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The Systems Challenge of Hedge Effectiveness Testing

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IAS39 is going to significantly increase the workload of a corporate treasury. At the very least, all derivatives will need to be valued regularly and other assets may need to be valued or monitored depending on their classification. Other instruments, such as embedded derivatives and projected transactions that may not have traditionally been within the scope of the corporate treasurer or the treasury system, will also have to be evaluated.

Essentially, treasury personnel are going to need far more flexibility in recording and tracking potential and actual exposures than they have in the past. Taking changes in the fair value of derivatives directly to the profit and loss account is highly likely to increase earnings volatility. This is illogical when you consider that these derivatives are hedges that exist primarily to reduce the volatility of actual economic earnings! This is one of the reasons hedge accounting has been permitted. If a hedge can be assigned to one or more exposures, then the changes in the value of the hedge can be offset against the change in the value of the hedged item and only the residual or ineffective portion will go to profit and loss.

However, if a company decides to apply hedge accounting, this may create a whole new burden for the corporate treasury. Initially, testing will have to be done to demonstrate that the hedge is expected to be highly effective. A hedging relationship will also need to be formally designated and documented. The documentation will need to detail the objective and strategy of the hedge, the nature of the hedged risk and the testing method used to demonstrate effectiveness. Testing will have to be done prospectively and retrospectively throughout the life of a hedging relationship.

For most corporates, using a system to do the grunt work will naturally be the preferred approach. The first requirement of an IAS39 compliance system should be to reduce this

workload, specifically by automating the tasks of

- Initial documentation
- Initial testing
- Ongoing valuation
- Ongoing retrospective and prospective testing
- Producing the necessary accounting entries

Effectiveness testing will be the core of hedge accounting and in this area the system should be able to achieve the standard goals that are to reduce workload, simplify the issues, manage changes in circumstance and eliminate any errors. This article will discuss some of the features that will be necessary to achieve these goals.

Effectiveness testing according to IAS39

The Standard defines an effective hedge as follows -

"A hedge is regarded as highly effective only if both of the following conditions are met:-

(a) At the inception of the hedge and in subsequent periods, the hedge is expected to be highly effective in achieving offsetting changes in fair value or cash flows attributable to the hedged risk during the period for which the hedge is designated. Such an expectation can be demonstrated in various ways, including a comparison of past changes in the fair value or cash flows of the hedged item that are attributable to the hedged risk with past changes in the fair value or cash flows of the hedging instrument, or by demonstrating a high statistical correlation between the fair value or cash flows of the hedged item and those of the hedging instrument. The entity may choose a hedge ratio of other than one to one in order to improve the effectiveness of the hedge.

(b) The actual results of the hedge are within a range of 80-125 percent." (AASB139, AG105) [1]

This excerpt indicates some of the requirements of effectiveness testing in a system. Demonstrating a high correlation between the hedge and the hedged item may be



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quite straightforward and some kind of generic testing should be available. If this is not possible, then testing could involve regression and statistical analysis of past changes in value, which will also require historical valuation. More complex testing may require simulation of cashflows and values based on multiple market variables. This would be similar to calculating Cashflow-at-Risk or Value-at-Risk to analyse a company's risk profile. The approach would be to calculate the risk measure for the hedged item and then for the hedge and hedged item combined. If a sufficient reduction in the at-risk measure can be demonstrated, the hedge will pass the effectiveness test.

The phrase 'highly effective' is used instead of 'almost fully offset' which was taken to mean that expected changes should have a ratio of between 95-105%. This was considerably more restrictive than the current interpretation of 'highly effective' which is a required ratio of 80-125%. These phrases have had an eventful history. 'Almost fully offset' was in the original IAS39 standard, removed by the IASB in July 2003, but replaced in October 2003. In February 2004 it was removed again (presumably for good). So if you are feeling indecisive about how to apply the Standard, remember that you're in good company!

It is true that a proportion of hedge relationships will be clearly effective and, in these cases, testing may be done by simply checking that the hedge and hedged items satisfy a few general rules. A system should have customisable rules that will enable all of the routine testing, documentation and tracking to be automated. An example of this would be checking that a group of foreign exchange forwards and the exposures that they are hedging all fit in to a single pre-defined time bucket.

Valuation Splitting

Example 1: A perfect hedge?

Hedged item: Bond with credit risk, company receives a quarterly fixed coupon of 6.50%

Hedging instrument: Interest rate swap, company pays quarterly fixed coupon of 6.50% and receives BBSW+120bp

Example 1 describes an investor who holds a fixed rate bond with the coupon swapped back into floating interest. The JP Morgan HEAT technical document does an extensive analysis of this hedge relationship and the authors conclude "it is not possible to design an effectiveness test that gives perfect effectiveness for the

above perfect hedges"[2]. The reason for this is that the hedged item and the hedging instrument behave differently due to the bond having a credit spread and the fact that the swap has two separate interest flows. To better prove an effective hedge, the bond should be valued without the credit risk and accrued interest. The swap should also be valued without accrued interest.

What this indicates is that when demonstrating effectiveness, the ability to split the components of valuation of any instrument will be important. The same will hold true for foreign exchange and commodity hedges. For example, splitting out the time value of an option or the forward points for a forward may be necessary to achieve an effective hedge. In the above example, it may be possible to match the critical terms and simply conclude that the hedge is effective (AASB 139, AG108). However, this does not mean that no ineffectiveness can be assumed. The credit risk of the counterparty to the derivative must still be taken into account (AASB 139, AG109). Adjusting the value of a financial instrument for credit risk can be complex, particularly for a derivative, but it is a clear requirement of the Standard. In summary, valuation in whole or split according to risk will be an important component of a hedge compliance system.

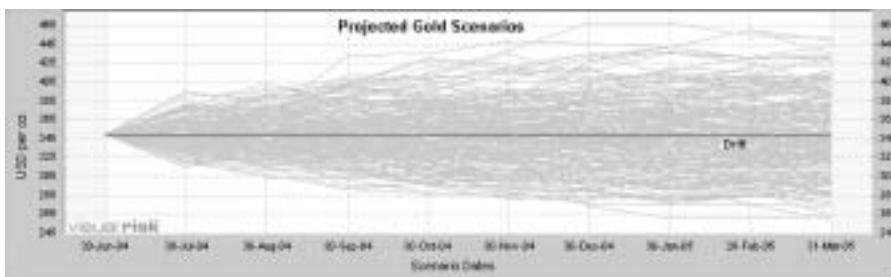
Flexibility of approach

Example 2: Always an effective hedge?

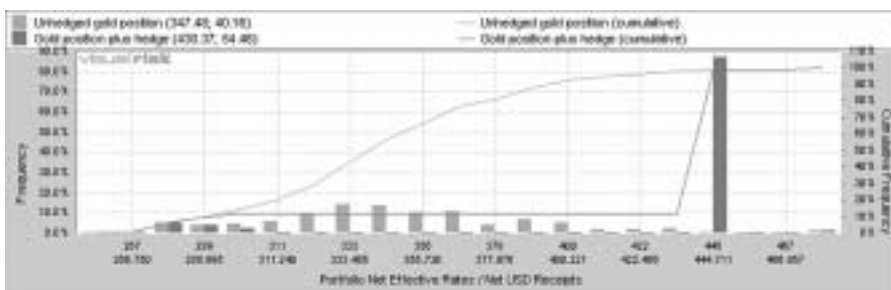
Hedged item: Gold sale in one year's time

Hedging instrument: Knock-out put option, strike price of \$450, barrier level of \$300. Company can sell gold at \$450 but if gold trades below \$300 before expiry, the option disappears

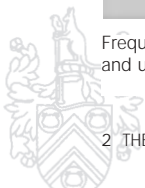
Example 2 is more complex and it will show the importance of having a choice of approaches to effectiveness testing. The charts show how a cashflow-at-risk comparison calculated using Monte Carlo simulation would work. In this case 200 gold price scenarios are projected and the histogram shows the potential



200 one year gold price scenarios with a starting value of \$350



Frequency histogram of prices achieved for the hedged and unhedged position for each of the scenarios



outcomes for both the unhedged and hedged positions. If unhedged, the gold price achieved varies from \$270 to \$470. With the option the price achieved is \$450 in most cases but when gold trades below \$300, then the option is not exercised.

To test effectiveness in this case using the volatility reduction method[3], the standard deviation (or cashflow-at-risk) of both positions are compared. In this case the option actually increases volatility because of the wide spread of outcomes and the test fails. A visual inspection of the chart in this case suggests another approach. It can be seen that the probability of the option being knocked out is about 10%. Therefore in 90% of outcomes, the option will fully offset the cash flow of the gold sale. This could be a valid argument to prove that the hedge is effective as the company can expect changes in the cashflows of the hedge and the hedged item to almost fully offset each other. It can be seen that the choice of test can determine whether hedge accounting may be applied or not. Flexibility in choosing tests and the ability to analyse the situation from a hedge accounting and risk perspective are key parts of any effectiveness testing system.

What if ...?

Flexibility and the ability to look ahead are the core requirements of managing hedge accounting under IAS39. Once a test method is chosen, it cannot be changed during the lifetime of the hedge relationship. If the chosen test ever fails on a prospective basis, then the hedge will be de-designated and the derivative will have to be marked to market. The gold hedge discussed above is an example of how a test might fail in the future. As the gold price moves lower the chances of the option being knocked out could increase to a level where it is no longer possible to satisfy the testing requirements. Similarly an effectiveness test using the volatility reduction method might pass when the gold price is a long way from the barrier but could fail later.

As the maturity of a hedging relationship gets closer, it is possible that the hedge and the hedged item do not match each other so closely. Where projected debt is the hedged item, then changes in the principal amount may lead to ineffectiveness. The motto for effectiveness testing is to 'be prepared'. As time progresses and/or market variables change, a poor choice of test originally could lead to earnings surprises. Due to the complexities and vagaries of the standard, flexibility and a full understanding of the hedge are very important. For this reason, effectiveness testing should be an extension of a corporate risk system, rather than accounting or back office. In a sense, corporate treasurers will need to understand and manage the risks to their economic earnings and at the same time, the risk to their accounting earnings.

Data collection and storage

Documentation and the need for an audit trail mean that market and other risk data will need to be regularly collected and stored for effectiveness testing. For example:

- All valuations will need to be recorded along with the market data used to arrive at the valuations.
- For Value-at-Risk, large correlation matrices might be needed. These will probably have to be updated and stored for audit trail purposes.
- Monte Carlo parameters must be chosen if simulation is used in testing - choice can affect outcome. Again an audit trail will be needed.
- If credit risk appears, the user will need to be able to assess and report this, possibly including additional credit spread or other credit data in valuation.

All of these data sets would probably have to be obtained on a regular basis, which could be a major headache for corporates and should be a part of any testing system.

Summing up

There are a number of challenges for system vendors in providing hedge effectiveness testing. Valuation and the splitting of valuations into their components will be necessary in many cases. Data will need to be stored to support valuations and test results. When applying hedge accounting, it will be important to be aware of what could happen to a hedge relationship in the future if circumstances change. Flexibility in choosing the test at inception of the hedge relationship and the ability to look at what-if scenarios will be needed for complex effectiveness testing. For these reasons, a testing system should be a natural extension of a risk system. The accounting and economic effectiveness of a hedge may diverge, so managing hedge accounting should begin and end with risk management.

References

[1] All references to the standard are to the pending accounting standard AASB 139 on the AASB website

[2] J.P. Morgan (2003). "HEAT Technical Document: A consistent framework for assessing hedge effectiveness under IAS39 and FAS133"

[3] Kalotay, Andrew and Abreo, Leslie (2001) "Testing Hedge Effectiveness for FAS 133: The Volatility Reduction Measure" *Journal of Applied Corporate Finance*, **13** (Winter), 93-99

