

Quantifying risk

THE ABILITY TO QUANTIFY UNDERLYING FINANCIAL RISKS IS AN ESSENTIAL STEP IN CONSTRUCTING A STRATEGICALLY OPTIMAL HEDGING STRATEGY, AS **JWAN MELLA** EXPLAINS.

As the volatility in financial markets has increased over the last few years, treasurers have increasingly attempted to mitigate the risks. Yet the key to an optimal hedging strategy is the ability to understand and quantify precisely the risks to which the business is exposed. Lloyds Banking Group has a dedicated team of risk solutions experts who can implement sophisticated risk quantification methodologies. Quantification provides treasurers with an advanced objective scientific basis, which can be used to frame hedging strategies and overlay subjective arguments. Below, we highlight some of the issues and how Lloyds can help treasurers address them.

Companies' financial risks are usually derived from foreign exchange, interest rates or commodities markets. Determining individual and aggregated risk exposures is an essential first step. In many cases, treasurers will stress-test their risk exposures by an arbitrary amount, often in isolation. For example, a company whose functional currency is sterling, with exposure to a handful of other currencies, might choose to quantify the risk by seeing what happens when sterling weakens and strengthens by 10% against all the other currencies. Applying this arbitrary risk measure

may suffice, but, equally, over the course of 2008, sterling lost over 20% versus the euro – a currency pair which had hitherto been very stable.

In order to gain a deeper understanding of the true underlying risk, rigour in quantifying the risks can reap many advantages, such as being able to visualise the underlying dynamics of the current risk profile and quantifying the diversification benefit.

FOREIGN EXCHANGE RISK MEASUREMENT FX risk can be viewed from many angles – here are the key factors to analyse:

- the translational risk associated with asset liability mismatch;
- the transactional risk where cashflows are spread over short, medium or long time periods;
- how different foreign exchange risks mitigate or compound each other; and
- how foreign exchange risk dynamics impact the underlying business.

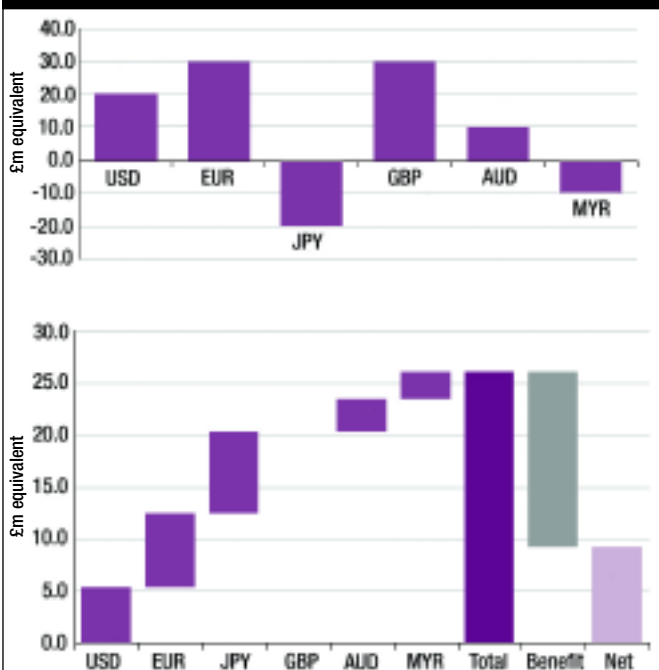
At the basic level FX exposure can be quantified using three pieces of information: the magnitude of the exposure, the volatility of the FX rate, and the relationship between the relevant FX pairs.

For instance, outlining the total exposure in each currency and stress-testing functional currency will provide only part of the story in terms of FX risk. For any given set of cashflows, a more precise and thorough measurement can be achieved by combining the volatility of the FX rate and the total magnitude of the individual cashflows. The rationale behind this approach is derived from the insight that a small currency exposure with a high volatility may have a larger risk than a large exposure to a low-volatility currency.

A further step is based on the correlation between the individual cashflows. This is derived from the fact that cashflows in the same direction and with positive correlation actually compound the risk while cashflows in opposing directions and positive correlation mitigate the risk. In other words, there can be an embedded diversification benefit in a company's cashflow – in essence, free hedging. The danger is that if a cashflow is hedged, while not taking the offsetting position into account, the risk profile can increase – in



Figure 1: Size of total cashflows and cashflow at risk



The top chart is a hypothetical analysis of a company's individual cashflows representing various currency exposures.

Combining the currencies' volatility versus sterling with the cashflows gives us the total FX exposure. Then we can combine the cashflows using the correlation to get the diversification benefit, providing a net risk position. As a result, hedging the area in pale lilac is the optimal strategy, rather than the total dark purple risk exposure.

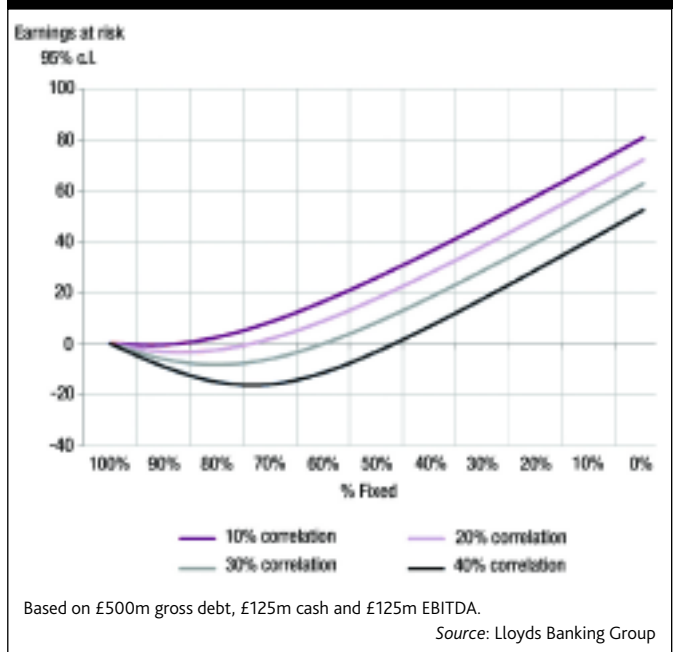
Source: Lloyds Banking Group

effect, treasurers will believe they are hedged appropriately while in fact they may have compounded their exposure (see Figure 1). This underlines the importance of such in depth analysis, especially for companies with varied and significant FX exposures.

COMMODITIES RISK Commodity risk can be tackled as standalone. However, given the close relationship between FX movements and commodity prices, we are able to easily combine these risks to achieve the overall cashflow at risk position. Essentially, commodity exposure will be treated as a currency cashflow risk and we will derive the net exposure using the same approach of combining volatility and magnitude of cashflows. And similarly to FX, commodity exposures can provide natural hedging as some commodity price movements are correlated to FX moves. This means that hedging an aggregate combined net risk will often be a more efficient strategy than hedging both currency and commodity separately.

A hypothetical example which demonstrates the importance of incorporating commodity risk with FX risk would be a company that reports in sterling but manufactures components for the European and US oil and gas industry. Here we have the direct commodity risk of raw materials for the manufacturing process, the FX risk from the contracts (in US dollars and euros) and the indirect earnings risk linked to oil and gas prices via the earnings of the company's client base. Here the company can combine all these risk factors to identify offsetting components and compounding components. The debt

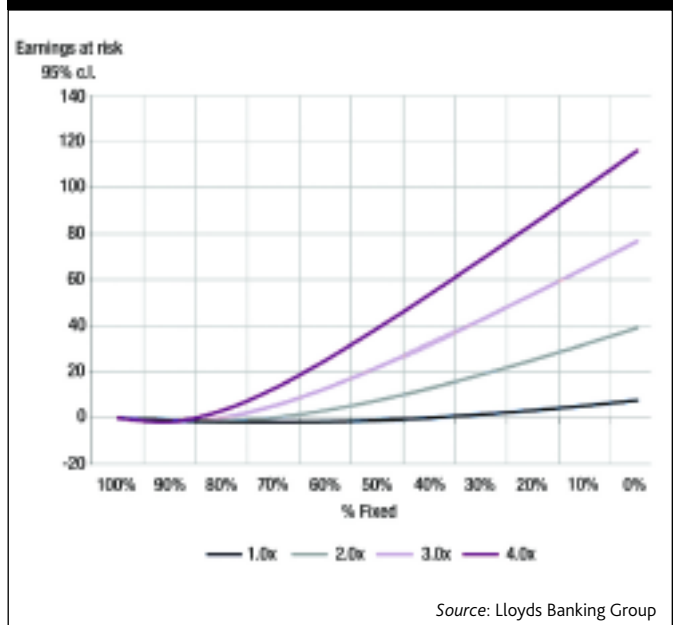
Figure 2: Risk in highly cyclical businesses



Based on £500m gross debt, £125m cash and £125m EBITDA.

Source: Lloyds Banking Group

Figure 3: Impact of leverage



Source: Lloyds Banking Group

profile and the cash management methods can also go into the mix to provide further benefit.

INTEREST RATE RISK MANAGEMENT Consider a scenario where the company is holding debt in a single currency and has traditionally had a treasury policy of 85% fixed rate borrowing and 15% floating. In addition the company is believed to possess some cyclical with interest rates. Cyclical is measured by the extent that interest rates and a company's earnings are correlated. A company that is highly cyclical can expect to have earnings fall in economic conditions that

Figure 4: Stress-testing the interest cover ratio

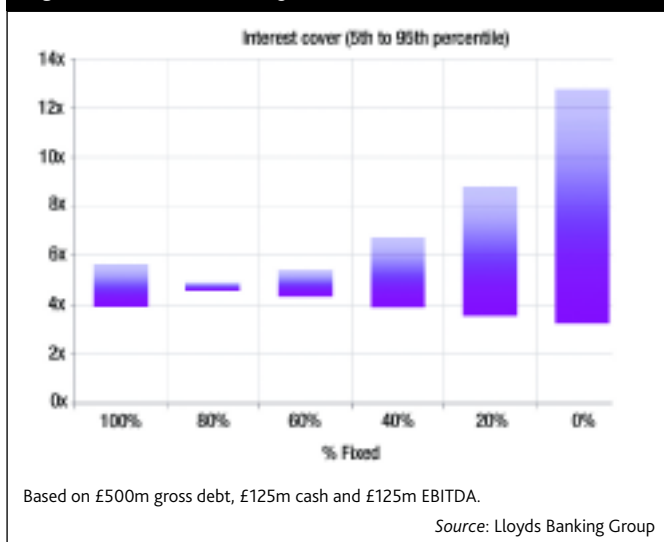
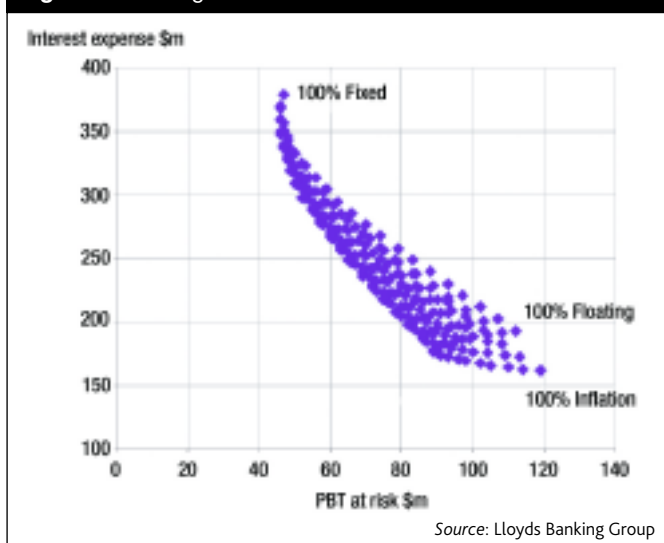


Figure 5: Taking account of inflation



lead to low interest rates and have earnings that rise under economic conditions that lead to interest rates rising. Alternatively, a non-cyclical business is where there is no relationship between the changes in earnings and the changes in interest rates. The way we quantify the risks to arrive at a strategic fixed/floating mix is by looking at:

- the benefit of cyclicity;
- the impact of leverage (since many companies have a varying levels of leverage over time); and
- the tolerance to floating interest rate risk around various financial metrics (this can be made to target covenant headroom or ratings constraints).

Correlation to floating rates is our proxy for cyclicity. Floating rate debt can mitigate risk for highly cyclical businesses. A 40% correlation is quite high to the extent that floating rate debt actually provides a risk reduction (thus a negative earnings-at-risk), as shown in Figure 2.

Based on 30% cyclicity, leverage has a significant impact on the earnings-at-risk (see Figure 3). Intuitively, the lower a company is leveraged, the more tolerance it has to floating rate volatility. This sort of analysis is good at quantifying how sensitive a company is to leverage and fixed/floating mix.

Another way of assessing the interest rate risk around a debt profile is to stress-test a key metric such as the interest cover ratio (see Figure 4). When there is a cash balance incorporated which offsets floating rate volatility, having 100% fixed debt profile actually provides more risk because the cash balance is assumed to be floating while the debt is fixed.

ADDING INFLATION TO THE MIX A company with revenue streams that are highly correlated to inflation can quantify how much of its debt should be inflation-linked (see Figure 5). The proportion of inflation-linked debt can be determined in a similar way to the floating rate components. However, rather than assessing the appropriate level of floating rate debt and inflation-linked debt in isolation, a better solution would be combine the two to arrive at an inflation/fixed/floating mix.

CONCLUSION Advanced risk management solutions and the increasingly sophisticated approaches to hedging strategies are undeniable progress in the way treasurers handle risk exposures. Yet the ability to quantify the underlying financial risks is an essential and important first step in being able to achieve a strategically optimal hedging strategy. This doesn't just mean working out the precise individual exposures; it means looking at the underlying risks as a whole and identifying where risks offset or compound each other and ultimately arriving at a solution which minimises the risk while minimising the cost.



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