

# How Will Derivatives Reporting Standards Affect Risk Management Practices?

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Accounting regulators on both sides of the Atlantic are working towards global convergence of U.S. and international accounting standards by 2005. One of the areas that the regulators have identified as a necessary requirement for convergence is the treatment of financial instruments such as derivatives. In the U.S., the Financial Accounting Standards Board (FASB) released Statement of Financial Accounting Standards No. 133 (SFAS 133) that became effective as of June 15, 2000. In Europe, the International Accounting Standard Board (IASB), the FASB's European counterpart, require all firms within the European Union (EU) to report their derivatives under International Accounting Standards No. 39 (IAS 39) by January 1, 2005.

Both SFAS 133 and IAS 39 require firms to initially measure all derivatives on their balance sheets at market value. The derivatives are then marked to market at every financial reporting date. Marking these derivatives to market results in unrealized gains or losses on firms' financial state-

ments. Prior to these new derivative rules, information about a firm's derivative activities was relatively sparse. This move towards marking to market all derivative instruments is part of accounting regulators' broader initiative toward greater convergence of international accounting standards to one based more on the information that are provided by prevailing market prices - sometimes known as a "fair value" or "mark-to-market" reporting system (Hansen (2004)). This is in contrast to a measurement system based on historical cost which requires firms to record their assets and liabilities at their original prices with no adjustments for subsequent changes in the market values of those items. A move from historical based accounting to a fair value reporting system would be a seismic shift for companies. In fact, many EU companies believe that, of all of the IASB's standards, IAS 39 will have the biggest impact on them. (Financial Times, (2004)).

According to the accounting regulators, investors want to know the impact of external events on a firm's value. The popular belief among the regulators and in the popular press is that many firms have been incurring big losses on their derivative positions. Unfortunately, historical cost accounting keeps investors in the dark because derivatives require little or no cash outlay when they are acquired. Thus, in mandating the accounting rules on derivatives, accounting regulators seem to have adopted the position that derivatives create *new* risks that are not properly priced by the market. By providing information on the market value changes of firms' derivative positions, firms' risk characteristics will become more transparent to investors so that the risk could be better priced.

The arguments made by the regulators do seem very compelling at face value. A measurement system that reflects the market values of derivatives would lead to better insights into the risk profile of firms so that investors

could exercise better market discipline and corrective action on firms' risk management decisions. Firms, in turn, would be more prudent in their risk management strategies. However, perhaps surprisingly, the derivative standards have met with a lot of global resistance from the industry. In fact, some powerful voices have expressed strong doubts about fundamental parts of the derivative rules. For example, Jacques Chirac, the French president, recently made an unusual foray into accounting to say that the IASB's rule on derivatives could have "nefarious consequences" for European economies. (Financial Times, (2004)).

To be sure, firms are not uniformly opposed to marking to market *all* their derivatives. For example, many firms believe that derivatives held for trading purposes should be marked to market. Similarly, firms generally believe that derivatives used to hedge existing exposures should also be marked to market. The roots of the dispute between the accounting regulators and the industry lie in the treatment of the so-called *cash flow hedges*. Cash flow hedges are hedges of *anticipated* or *forecasted* exposures. Firms routinely engage in derivative transactions to manage their long term anticipated exposures. Firms are concerned that derivative disclosures mandated by SFAS 133 and IAS 39 will induce volatility into the short term earnings or cash flows of firms that are appropriately using derivatives to manage their *anticipated* exposures. This volatility arises because firms do not recognize these *anticipated* exposures on their books until they are actually *realized*. However, derivative instruments that are being used to hedge such unrecognized exposures must be marked to market. Because anticipated cash flows are not recorded on the books of a firm until they are realized, investors would only see one of the two components of the transaction—specifically, the derivative side, but not the underlying exposure that is being hedged. Thus, firms fear

that investors would penalize the firm because they would be unsure whether the firm is hedging or speculating and firms cannot credibly communicate to them that they have a hedgeable exposure. In other words, if a firm is hedging, then any interim volatility in its cash flows arising from the derivative is *artificial* in the sense that these fluctuations will be offset by the underlying exposure that is being hedged. On the other hand, if a firm is speculating, then any interim volatility in its cash flows arising from the derivative is *real* and should be priced. Some industry leaders were concerned that the volatility induced by SFAS 133 and IAS 39 could have *real effects* on firms' risk management strategies. For example, in a letter to the FASB, Alan Greenspan, chairman of the Federal Reserve Board has argued that

“The treatment of cash flow hedges will report an increase in the volatility of comprehensive income and stockholders' equity where no comparable increase in risk has occurred ... [so, the standard] may discourage prudent risk management activities.” (Greenspan (1997)).

To better understand the arguments raised by industry leaders such as Mr. Greenspan and others, it is useful to consider the following risk management scenario. Consider a firm that perfectly hedges the risky cash flows from an expected inventory sale by buying a forward contract. Suppose, in the interim, the forward contract is marked to market such that the gain or loss on the forward contract is observed before the terminal cash flows from the inventory sale are realized. If the forward purchase transaction is viewed *independently* of the inventory sale transaction, then the interim realization of the payoffs from the forward contract makes the firm's cash flows appear more volatile than the firm's actual net cash flows. However, such volatility in the firm's cash flows is *artificial*, in the sense that the gain or loss on the

forward contract will be exactly offset by the loss or gain on the inventory when it is sold. If markets function properly and all investors are fully informed, such volatility is, therefore, a veil, and all investors can see through it. However, there are several natural features of the firm's environment that can prevent such volatility from merely being a veil.

First, investors may not know for sure whether or not the firm has a hedgeable project. For example, consider a firm with a long-term hedgeable project that buys a forward contract and thus correctly hedges, thereby increasing the *short-term* volatility of its cash flows but reducing the *long-term* volatility of its cash flows. On the other hand, consider another firm that does not have a hedgeable project but the firm's manager obtains information that leads her to incorrectly buy a forward contract. The manager thus inadvertently *speculates* thereby increasing both the short-term *and* the long term volatilities of its cash flows. Investors who only observe the short term payoffs of the forward contract from marking it to market may not be able to distinguish between these two firms.

Second, managers and shareholders of firms may have short horizons and therefore dislike *both* short-run and long-run volatility. Thus, a firm with a hedgeable project may not want to hedge when its *perceived* short-run volatility is increased. This occurs because the capital market cannot distinguish a firm that is appropriately hedging by buying a forward contract from another firm that is exacerbating its short-term and long-term volatility—thereby speculating by buying a forward contract.

Third, the effect of volatility of the firm's interim cash flows may be magnified by the fact that the payoffs of a particular firm from hedging or not hedging depend on the underlying fundamentals of the firm as well as the actions of other firms in the economy. Each firm chooses the action (of

buying or not buying the forward contract) that maximizes its own payoffs taking other firms' actions as given. This may result in a social inefficiency because the firm does not take account of the social optimum when making its decision. Thus, if buying the forward contract is very costly because a firm with a hedgeable exposure cannot easily separate itself from a firm with an unhedgeable exposure, then it may turn out to be the case that none of the firms will buy the forward contract. This phenomenon results in widespread underhedging.

In a recent study (Sapra and Shin (2003)), we address the above concerns in a stylized, yet fairly general formal model. We tackle the arguments made by the industry leaders head-on and investigate whether the volatility induced by derivative disclosures could indeed impede sound risk management for cash flow hedges. In order to do so, we abstract away from all agency conflicts for engaging in derivative activities and instead assume that all firms in our environment are run by benevolent managers who maximize the payoffs of shareholders. Removing all conflicts between managers and shareholders allows us to evaluate the claims made by firms that even those managers who are properly hedging in the best interests of shareholders could stop hedging altogether because of the effects of volatility induced by derivative disclosures.

To capture the effect of derivative disclosures on *short term* volatility, we assume (i) that shareholders have short horizons, so that the managers are maximizing only short-term payoffs; (ii) the firm is involved in a cash flow hedge, and the payoffs of the forward contract are realized before the payoffs of the long term project; (iii) the firm is endowed with either a hedgeable project or an unhedgeable project, but the firm cannot credibly disclose that it has a hedgeable exposure to the capital market. These three conditions

ensure that short term volatility in the firm's cash flows matters.

More specifically, we model the environment of a firm that undertakes a project with a long gestation that takes two periods to yield its terminal cash flows. There are three dates in our model: an initial date, an interim date, and a terminal date. At the initial date, when the manager makes the hedging decision, she does not know for sure whether the cash flows from the project are hedgeable. However, the manager observes a private but noisy signal about the project type. Thus, even though the manager is uncertain about her project type, she is still better informed than the capital market about whether her firm's project is hedgeable or not. Based on her superior information, at the initial date, the manager then decides whether or not to hedge the terminal cash flows from the project by buying a forward contract. The forward contract is a perfect hedge of a firm's hedgeable project because the payoffs from the forward contract are perfectly negatively correlated with the payoffs from the hedgeable project. On the other hand, the payoffs from the project may be unhedgeable in the sense that the payoffs from forward contract are not correlated with the payoffs from the project.

To capture the industry concern that the interim cash flow volatility of a firm that is properly hedging may be higher than the firm's terminal cash flow volatility, we assume that the payoffs from the forward contract are realized at an interim date while the cash flows from the project are realized at the terminal date. Thus, except for the sequential mismatch in the resolution of uncertainty, the payoffs from the forward contract are a perfect hedge of the cash flows from the hedgeable project. The manager makes the hedging decision at the initial date in order to minimize both the interim and the terminal cash flow variances. These variances, in turn, depend on what information is available to the capital market at the interim date. We

model two information regimes: a *disclosure regime* in which the firm is required to disclose whether or not it has purchased the forward contract and a *non-disclosure regime* in which the firm does not disclose any information about its derivative activities. The disclosure regime captures the information environment under SFAS 133 and IAS 39. If the firm buys the forward contract, these derivative rules require the firm to mark the forward contract to market at the interim date and thereby disclose the payoffs on the forward contract. However, when the capital market observes the forward contract at the interim date, it is unsure whether the firm has a hedgeable project or an unhedgeable project. As discussed earlier, the firm cannot credibly disclose to the market that it has a hedgeable project. This occurs because the information that the firm observes about its project type is imprecise at the time it makes its hedging decision. Therefore, a firm with an unhedgeable project, basing its hedging decision on the best information that it has, could still *incorrectly* hedge and thereby *speculate* unintentionally, by buying the forward contract. This feature of our model actually captures the accounting regulators' concern that if the unhedgeable firm buys a forward contract but does not disclose this information to the market, then the forward contract would create a new risk that would not be properly priced by the market.

Our study also sheds some light on the general debate of mark to market accounting. In the wake of recent corporate scandals, there have been calls for greater transparency about a firm's assets and liabilities. One of the controversial issues that accounting regulators have been debating is whether or not all firms should adopt mark to market accounting. Our study shows that by marking the forward to market, a firm is only disclosing one side of a hedging transaction, namely the gain or loss on the forward. However, the firm cannot credibly disclose the other side of the hedging transaction,

namely the underlying exposure that is being hedged. We show that because the firm cannot credibly communicate that the exposure from its underlying project is hedgeable, greater transparency in the firm's derivative activities could have detrimental consequences.

The main result of our study is that derivative disclosures distort a firm's risk management strategy. When judged against the criterion of minimizing the volatility of terminal cash flows, the enforced reporting requirement that stipulates that derivatives be marked to market can be detrimental. There is, in other words, unnecessary market volatility due to the imposition of the reporting requirements. The intuition behind these results is as follows. When derivative disclosures are not mandated, the firm's interim volatility is not affected by its hedging decision so the firm minimizes its terminal volatility which is the socially optimal decision. When derivative disclosures are made, we show that the firm's *interim* volatility depends on whether or not it has purchased the forward contract. Therefore the firm will choose its hedging decision to minimize its *interim* volatility rather than its *terminal* volatility leading to distortions in the firm's risk management strategy.

We show that the nature of the distortions when derivative disclosures are made depend crucially on (i) the firm's information quality about the project type and (ii) the market's prior beliefs that the firm has a hedgeable project. In particular, we show that when firms do not have very precise information about project types or the proportion of firms with hedgeable projects is relatively low, then there is massive *underhedging* in the economy relative to the social optimum. In fact, we show the existence of a unique equilibrium in which none of the firms buy the forward contract. The intuition behind this result is as follows: any firm that buys the forward must convince the market that it has a hedgeable project. However, when the *ex ante* incidence

of hedgeable firms is small or when the firms' information is very noisy, the market exercises a great deal of scepticism about whether a firm has a hedgeable project. In the face of such scepticism, a firm's best reply is not to buy the forward given the hedging decisions of all the other firms. We show that this is the best reply for *all* the firms resulting in a large social inefficiency. This result lends support to the claims made by industry leaders that derivative disclosures could induce imprudent risk management because firms with hedgeable projects would forego hedging. On the other hand, when the information of firms is relatively precise and the proportion of firms with hedgeable projects is relatively high, there is excessive *speculation* in the economy relative to the social optimum. We show that all firms in the economy buy the forward contract. This occurs because it is now *very easy* to convince the market that it has a hedgeable project by buying the forward contract, so that all firms buy the forward contract. This once again results in a large welfare loss because even the firms with unhedgeable projects buy the forward contract. For intermediate levels of information quality and prior beliefs about the proportion of hedgeable firms, there exists a unique interior equilibrium in which some firms buy the forward contract while the remainder do not. However, the incidence of hedging is sub-optimal.

The equilibrium in which all of the firms in the economy forgo hedging because of derivative disclosures is noteworthy because such a result would lend support to Greenspan's argument quoted earlier that derivative disclosures impede risk management. How likely are we to see such a result in the real world? In other words, are the parameter values for which derivative disclosures discourage prudent risk management strategies realistic? To shed some light on these questions, we relate the informativeness of the signals that firms observe with the probabilities of type I and type II errors. A type

I error in our context is the error of not buying the forward contract when the firm has a hedgeable project. A type II error is buying the forward contract when the firm is unhedgeable. We focus on the decision rule that equates the probabilities of both types of errors. We show that for most reasonable levels of information quality, derivative disclosures will most likely result in excessive speculation rather than underhedging. In fact, underhedging virtually disappears when the type I and type II errors less than or equal to 10% which we feel is a reasonable level of error probability for many firms. The above results therefore suggest that the claims by industry leaders that derivative disclosures will lead firms to forego sound risk management strategies may be tenuous.

## References

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