

*Amol Dhargalkar*

# Questions, Questions

How firms should evaluate financial risk



The last two years have seen unparalleled volatility in all aspects of financial markets. The price of oil has ranged from \$32 to \$145 per barrel, the EUR-USD exchange rate has traded between 1.19 and 1.63, and the 10 year US Treasury yields have gone from 2 percent in late 2008 to 4 percent in early 2010 to back below 3 percent recently. These extreme swings and the prevalence of “underwater” hedges have often left boards and senior management questioning their risk management strategies.

In response to these concerns, this article will create a framework of questions for firms with multiple financial risks (interest rate, currency and commodity risk) to help define the objectives of a hedging program.

### Why do we have a hedging program?

The ultimate objective of any hedging program is not to make money. Rather, it is to reduce uncertainty and mitigate risks associated with a firm’s business. The most successful and sophisticated firms focus on understanding how their various risks net against one another and then on implementing a hedging program to reduce the potential of large negative moves in a key metric such as Cash Flow at Risk, Operating Income or EBITDA.

Often, understanding the risks and implementing a hedging program sounds easier to understand than it is to execute. A simple example is a multinational U.S. firm that has American and European units, each of which is generating positive cash flows. For the sake of example, assume that each unit sells in its local currency and that the U.S. unit needs to purchase some of its goods in Europe (priced in EUR). This means that the US unit has positive USD cash flow and negative EUR cash flow; the European unit has positive EUR cash flow. On first glance, the U.S. unit might like

to hedge its negative EUR cash flow to protect against movements in EUR-USD. However, the U.S. unit’s negative EUR cash flow actually serves to naturally offset the European unit’s positive EUR cash flow. Hedging the U.S. unit’s negative EUR cash flow would actually increase the firm’s overall exposure to depreciating EUR.

A more complicated scenario would involve a global U.S. firm that has operations in many currencies, significant commodity risk, and significant leverage in different countries across the globe. Of course, the firm could choose to entirely hedge every single risk; practically, though, this is impossible and would add significant operational cost with arguably limited benefit.

### What risks do we hedge?

The first step is to understand and articulate the exposures. The critical step of understanding and articulating exposures is often much more complicated than expected. The analysis of exposures requires a

robust understanding of the business and the factors that introduce/mitigate risks. Some of these factors are timing mismatches, basis mismatches, correlations between costs and revenue, and correlations between exposures.

For example, a global U.S. firm may have significant sales in Thailand, but if it is able to re-price its product as the currency moves, the risk may be far smaller than appears initially or may even be in the opposite direction. Alternatively, a multinational U.S. firm may have EUR expenses for purchasing copper at its German production facility; however this expense introduces little currency risk as the price of copper is pegged to USD. Entering into a hedging program without a solid understanding of the underlying exposures is a recipe for danger.

### How much do we hedge?

The next step is to quantify the exposure through using a key metric, such as operating income. The simplest way to do so would be a standard shock analysis. A shock analysis answers the questions, “What if everything increased by 10 percent?” This simple approach, however, is subject to two major errors: firms tend to underestimate the likelihood of a large move (how many predicted in March 2008 that the EUR would drop 25 percent in two years?); and, the analysis ignores any correlations between the key financial risks.

An ideal tool for a firm with multiple risks is a Monte Carlo analysis, which simulates a wide variety of potential outcomes across a large number of variables. Using this methodology is

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akin to observing a million possible combinations of commodities, currencies and interest rates. Included in the combinations are scenarios that most would never even envision, such as the price of gold going to either \$500 or \$2,000 in the next year. These extreme events, though, are properly weighted based on the current market expectations and volatility (uncertainty). In addition, all of the variables must be correlated to one another based on either historical or future expectations of how the variables move in relationship to one another. While it can be quite technical to craft such an analysis, the results are often highly illuminating, as will be shown below.

The most sophisticated firms utilize the Monte Carlo method. Karen Weller, CTP, Director of Derivatives at Royal Caribbean Cruises Ltd., reflects, “At Royal Caribbean Cruises, we have exposures to interest rates, foreign exchange rates, and commodity prices, including fuel. When deciding whether or not to hedge these exposures, it is imperative that we understand the extent to which they naturally offset each other in order to achieve the greatest level of risk reduction for each hedging dollar spent.

“Hedging each exposure in a silo approach is not cost-effective, and may actually increase our overall risk if we choose to hedge an exposure that is already mostly offset by another. Understanding the inter-relationship of our exposures and the natural diversification benefit within those relationships allows us to create the most efficient and effective hedging strategy.”

Added Travis George, Vice President, Corporate Controller and Chief Accounting Officer of Molex: “This (Monte Carlo method) helped us identify our most significant risks, and in some cases, showed us that our risk was lower than we thought. We then used the analysis to design a hedging program for the significant risks that was simple and efficient.”

### How do we implement a hedging strategy?

It is easy to implement a hedging program. But to systematically reduce risk through the highs and lows of volatile markets, it is imperative that the hedging program is aligned with an effective hedging strategy. Building a Monte Carlo model will produce reams of output, so the final step is to identify an ideal hedging strategy based upon the firm’s overall risk tolerance and the model results.

Often, articulating the risk tolerance is a difficult internal process that requires senior management to go beyond gut feel and state a desired objective for the level of risk with which they and investors are comfortable. Once a risk tolerance objective is stated, it becomes much simpler to both identify an ideal hedging strategy and to evaluate the effectiveness of the strategy.

### Case study

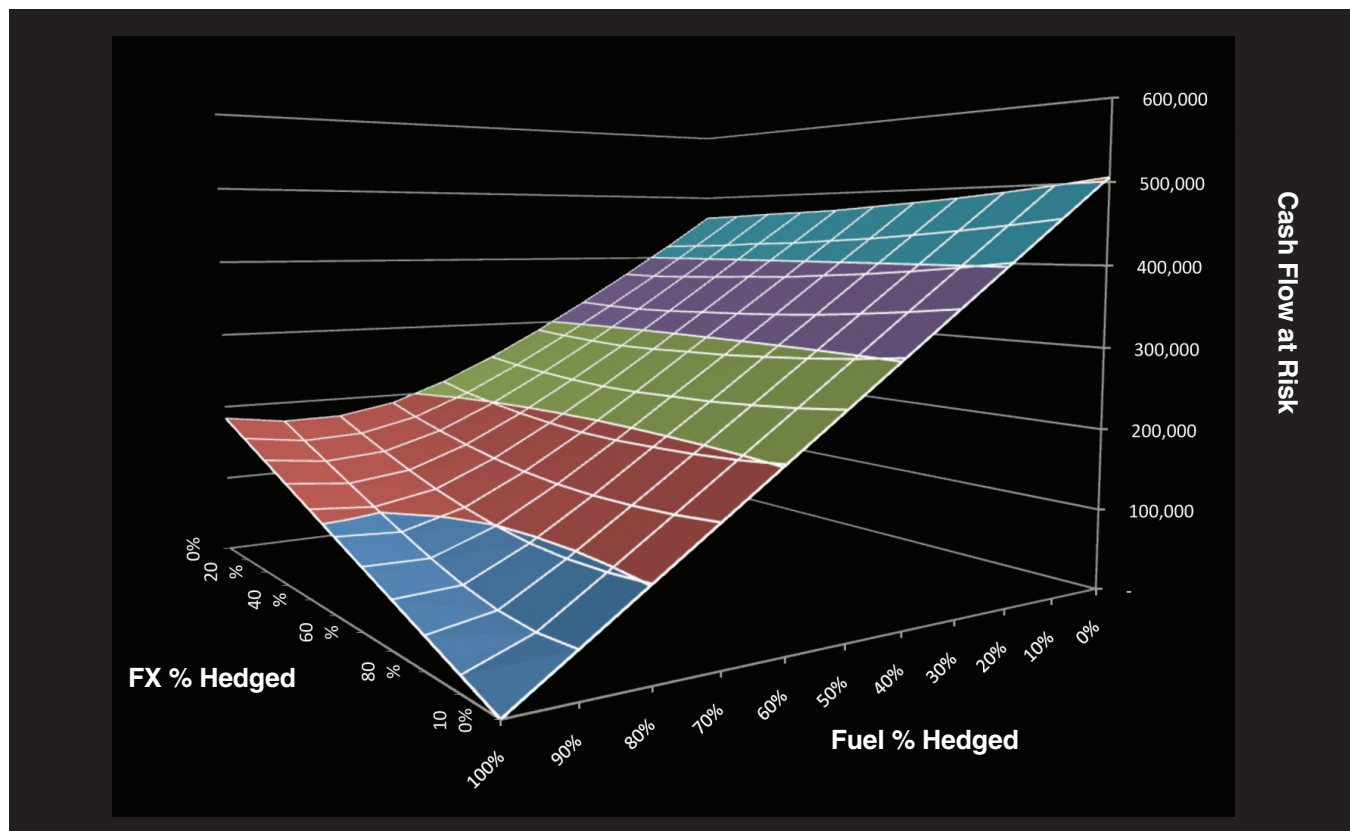
Figure 1 is a sample output for Global U.S. Firm (GUS). GUS faces significant fuel and currency exposures shown in Figure 1. GUS wants to understand what level of hedging they should employ to reduce the risk around their USD operating income. The company currently does not hedge any of its risks under the belief that its risks are “naturally hedged” against one another (i.e. when fuel prices increase, their foreign income increases in USD terms). Clearly, this is a large firm that faces significant overall risks. At first glance, one would assume that the currency exposure is as significant as the fuel risk based on the Operating Income total.

The outputs of the Monte Carlo analysis are provided in the three dimensional graph in Figure 2. The independent variables are the percent of fuel exposure and percent of currency exposure hedged. The dependent variable (z axis, going straight up) is the Cash Flow at Risk for a given

**Figure 1: Cash Flow Risks**

Cash Flow Risks by Currency/Commodity (FX amounts in millions)	
Currency	Annual Amount
Brazil	(BRL 140)
Canada	CAD 200
Europe	EUR 500
England	GBP 300
Japan	(JPY 4,000)
Singapore	SGD 80
US	USD 600
Crude Oil	(12,000 barrels)

**Figure 2: Monte Carlo Outputs**



level of hedging. Specifically, this is the difference in USD operating income between the average and the worst case scenario (a two-standard deviation move). The graph tells GUS how wide the distribution of outcomes could be between what they expect, the mean, and what could happen, the two-standard deviation move—the lower the number, the lower the risk.

The point of least risk is at the intersection of the two axes. When both risks are hedged 100 percent, there is no Cash Flow at Risk. The color gradients on the chart indicate “buckets” of risk. For example, blue indicates that the Cash Flow at Risk is between \$0 and \$100million, while red indicates the Cash Flow at Risk is between \$100 million and \$200 million. The edges of the plane represent extremes in the

hedging scenarios, either 100 percent of currency or 100 percent of fuel hedged.

What are the key conclusions from all of this analysis for GUS?

1. GUS is not “naturally” hedged, as it still faces significant risk that operating income could be materially lower than expected due simply to fuel and currency movements. Without adding any additional hedges, at the 0 percent Fuel Hedged and the 0 percent FX Hedged, GUS has almost \$500,000 of Cash Flow at Risk.
2. The easiest way to reduce their risk is to implement a fuel hedging program. Hedging currency exposure alone may actually increase their overall exposure.
3. At certain levels of fuel hedging, the most effective way to reduce risk is to simultaneously hedge

both currency and fuel.

4. There is such a thing as too much hedging, at least when looking at only hedging fuel exposure.

Firms with multiple financial risks must be vigilant in their development of hedging programs. It is dangerous to focus on areas that are currently grabbing the newspaper headlines—nearly as dangerous as using an opportunistic approach, i.e., “I’ll hedge when it moves in my favor.”

By utilizing simulation modeling, treasury professionals will have the pertinent information to discuss risk management and answer the question: “How can we make our hedging program effective?”

*Amol Dhargalkar, Director, Corporate Advisory Services, Chatham Financial Corp., spoke about mitigating hidden costs and maximizing opportunities in debt and hedging terms at the 2010 AFP Annual Conference Executive Institute.*