

Utilizing Value at Risk (VaR) and Efficient Portfolio Theory to optimize hedging cost management?

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Our Businesses at a Glance

Materials Group

\$6.5 bil.⁽¹⁾

(former LGM and IHM)

Pressure-sensitive materials

- Label materials (LPM)
- Graphic and reflective materials
- Functional materials (e.g., tapes⁽²⁾)



Solutions Group

\$2.5 bil.⁽¹⁾

(former RBIS)

- RFID solutions
- Branded tag and embellishment solutions
- Data management and identification solutions
- Pricing and productivity solutions



(1) FY 2022 Net Sales

(2) Previously part of IHM

Former segment names: Label and Graphic Materials (LGM), Industrial and Healthcare Materials (IHM) and Retail Branding and Information Solutions (RBIS)

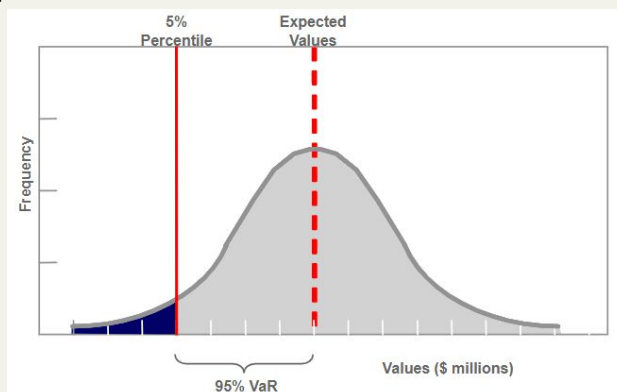
Project outline - hedging based on VaR 1.0

Issue to address: FX hedging comes with high hedging costs (forward points)¹.

How: based on advice from 2 relationship banks, use an efficient frontier approach to save on forward points with an acceptable Value-at-Risk (VaR). We developed our own spreadsheet model to run the analysis, had it reviewed by the banks and extensively backtested. We apply these to our monthly balance sheet FX exposures.

Value-at-Risk (VaR)

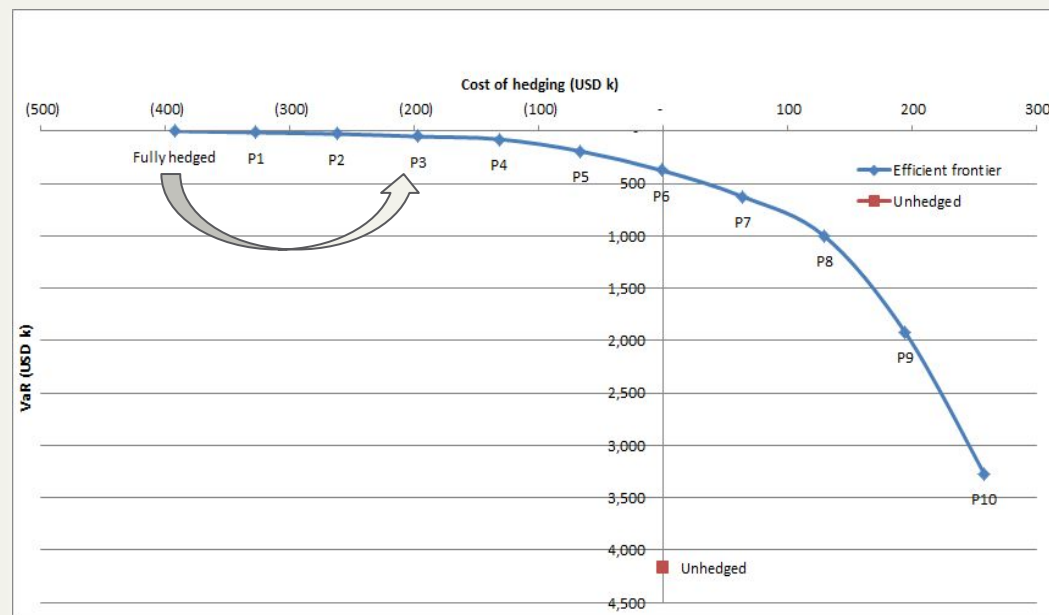
VaR is a statistical measure of risk which takes into account both FX volatility and correlation among currencies to determine the overall risk of the FX portfolio. The higher the currency diversification in the portfolio the lower the portfolio risk.



VaR efficient frontier

Efficient frontier is a set of FX portfolios that are expected to provide the highest returns at a given level of risk. A portfolio is said to be efficient if there is no other portfolio that offers higher returns for a lower or equal amount of risk.

We were using portfolios at the flatter part of the curve to save on forward points without taking too much risk.



¹ Other means to address hedging costs (e.g. reducing exposures, competitive pricing through multi-bank electronic trading platform, STP) were already implemented.

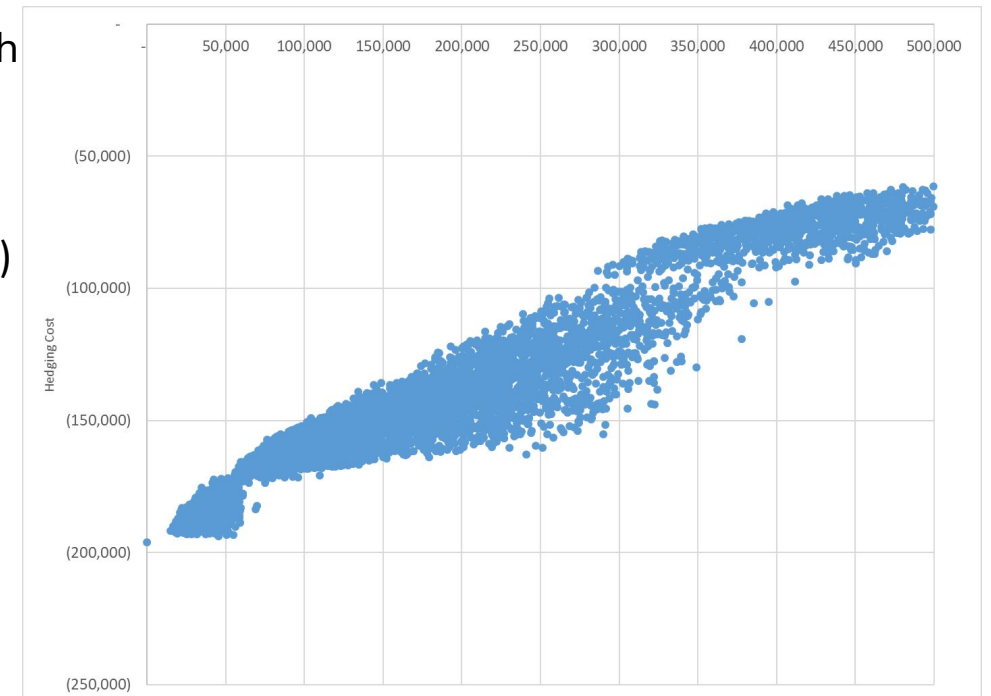
Project outline - hedging based on VaR 1.0 → 2.0

Issue to address: The hedging approach on the previous slide was implemented in Q1 2019 and came to a halt in March 2020 (Covid-19!) as correlations between currencies collapsed, so we switched back to fully hedging. The spreadsheet solver function took 2.5 hrs per iteration, hence we wished to automate the process in the meantime.

How: Our TMS provider Kyriba had acquired FireApps and we asked them to develop an automated solution to replace the spreadsheet. Implementation was done in 6 months and it all runs in a SaaS solution in the cloud.

Resulting in:

- Results available in minutes rather than hours. Total time a month is 1-2 hours including decision making and execution.
- We used to plot 10 points between fully hedged and positive carry. Now we get thousands of points just between P0 and P3 (the flatter part of the efficient frontier curve in the previous slide) of which we shortlist a few to select one from.
- Extensive backtesting for the year preceding commencement to fine tune parameters. Based on this, we set the following thresholds to further restrict the risk:
 - Maximum portfolio VAR of \$250k at 95% Confidence
 - No currency allowed an exposure more than \$10 mln
 - No more than 2 currencies allowed an exposure above \$5 mln



Project outcomes

- These stringent parameters in the previous slide have allowed us to achieve significant savings during Q2-Q3 2023 with only one month negative so far (appreciated by our CFO!):

Particulars	P4	P5	P6	P7	P8	P9	YTD
VAR Result	\$ 75,446	\$ 301,081	\$ 238,107	\$ (40,131)	\$ 71,674	\$ 174,848	\$ 821,024

- We maintain flexibility: at any point in time during the month, we are able to switch back to fully hedging in case of black swan events, like we did in March 2020 when Covid-19 hit the financial markets. We monitor the results development at several times during the month.
- Group-wide application was aligned with FP&A (outcomes have an impact on BU's management results) and Tax (correlation of exposures across entities/jurisdictions, possibly resulting in uneven tax treatment). In our current approach, all "VaR hedging" is done at our Inhouse bank entity in the Netherlands, also covering exposures in other entities (initially only for the Inhouse bank entity exposures), hence no longer triggers FP&A and Tax concerns.

Thank You

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