3

Fundamental Risk Factors of Financial Markets

The fundamental risk factors in financial markets are the market parameters which determine the price of the financial instruments being traded. They include foreign currency exchange rates and the price of commodities and stocks and, of course, interest rates. Fluctuations in these fundamental risks induce fluctuations in the prices of the financial instruments which they underlie. They constitute an inherent market risk in the financial instruments and are therefore referred to as risk factors. The risk factors of a financial instrument are the market parameters (interest rates, foreign currency exchange rates, commodity and stock prices), which, through their fluctuation, produce a change in the price of the financial instrument. The above mentioned risk factors do not exhaust the list of the possible risk factors associated with a financial instrument nor do all risk factors affect the price of each instrument; for example, the value of a 5 year coupon bond in Czech Corona is not determined by the current market price of gold. The first step in risk management is thus to identify the relevant risk factors of a specified financial instrument.

3.1 Interest Rates

Various different conventions are used in the markets to calculate interest payments. For example, interest rates on securities sold in the US money markets (T-bills, T-bill futures) are computed using linear compounding, whereas in the European money market, simple compounding is used. Interest rates in the capital markets are calculated using discrete or annual compounding while option prices are determined using the continuous compounding convention. While these conventions are not essential for a principle understanding of financial instruments and risk management they are of central importance for the implementation of any pricing, trading or risk management system. Before entering into a general discussion of interest rates in Section 3.1.5, we will therefore introduce the most important compounding conventions here.
3.1.1 Day Count Conventions

Before one of the many compounding conventions are applied to calculate the interest on a certain amount over a period between the time (date) \( t \) and a later time \( T \), the number of days between \( t \) and \( T \) over which interest is accrued must first be counted. The beginning, the end and the length of this time period (usually measured in years) must be precisely specified. To do this there are again different conventions used in different markets, known as day count conventions, DCC for short.

These market usances are usually specified by made use of a forward slash notation: the method for counting the days of the month are specified in front of the slash, the number of days of the year after the slash. A list of the most commonly used conventions is presented in Table 3.1. These conventions compute the length of an interest rate period as follows:

- **Act/Act**: The actual number of calendar days are counted and divided by the actual number of days in the year.

- **Actual/365f**: The actual number of calendar days between \( t \) and \( T \) are counted and divided by 365 to obtain the interest period in years regardless of whether the year concerned is a leap year. This distinguishes the Actual/365f convention from the Act/Act in years.

- **Actual/360**: The actual number of calendar days between \( t \) and \( T \) are counted and divided by 360 to obtain the interest period in years.

- **30/360**: The days are counted as if there were exactly 30 days in each month and exactly 360 days in every year. In addition, the following holds:
  
  - If the *beginning* of the interest period falls on the 31st of the month, the beginning is moved from the 31st to the 30th of the same month for the purpose of the calculation.
  
  - If the *end* of the interest period falls on the 31st of the month, it is moved forward for the purposes of the calculation to the 1st of the next month **unless** the *beginning* of the interest period falls on the 30th or 31st of a month. In this case, the end of the interest period is moved from the 31st to the 30th of the same month.

- **30E/360**: The days are counted as if there were exactly 30 days in each month and exactly 360 days in each year. In addition, the following holds:
  
  - If the *beginning* of the interest period falls on the 31st of the month, the beginning is moved from the 31st to the 30th of the same month for the purpose of the calculation.
  
  - If the *end* of the interest period falls on the 31st of the month, the end of the period is moved to the 30th of the same month for the purpose of the calculation (this differentiates this day count convention from the 30/360 convention).