4.3.2 Green Parrot Risk Evaluation Exercise

Unit: Unit 1 – Treasury Strategy

Module: Module 4 – Financial risk

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Summary: An exercise which uses commercial and market data to demonstrate the application of Chapman's methodology for risk evaluation in the treasury context, using foreign exchange risk as a model. The exercise can also be tackled as a case study.

Keywords: foreign exchange, risk evaluation, sensitivity, scenario, value at risk, enterprise risk management, hedging

Green Parrot AG – Risk evaluation

In this exercise you will evaluate the FX risks faced by Green Parrot AG and investigate the impact of FX risk on operating profit.

You will need to refer to the information in Green Parrot Case Background from Unit 1/Module 1, and we have also provided you with summary data on Green Parrot, including a breakdown of profit by currency in the Op Profit worksheet, in the accompanying proforma spreadsheet. The time is mid July, half way through the current financial year. Note that this question has been frozen in time so that you do not waste time updating exchange rates to the latest rates.

Green Parrot both sells and purchases in USD, EUR, GBP and CHF; in addition it has a sales stream in JPY. This latter is relatively small, and for the purposes of simplicity (and only for simplicity) we will ignore the JPY exposure in this exercise.

Green Parrot buys all its cocoa centrally, paying GBP and hedging the commodity risk on the London cocoa exchange. Again, for the purposes of this exercise we will ignore the commodity price risk of cocoa purchases – although this is also an important dimension of Green Parrot's risk profile.

Green Parrot monitors its foreign exchange exposures via weekly meetings of its Treasury Committee, taking action in the market based on the outcome of each meeting. Green Parrot prefers to manage its FX risks based on the time horizon of a financial year as this ties in with its budget and its forecasts to the market. The Treasury Committee is about to consider the FX exposures arising from the budget for next year, with the aim of protecting the CHF value of forecast operating profit.

For planning purposes, currency numbers have been derived from a global 5% increase in prior year numbers, and using the prior year's average exchange rates as a benchmark, see Op Profit worksheet in the accompanying exercise proforma spreadsheet.

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In order to build a comprehensive view of its exposures, Green Parrot evaluates its FX risks from three perspectives:

1. Sensitivity analysis
2. Scenario analysis
3. Value at Risk

Green Parrot uses **sensitivity analysis** to flex one or more inputs to assess the impact on the target parameter, in this case its re-forecast operating profit. In this context it is less concerned with *whether* a change will take place, than *what* the impact is expected to be if the change does happen.

Green Parrot uses **scenario analysis** as a more extreme version of sensitivity analysis. It looks beyond direct input fluctuations to indirect ones – for instance what happens if there is crop failure in a particular region? These events (or scenarios) are likely to impact multiple inputs. For the Treasury Committee though you must confine your discussion to FX risk. Obviously there are many scenarios which affect the commodity aspect as well.

Green Parrot also uses **Value at Risk analysis** to combine an estimate of loss (re-forecast operating profit worsening) with the probability of it happening, over a defined timescale. Green Parrot combines VaR with portfolio theory to quantify the total correlated risk in its overall portfolio of operating cashflow FX exposures, compared with sensitivity testing, which typically examines only one parameter at a time. Green Parrot uses a 7-day VaR, as this correlates with the weekly meetings of the Treasury Committee; the aim being to establish the maximum worsening in the re-forecast CHFm equivalent operating profit that might be suffered between meetings, at both 95% and 99% confidence levels.

Your assistant has already done some initial analysis, and prepared a template workbook (see accompanying proforma spreadsheet) for your use. Your assistant has shaded in light blue the cells on the Op Profit worksheet where they are unsure about what Excel formulae or commentaries to enter. As part of your work on this exercise, you need to complete the blue-shaded analysis cells in the Op Profit worksheet.

Consider in each case whether a one dimensional measure of risk is most suitable for these evaluations or a classic two dimensional risk that fits onto a risk matrix.

Note that we have simplified the business model to facilitate this exercise. You can assume that the group is one homogenous whole and that there are no issues of repatriation of profits and that the net profit by currency would at some stage have to be bought or sold. The model is therefore effectively one large chunk of transaction exposure, but on a forecast basis. Further simplifications include:

- That we cannot change prices in line with exchange rates and so we do have naked exposure.
- That using a one year time horizon is a true way to look at the exposure, whereas in fact a proper analysis would consider a time horizon where the business model could be changed to respond to moving exchange rates.

- That we can ignore the effects of competition and the situation that competitors are in.

Question 1: Sensitivity analysis

a) From the given budget numbers and exchange rates, analyse the build-up of Green Parrot's operating profit (Sales less cost of goods sold less other expenses) by currency. Hence derive a split of operating profit by currency, both in currency and in CHF terms.

Student Notes:
On the Op Profit worksheet, fill in the blue shaded cells (rows 14-25) using the instructions down the left-hand side. Note: Filling in the blue cells will populate both the Sensitivity and VaR worksheets. In rows 27 and 28, enter your immediate comments regarding the net foreign exchange exposure and its components.

b) How sensitive is Green Parrot's operating profit to a general strengthening or weakening of CHF against major currencies? Why?

Student Notes:
See Sensitivity worksheet, cells C16-E26.

c) How sensitive is Green Parrot's operating profit to a strengthening or weakening of CHF against USD, GBP and EUR individually? Why?

Student Notes:
See Sensitivity worksheet, cells C37-I39

d) What implications does this have for Green Parrot's FX risk management?

e) What are the limitations of the analysis so far?

Question 2: Scenario analysis

For the identified risk - ***Increases in raw material and energy costs could affect future financial results,*** envisage a scenario affecting that risk and consider the likely foreign exchange effect on Green Parrot's operating profit? You need to consider your sensitivity analysis of operating profit from Question 1 above when answering this question.

Student Notes:
Details of identified risk
A fluctuation in cocoa costs will directly impact the size of the GBP exposure, so Green Parrot should also run sensitivities on the commodity price of cocoa, and its impact on the GBP exposure. As things stand, a fluctuation of 10% in the commodity price is equivalent to a 10% change in the exchange rate for GBP, so the effect on a headline basis can be seen from the sensitivity analysis. However, there will be a levered effect if both commodity and exchange rates fluctuate – a 10% move in both might result in a 21% fluctuation in GBP costs (1.1 x 1.1) if they go the same way, or 0% if they contra each other. It is unlikely that a fluctuation in the cocoa price itself will have an effect on global exchange rates, however global exchange rates may influence the hard currency price of cocoa, and the market may prefer particular currencies from time to time. At the margin, Green Parrot might wish to be flexible about its payment currency for cocoa.

Other raw materials and energy should be predominantly denominated in local territory currency. Fluctuations in these will impact per currency profitability and Green Parrot should check the materiality of such fluctuations when developing its hedging strategy (we don't have enough data so far). In the medium term as an energy consumer, Green Parrot should consider the impact of carbon limits; these are likely to result in on-cost on a per currency basis as countries implement the Kyoto accord. Equally, offsets may be available if Green Parrot invests in appropriate projects in developing countries (such as those from which it sources its cocoa), and Green Parrot may be able to capitalise on any eco-friendliness it can demonstrate.

Question 3: Value at Risk

Your assistant has already done the following analysis, see VaR Worksheet.

- From the selected historic FX rate data (the prior six months), calculations of the seven-day standard deviations of the percentage changes in rate for GBPCHF, EURCHF and USDCHF.
- Calculations of the 7-day CHFm Value at Risk at 95% and 99% confidence levels for each major currency.
- Calculations of the covariances between movements in each of EUR, GBP and USD relative to CHF.
- Calculations of the correlation coefficients between each currency pair CCY/CHF.
- Calculations of the correlated 7-day Value at Risk for the portfolio at each of the 95% and 99% confidence levels.

a) Explain carefully the meaning and importance of the VaR numbers in rows 136-137 on the VaR worksheet. What is the significance of the portfolio VaR numbers in cells C155-156 on the VaR worksheet? Does the sign of the VaR numbers matter?

b) Based on the currently available information, do you consider that these VaR numbers represent an acceptable level of financial risk for Green Parrot? What further information might you want to help you decide?

c) If you consider that these FX risks are not acceptable, what would you do about them?

d) Explain the effects of flexing the underlying currency exposures (to simulate hedging action or price / volume changes). Concentrate on the GBP exposure shown in the Sensitivity table cells J155-K173 on the VaR worksheet.

e) What are the theoretical shortcomings and practical limitations of using VaR analysis **in this context**? Do you consider that these shortcomings and limitations invalidate the methodology?

Student Notes:

If in doubt with the maths, see the Appendix A-C readings in Module 4.

Question 4: Overall / conclusions

a) In Green Parrot's case, do the three analysis methodologies reinforce or contradict each other? Which of them do you find the most helpful?

b) What priorities (per currency) would you suggest in managing Green Parrot's currency exposures?

c) Current levels for selling EUR are better than budgeted (current EURCHF 1.66 compared to budget 1.58). What would be the effect of taking advantage of these levels and closing out the exposure using outright forward FX contracts (ignore forward points)? Hint: Look at the Sensitivity table for EUR exposures on the VaR worksheet cells J179-K195.

d) How might you use a VAR approach to support Green Parrot's FX hedging policy?

e) How would you update the position for successive weekly Treasury Committee meetings?

f) On the Op profit worksheet in cells D34 and D35 there is space to calculate the (implied) 6 month VaR from the 1 week result – do this. How does the result compare to the result from the basic sensitivity analysis? How credible is the result? How might you use it?