and (3), the subsamples include observations above and below the median of OCI volatility, respectively. The Appendix provides a description of all variables. Firm fixed effects are included. Standard errors are in parentheses. $^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$

either the SCI or IS. For control firms, *Pre* is equal to one for the years prior to the effective date of ASU 2011-05 and zero for the years after the effective date. Since firms must report OCI in a transparent format in the post-ASU period, *Changer* firms only differ from the control firms in the pre-ASU period. The variable of interest is then the interaction of *Changer* and *Pre*. We include firm fixed effects to control for the time invariant firm characteristics. Table 5 presents our results.

In Table 5 column (1), we do not find an overall value effect of ASU 2011-05 on Changer firms although we find evidence of the value benefit of CF hedging. We subdivide our sample based on the median OCI volatility into HighVolOCI in column (2) and LowVolOCI in column (3). In column (2), for the HighVolOCI subsample, there is no evidence of a value benefit to CF hedging suggesting that high OCI volatility may distract investors of these firms. In column (3), for the low OCI volatility subsample, the coefficient on CFHedge is positive and significant suggesting that without the distraction of OCI volatility, investors recognize the benefit of CF hedging. Among HighVolOCI firms, we find voluntarily reporting OCI transparently in the pre-ASU period leads to significantly lower valuations by the market. Although the coefficient on the interaction of *Changer* and

Pre is positive, the sum of the coefficients of *Pre* and this interaction term is insignificant (p-value = 0.7587). This suggests Changer firms with highly OCI volatility avoided the negative impact in the pre-ASU period by reporting opaquely. In column (3), we do not observe any difference in firm value from OCI reporting transparency among LowVolOCI firms.

To formally test whether transparent reporting impacts firm valuation differently based on OCI volatility, we perform a triple difference in difference specification in column (4). *HighVolOCI* takes the value of one for firms with OCI volatility above the sample median and zero otherwise. While we find a negative impact on firm value suffered when firms with high OCI volatility report transparently in the pre-ASU period (*Pre*HighVolOCI*), the triple interaction coefficient, *Changer*Pre*HighVolOCI*, is significantly positive. The sum of the coefficients on *Pre*HighVolOCI* and the triple interaction is insignificant cancelling out any negative value effects from transparent reporting in the pre-ASU period. The results are consistent with a valuation penalty for high OCI volatility firms if this information is displayed prominently, while those reporting opaquely can avoid this valuation penalty in the pre-ASU period. This is consistent with our results in Table 4 and is supportive of H2b.

5.4 FXCF hedging practice and univariate results

Table 6 Panel A provides a summary of CF hedging practice by year. Among 213 firms with FX exposure during our sample period, 55 percent (117 firms) engage in FXCF hedging at some time, while about 23 percent of firms (49 firms) participate in other types of CF hedging (commodity and/or interest rate hedging) but not FXCF hedging. There are 47 firms, 22 percent of the sample with FX exposure, that never engage in any type of CF hedging (FXCF or other). The portion of Exposed firms that hedge FX cash flows slightly drops in years after ASU 2011-05, preliminary evidence that firms reduce FXCF hedging activities in response to the increase in OCI reporting transparency.

Since we focus on FXCF hedging in this study, we segregate FXCF hedgers from non-FXCF hedgers in Panel B to preliminarily examine the differences across these subsamples. It is evident that FXCF hedgers face greater FX risk, as measured by the foreign sales ratio, geographic dispersion, and imbalance of foreign sales and foreign assets. This suggests that FXCF hedging is primarily driven by FXCF exposure. FXCF hedgers tend to be highly levered and more likely to enjoy tax benefits (*TaxConv*), indicating additional motivations for hedging. Firms that engage in FXCF hedging are more likely to have the resources and structure to support hedging as they are typically larger (*Tassets* and *Employees*) and more likely to engage in any other types of hedging (*OtherHedge*), including other non-FXCF hedges, fair value hedges, net investment hedges, or non-designated hedges. FXCF hedgers typically exhibit a lower level of earning smoothing activity while their CEOs have significantly lower equity compensation. Coupled with evidence that FXCF hedgers exhibit higher levels of FX risk exposure, these univariate results are inconsistent with Tufano's (1996) premise that managers make their hedging decision based on their private risk exposure and aversion rather than corporate risk management.

5.5 Choice of FXCF hedging: probit results

We report the likelihood of engaging in FXCF hedging using Eq. (5) in Table 7 column (1) with total assets (*Tassets*) as our proxy for firm size and earnings smoothing measures

Table 6 Hedging Practice Summary

Year	Firms with FX exposure	Firms with FXCF hedging		Firms with Other CF hedging	Firms without CF hedging
		FXCF firms	% Exposed		
Panel A: CF Hedging Participation by Year					
Number of Firms 2010–2015	213	117	54.93%	49	47
2010	184	95	51.63%	26	63
2011	191	96	50.26%	33	62
2012	186	91	48.92%	42	53
2013	174	84	48.28%	43	47
2014	158	76	48.10%	35	47
2015	144	71	49.31%	38	35

	Firms with FXCF hedging		Firms without FXCF hedging		FXCF - without FXCF
	Firm-year observations	Subsample mean	Firm-year observations	Subsample mean	
Panel B: FXCF Hedger Subsample Summary and Differences in Means					
SSEonly	535	0.310	502	0.297	0.013
FsaleRatio	535	0.505	502	0.364	0.141***
Dispersion	535	0.820	502	0.605	0.215***
Imbalance	535	0.329	502	0.207	0.122***
VolDollar	535	0.852	502	0.817	0.035
GrowSale	535	0.048	502	0.054	−0.007
Leverage	535	0.260	502	0.226	0.034***
Liquidity	535	0.854	502	0.858	−0.003
TaxConv	535	0.746	502	0.639	0.106***
HHI	535	0.267	502	0.233	0.034
Tassets	535	9.060	502	8.918	0.143**
Employees	535	3.054	502	2.693	0.361***
ROA	535	0.084	502	0.078	0.005
HP	535	0.012	502	0.013	−0.001
HN	535	−0.014	502	−0.009	−0.005***
EquityInc	363	0.148	347	0.226	−0.079***
Jsecurity	363	1.377	347	1.412	−0.035
OtherHedge	535	0.667	502	0.476	0.191***

Table summarizes the hedging practices for the firms in our final sample. Panel A presents the CF hedging participation by year. CF hedgers are split into two groups, those employing FXCF hedging and those that engage in CF hedging but not FXCF hedging specifically. Panel B compares subsample means between firms with and without FXCF hedging

(*HP* and *HN*) as our proxy for managerial risk aversion. In column (2), we use *Employees* as our proxy for firm size. In column (3) and column (4), we use *EquityInc* and *Jsecurity*, respectively, as our proxies for managerial risk aversion although missing data reduces our observations significantly in these results.

Overall, our results show that the likelihood of engaging in FXCF hedging is significantly higher in the pre-ASU period, evidenced by significantly positive coefficients on

Table 7 FXCF hedge participation decision- Probit

$$FXCFhedge = a + \beta_1 SSEonly + \beta_2 FsaleRatio + \beta_3 Dispersion + \beta_4 Imbalance + \beta_5 VolDollar + \beta_6 GrowSale + \beta_7 Leverage + \beta_8 Liquidity + \beta_9 TaxConv + \beta_{10} HHI + \beta_{11} Size + \beta_{12} Manage + \beta_{13} ROA + \beta_{14} OtherHedge + \varepsilon \quad (5)$$

	(1)	(2)	(3)	(4)
SSEonly	0.356**	0.352**	0.394*	0.404*
	(0.164)	(0.165)	(0.205)	(0.211)
FsaleRatio	1.016**	0.925**	1.315**	1.479***
	(0.410)	(0.411)	(0.543)	(0.540)
Dispersion	0.591***	0.568***	0.671***	0.741***
	(0.205)	(0.205)	(0.244)	(0.245)
Imbalance	1.458***	1.597***	0.640	0.384
	(0.400)	(0.404)	(0.537)	(0.530)
VolDollar	0.139	0.139	0.237	0.178
	(0.255)	(0.253)	(0.318)	(0.316)
GrowSale	0.262	0.251	0.280	−0.167
	(0.383)	(0.383)	(0.491)	(0.468)
Leverage	0.073	0.175	0.458	0.376
	(0.376)	(0.390)	(0.469)	(0.467)
Liquidity	−0.041	0.001	0.107	0.072
	(0.062)	(0.067)	(0.074)	(0.074)
TaxConv	0.054	0.100	0.315**	0.250*
	(0.118)	(0.119)	(0.147)	(0.143)
HHI	0.066	0.036	−0.068	−0.013
	(0.128)	(0.128)	(0.163)	(0.164)
Tassets	0.197***		0.134*	0.162**
	(0.060)		(0.079)	(0.079)
Employees		0.173***		
		(0.053)		
ROA	0.079	−0.449	−1.284	−1.525
	(0.908)	(0.881)	(1.071)	(1.086)
HP	−1.224	−0.920		
	(1.995)	(1.986)		
HN	−0.173	−0.553		
	(2.304)	(2.330)		
EquityInc			−1.659***	
			(0.414)	
Jsecurity				0.174
				(0.139)
OtherHedge	0.279**	0.331***	0.321**	0.329**
	(0.123)	(0.120)	(0.146)	(0.147)
Industry/Year	Yes	Yes	Yes	Yes
Observations	1037	1037	710	710
Pseudo R^2	0.279	0.279	0.285	0.264

Table 7 (continued)

Table reports the results of Eq. (5), which examines the determinants of a firm's probability of engaging in FXCF hedging. The dependent variable, *FXCFhedge,* is a dummy variable that takes the value of one if the firm engages in FXCF hedge during the period, and zero otherwise. The drop in observations in columns (3) and (4) reflects missing data of *EquityInc* and *Jsecurity*. The Appendix provides a description of all variables. Standard errors (clustered at the firm level) are in parentheses. $^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$

SSEonly. Higher participation when reporting opaquely, or equivalently firms reducing the use of FXCF hedging in response to the mandated increase in reporting transparency, is consistent with H3a and management concerns when hedging results are more visible. According to our findings in the previous sections, CF hedging contributes to investor opinion divergence and the volatility of OCI which is detrimental to firm value. In this sense, it might appear reasonable for managers to adjust FXCF hedging to reduce investor opinion divergence and the potential valuation penalty from OCI volatility. However, since we find weak evidence that investors value CF hedging and that impact is insensitive to reporting location and hedging results, any decision to reduce the use of FXCF hedging may be inconsistent with shareholder wealth maximization.

Firms are more likely to engage in FXCF hedging the greater their FX exposure as measured by *FsaleRatio*, *Dispersion,* and *Imbalance*, consistent with previous research findings. Our results show that FXCF hedgers are larger and more likely to enjoy tax benefits (*TaxConv*). Size could reflect a firm's access to the personnel necessary to manage an active hedging program, as the literature suggests. Our results hold when we replace total assets with total number of employees as our measure of size in columns (2). As in the univariate comparison, *HHI* is insignificant here, suggesting that the pricing power may not contribute to the decision to hedge FXCF.

Overall, firms that engage in other types of hedging are more likely to engage in FXCF hedging as well, suggesting firms that select hedging have the resources and structure to support hedging activities. While the FXCF hedging decision is unaffected by earning smoothing activities, firms with higher levels of CEO equity-based incentives are less likely to engage in FXCF hedging, consistent with our univariate result in Table 6. In column (4), CEO job security does not appear to influence the FXCF hedging choice.

5.6 Degree of FXCF hedging: OLS results

FXCFdegree captures the total notional value of FXCF hedges, divided by the firm's level of foreign gross profits. As discussed in the previous section, we include the *IMR* calculated from the Probit regression (6) to correct for potential self-selection bias and any related omitted variable issue. *OtherHedge* serves as our exclusion variable here as the first stage Probit regression results show that it is a significant determinant in the hedging participation decision but should not be related to the level of FXCF hedging. Column (1) of Table 8 reports the result of our test of *FXCFdegree* using Eq. (6), on only firms that engage in FXCF hedging.

In column (1), the coefficient on *SSEonly* is insignificant. We find no evidence to support H3b, that firms modify their overall FXCF hedging level solely due to reporting transparency. However, in columns (2) through (6), when we focus on the group of firms that previously experienced the highest volatility (*HighVol*) hypothesis H3c is

Table 8 FXCF hedge level decision—OLS regression

$$FXCFdegree = a + \beta_1 SSEonly + \beta_2 VolHedGL + \beta_3 VolHedGL * SSEonly + \beta_4 FsaleRatio + \beta_5 Dispersion + \beta_6 Imbalance + \beta_7 VolDollar + \beta_8 GrowSale + \beta_9 Leverage + \beta_{10} Liquidity + \beta_{11} TaxConv + \beta_{12} HHI + \beta_{13} Size + \beta_{14} Manage + \beta_{15} IMR + \varepsilon \quad (6)$$

	(1)	(2)	(3)	(4)	(5)	(6)
	FXCFdegree	*FXCFdegree*	*FXCFdegree*	*FXCFdegree*	*FXCFdegree*	*FXCFdegreeAlt*
SSEonly	0.054	−0.025	−0.007	−0.091	−0.055	−0.031
	(0.058)	(0.053)	(0.053)	(0.075)	(0.070)	(0.027)
VolHedGL	0.039					
	(0.043)					
*VolHedGL*SSEonly*	−0.014					
	(0.044)					
HighVol		0.016	0.050	0.012	0.032	0.019
		(0.056)	(0.059)	(0.069)	(0.074)	(0.032)
*HighVol*SSEonly*		0.200*	0.181*	0.244*	0.236*	0.084*
		(0.108)	(0.098)	(0.136)	(0.133)	(0.048)
FsaleRatio	−0.185	−0.090	0.003	−0.293	−0.218	
	(0.319)	(0.250)	(0.200)	(0.275)	(0.252)	
Imbalance	−0.032	−0.026	0.015	0.042	0.064	−0.033
	(0.047)	(0.049)	(0.057)	(0.078)	(0.086)	(0.025)
Dispersion	−0.118	−0.125	−0.127	−0.008	−0.120	−0.088**
	(0.091)	(0.080)	(0.081)	(0.124)	(0.123)	(0.040)
VolDollar	−0.012	0.008	0.004	0.021	−0.001	0.007
	(0.071)	(0.071)	(0.069)	(0.076)	(0.076)	(0.031)
GrowSale	−0.008	0.033	0.074	0.195	0.177	0.084
	(0.141)	(0.144)	(0.150)	(0.228)	(0.221)	(0.074)
Leverage	−0.096	−0.121	−0.063	−0.082	−0.122	0.003
	(0.220)	(0.222)	(0.200)	(0.200)	(0.213)	(0.110)
Liquidity	−0.016	−0.018	0.026	0.038	0.044	0.029*
	(0.021)	(0.022)	(0.034)	(0.035)	(0.036)	(0.015)
TaxConv	0.086*	0.072	0.102**	0.132*	0.116*	0.006
	(0.048)	(0.045)	(0.049)	(0.068)	(0.064)	(0.021)
HHI	−0.152***	−0.157***	−0.132***	−0.096*	−0.072	−0.065***
	(0.045)	(0.043)	(0.039)	(0.054)	(0.051)	(0.021)
Tassets	0.029	0.028				0.029*
	(0.029)	(0.027)				(0.017)
Employees			0.111**	0.141**	0.139**	
			(0.050)	(0.060)	(0.059)	
ROA	0.915	0.982	0.851	1.242*	0.963	0.458*
	(0.696)	(0.604)	(0.562)	(0.731)	(0.649)	(0.257)
HP	1.085	1.085	1.512			0.441
	(1.425)	(1.260)	(1.319)			(0.545)
HN	0.021	−0.049	0.051			−0.301
	(0.684)	(0.642)	(0.600)			(0.304)
EquityInc				−0.292		
				(0.250)		

Table 8 (continued)

$$FXCFdegree = a + \beta_1 SSEonly + \beta_2 VolHedGL + \beta_3 VolHedGL * SSEonly + \beta_4 FsaleRatio + \beta_5 Dispersion + \beta_6 Imbalance + \beta_7 VolDollar + \beta_8 GrowSale + \beta_9 Leverage + \beta_{10} Liquidity + \beta_{11} TaxConv + \beta_{12} HHI + \beta_{13} Size + \beta_{14} Manage + \beta_{15} IMR + \varepsilon \quad (6)$$

	(1)	(2)	(3)	(4)	(5)	(6)
	FXCFdegree	*FXCFdegree*	*FXCFdegree*	*FXCFdegree*	*FXCFdegree*	*FXCFdegreeAlt*
Jsecurity					0.095	
					(0.063)	
IMR	0.234**	0.258**	0.275**	0.317*	0.233*	0.067
	(0.111)	(0.108)	(0.110)	(0.161)	(0.137)	(0.054
Industry/Year	Yes	Yes	Yes	Yes	Yes	Yes
Observations	365	365	365	249	249	365
R^2	0.366	0.377	0.410	0.511	0.511	0421

Table reports the results of Eq. (6) for firms that engage in FXCF hedging in that reporting period. *FXCFdegree* and *FXCFdegreeAlt,,* represent the level of FXCF hedging computed as the total notional value of FXCF hedges divided by foreign gross profit and foreign sales, respectively. *IMR* is the inverse Mills ratio obtained from Eq. (5) to control for the potential sample-selection bias of the FXCF hedger sample. The Appendix provides a description of all variables. The number of observations in columns (4) and (5) is lower due to missing data for *EuityInc* and *Jsecurity*. Standard errors (clustered at the firm level) are in parentheses. $^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$

supported. The coefficients on the interaction of *SSEonly* and *HighVol* in all specifications are consistently positive and significant, indicating a higher hedging level among high OCI volatility firms when they were able to report opaquely. That is, *HighVol* firms reduce their degree of FXCF hedging after the mandated switch to transparent reporting. This is consistent with opaque preferring firms, especially those with prior high OCI volatility, reducing their hedging level to minimize what they believe to be a potential source of investor distraction if reported transparently. Although not reported in our results, univariate tests of differences in OCI volatility across reporting location confirm that previously opaque firms did reduce OCI volatility when forced to report more transparently.

In columns (4) and (5), we replace HP and HN with *EquityInc* and *Jcecurity*, as previously defined, at the price of losing observations. It appears that CEO equity compensation and job security, along with factors that drive earnings smoothing, do not have a significant impact on the level decision. After controlling for other factors related to the FXCF hedging decision, we find that firm with higher pricing power hedge less, consistent with Campbell (2015). There is also evidence suggesting larger firms tend to hedge more consistent with the presence of resources to manage a hedging program.

In column (6), as an alternative measure for the FXCF hedging level, we scale the notional value of FXCF hedges by foreign sales rather than foreign gross profit. Although we believe most firms hedge their foreign sales exposure net of foreign costs, foreign cost data is hard to estimate while foreign sales information is more readily available and potentially more reliable. Bodnar et al. (1995) provide empirical evidence that firms only partially hedge their FX exposure, so it is possible that firms decide their hedging level based on a certain percentage of foreign sales. Our results, that firms reporting higher OCI

volatility when reporting opaquely reduce the level of FXCF hedging following mandated reporting transparency, hold under this alternative specification of the dependent variable.

As we discussed in the previous sections, the change in hedging level may not be justified as we find no evidence of additional information asymmetry associated with CF hedging following more transparent reporting. Furthermore, we show that firm value is positively related to CF hedging degree proxied by the absolute value of unrealized hedging gains and losses. Nevertheless, it appears managers reduce participation in and the level of FXCF hedging as a means of reducing OCI volatility, which also has firm value implications, despite any benefits of FXCF hedging. Although beyond the scope of this paper, it is possible that firms shift to methods of currency exposure management that do not have OCI implications, such as operational hedging.

5.7 Robustness checks

In this study, we focus on the degree of OCI transparency and its impact on information asymmetry, firm value, and hedging choices. As suggested by the literature, location matters in terms of effectively conveying information. That is why our key variable of interest is *SSEonly*, a location variable indicating opaque reporting only. Since ASU 2011-05 increases OCI transparency by requiring a more prominent reporting location in addition to the SSE, it creates a unique setting to test the impact of location alone. We also examine the impact of ASU 2011-05 with our difference-in-difference model (Table 5). As a robustness check, we also run the model excluding 26 of 175 *Changer* firms that voluntarily adopted ASU 2011-05 earlier and our results are unchanged. Although not reported in our results, early adopters had significantly lower OCI volatility than the subsample of *Changer* firms that delayed compliance with the mandate until its effective date. Our results using alternative model specifications show that it is information transparency of high OCI volatility, reflected in a statement location of either IS or SCI, which leads to lower firm value.

For our key independent variables, we employ several alternative specifications. As already mentioned, we use two different *FXDegree* measures (scaling by foreign gross profit and sales), two different *Size* measures (number of employees and total assets) and three measures of managerial risk aversion (earnings smoothing, equity incentives, and job security). We also use performance-matched discretionary accruals (controlling for profit in modified Jones model) to construct alternative measures of earnings management (*HP* and *HN*). Our main results are robust to each of these alternative specifications.

Our findings are based on a sample of firms for whom the statement transparency mandate represents an exogenous shock. To address potential self-selection bias and any omitted variable problems related to the decision to hedge, we use the Heckman two-stage procedure and include the Inverse Mills ratio in our model of the hedging level decision.

Our sample of S&P 500 firms includes both financial institutions and utilities. In results not reported, our results are consistent when we exclude these firms. There are limitations that our results might only hold for S&P 500 firms since our results do indicate that FXCF hedging activity is more likely among larger and more profitable firms. We believe that value relevance may also be greater for S&P 500 firms since firm visibility is higher. Our findings suggest that the FXCF hedging decision is driven by both the motivation and means to minimize the impact of unrealized hedging gain or loss on CI. While our results should hold for comparable firms that have similar currency exposure, size, and visibility, they may not apply to much smaller firms with limited foreign

sales or sophisticated personnel to handle hedging transactions, and those not actively traded by nonprofessional investors.

6 Conclusion

Our first contribution comes from whether the change in statement location benefitted investors by reducing information asymmetry surrounding CF hedging activities. Our results confirm that accounting authorities were correct in that prominent OCI disclosure helps promote information transparency, reducing investor opinion divergence rather than amplifying. We only find limited evidence that non-institutional investors may be confused by complex hedging information when it becomes more visible. Thus, we do not find sufficient evidence to support managers' belief that this information would lead to investor confusion.

Our second contribution is the impact of transparent reporting of CF hedging results on firm value. We find evidence firms previously enjoyed higher valuations when they reported OCI only in the SSE, consistent with the implications of limited attention and processing power modeled by Hirshleifer and Teoh (2003). When these firms were forced to report transparently, volatility of reported OCI is negatively associated with firm value, justifying managers opposition to ASU 2011-05. However, we find no support for differences in investor valuations of hedging due to a change in reporting prominence. While our results provide evidence that investors value a firm's efforts to manage risk, there is not sufficient evidence that transparent reporting increased this value premium.

We examine whether the increased transparency of unrealized CF hedge gains and losses in a separate statement resulted in a change in hedging behavior. The implementation of ASU 2011-05 provides an exogenous shock forcing firms that preferred opaque reporting to increase the prominence of OCI. We find evidence that increased transparency resulted in a reduced likelihood of engaging in FXCF hedging. Our results also show a reduced level of FXCF hedging following reporting in a more transparent format among firms with the greatest volatility of CF hedging gains and losses before the mandated financial statement prominence. These findings are consistent with comment letters suggesting that some managers feared additional transparency would only confuse users.

We find evidence to support the general view that CF hedging is a value enhancing activity regardless of reporting prominence. On the other hand, we find compelling evidence that investors lower their valuations in the presence of OCI volatility. Since CF hedges increase OCI volatility, this suggests a possible trade-off. Managers appear to choose to reduce the use of FXCF hedging to reduce the volatility of OCI once they lose the option to limit the visibility of this information. While our results are consistent with concerns expressed by managers prior to the implementation of ASU 2011-05, managers' actions to reduce FXCF hedging may not be consistent with shareholder wealth maximization.

Appendix

See Table 9.

Table 9 Variable Construction

Name	Construction and data source
Dependent variables	
Spread	Daily percentage bid-ask spread on the date of annual report release, calculated as: bid-ask spread scaled by the mid-point of the two quotes that define the spread (CRSP: BID, ASK; Hand-collected from 10-k: annual reporting date)
abVol	Abnormal trading volume, calculated as the difference between average daily trading volume for firm *i* during the information period (IP) and the normal period (NP), adjusted by the difference between average daily trading volumes for the S&P 500 during the information period and the normal period. Daily trading volume is the percentage of shares outstanding that trade on the day (CRSP: VOL; Hand-collected from 10-k: annual reporting date)
MVBA	Market to book value of assets, market value of assets is the market value of equity on the date of annual report release (Hand-collected from 10-k: annual reporting date) plus the book value of debt (CRSP: SHROUT PRC) divided by book value of total assets (Compustat: TA)
FXCFhedge	Equals one if the firm engages in FXCF hedge, zero otherwise (Hand collected from 10-K footnotes)
FXCFdegree	Total notional value of FX contracts designated as FXCF hedge, in US dollar (Hand collected from footnotes) scaled by foreign gross profit. Foreign gross profit is GP ratio × foreign sales (Hand collected from 10-K footnotes, and Compustat: GP)
Reporting transparency	
SSEonly	Equals one if the firm reports OCI only in SSE format in the period, and zero otherwise (Hand collected from 10-K footnotes)
Independent variables	
CFhedge	Equals one if the firm engages in any CF hedge, zero otherwise (Compustat CIHEDGEGL)
AOCIhedge	The absolute value of unrealized cash flow hedging gains and losses recorded in AOCI at the end of year *t*, scaled by sales for year *t (*Compustat: AOCIDERGL, SALE)
VolOCI	Incremental volatility of OCI over volatility of NI, calculated as 3-year standard deviation of total comprehensive income scaled by total assets, minus the 3-year standard deviation of net income scaled by total assets (Compustat CI, NI, TA)
FsaleRatio	The ratio of foreign sales to the firm's total sales. Foreign sales include non-domestic sales and the portion of domestic sales identified as export (Compustat Segments: SALES, SALEXG)
Dispersion	Geographic dispersion calculated as ΣAiln(1/Ai), where Ai is the ratio of subsidiary i's sales to the firm's total sales (Compustat Segments: SALES)
Imbalance	Degree to which a firm is *imbalanced* in terms of foreign revenues and foreign expenses, calculated as: *FsaleRatio–FassetRatio.* The *FassetRatio* is foreign assets identified as non-domestic identifiable assets, or long-lived assets or PPE if identifiable assets is missing scaled by the firm's total assets. If identifiable assets are missing, then foreign long-lived assets or PPE are used, in which case total long-lived assets or PPE becomes the scaler (Compustat Segments)
VolDollar	Exchange rate volatility, calculated as the standard deviation of the trade-weighted U.S. Dollar index (broad, monthly) over previous 5 years (FRED)
VolHedGL	Lagged volatility of reported unrealized cash flow hedging gain or loss relative to lagged volatility of net income, calculated as 3-year standard deviation of CIDERGL over 3-year standard deviation of net income (Compustat)
HighVol	Equals one if the firm experienced higher volatility (upper quartile) of reported unrealized cash flow hedging gain or loss (Compustat: CIDERGL) in the previous year, and zero otherwise

Table 9 (continued)

Name	Construction and data source
Changer	Equals one if the firm switches from SSE reporting to SCI or IS reporting upon the implementation of ASU 2011–05, and zero otherwise
Pre	Equals one for the years before Changer firms switch their reporting format and zero for the year and the years after the switch. For firms that always report transparently, *Pre* equals to one for the years prior to the effective date of ASU 2011–05 and zero otherwise
HighVolOCI	Equals one for firm-years with above median OCI volatility and zero otherwise
Control variables	
Lmval	The natural log of market value (PRCC_F x CSHO) (Compustat)
Big4	Equals one if the firm is audited by a Big 4 firm and zero otherwise (Audit Analytic)
GrowCap	Growth rate of real capital expenditure, calculated as: CAPX in year + 1 adjusted for CPI to CAPX in year 0, minus 1 (Compustat and FRED)
Loss	Equals one if the firm has a loss in year t and zero otherwise (Compustat: NI)
Coverage	The number of analysts used to calculate the mean consensus forecast for the year t (IBSE)
Surprise	Net income (NI) in year t minus net income in year t-1 scaled by price in year t-1 (Compustat)
VolEarn	Earnings volatility, calculated as: standard deviation of quarterly earnings over previous 3 years, scaled by total assets (Compustat)
LowInst	Equals one if the percentage of institutional ownership is below the sample median and zero otherwise (Thomson Reuters)
Dividend	Equals one if the firm paid a dividend in the current year and zero otherwise (Compustat)
Leverage	Financial leverage, calculated as: Total debt /AT (Compustat)
Liquidity	Cash and cash equivalent divided by current liabilities (Compustat)
Tassets	Log of firm total assets (Compustat)
ROA	Firm profitability, calculated as: NI / AT (Compustat)
GrowSale	Growth rate of total sales, calculated as SALE in year + 1 to SALE in year 0, minus 1 (Compustat)
TaxConv	Tax convexity, an indicator variable equal to one if a firm has positive net income and non-zero NOL tax carryforwards in a year, and zero otherwise (Compustat)
HHI	Herfindahl-Herschmann index calculated as the sum of squared market share of each firm competing in the industry, as classified by two-digit SIC codes (Compustat Global)
Employees	Log of thousands of employees (Compustat)
DA	Discretionary accruals, computed using modified Jones model (Compustat)
HP	High positive *DA*, equal to *DA* if $DA \geq 75$ percentile, 0 otherwise
HN	High negative *DA*, equal to *DA* if $DA \leq 25$ percentile, 0 otherwise
EquityInc	Sensitivity of CEO's stock and stock option holdings to change in stock price, calculated as the effect of a 1 percentage point increase in firm's stock price on CEO's equity holding (1pct), scaled by total annual compensation computed as the sum of 1pct, cash salary and bonus (ExecuComp)
Jsecurity	CEO job security that takes a value of 0, 1 or 2, constructed as the sum of two indicator variables: CEO-Director duality and insider-dominated board (ExecuComp and BoardEx)
OtherHedge	Equals one if a firm engages in non-currency hedges, commodity hedging or interest rate hedging, and zero otherwise (Hand collected from 10-K footnotes)

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