

# International Financial Markets: Exchange Rates and Inflation

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Christian Wolfsberger \*

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**Author note:**

\* *Christian Wolfsberger*, is a Quality&Engineering Graduate at BMW (UK) Manufacturing Ltd. He is a qualified Energy electrics technician in operating technology and received his B.Eng. at the Hochschule Konstanz University of Applied Sciences (HTWG), Germany; and his M.Sc. from Aston University, UK. He can be contacted at [wolfsbec@aston.ac.uk](mailto:wolfsbec@aston.ac.uk).

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## **ABSTRACT**

This paper investigates how multinational companies manage foreign exchange risk. It considers currency translation using direct and indirect rates of exchange as well as the calculation of cross rates. The feasibility of estimating exchange rates is reviewed and internal and external hedging techniques are covered. The findings, based on a literature review, are indicating the difficulties for accurate exchange rate forecasts. Corporations are recommended to use the spot rate for financial budgeting and in case countries with high inflation are considered, the forward rate should be used as a value for the expected exchange rate. The results in regard to the difficulties in forecast prediction led to the necessity of mitigating the endangerment of foreign currency rate variations through hedging activities. Companies should try to use internal hedging instruments in order to avoid high transaction costs. In case internal hedging is not sufficient enough to control the exchange rate risk, external hedging is proposed to hedge translation exposure.

## **1 FOREIGN CURRENCY TRANSLATION**

The Accounting Standards Board (1996) states, that any financial calculation which includes values of different monetary environments requires a translation and presentation as if they were of the same unit. Since it is not possible to link amounts stated in their individual currency, it requires conversation towards a single common currency for those components denominated or appraised in foreign currency (for illustrative calculation, see Appendix A.). Foreign exchange rates are expressing the financial value of one national currency (e.g. British Pound) in relation to a different currency (e.g. Euro).

Shapiro and Sarin (2009) point out that apart from theoretical calculations in reality, as seen in Figure 1, these rates of exchange are brought up in pairs through a dealer agreeing to purchase foreign exchange at a certain bid rate or to sell foreign exchange for a specific ask (or offer) rate. According to Madura and Fox (2011) the most general performed type of foreign exchange is an immediate deal at the spot rate, performed at the spot market. The internationally agreed settlement cycle, following Guinan (2009), is within two days. In contrast to the spot rate, Copeland (2005) outlines the possibility of contracts at a predetermined forward rate (also known as future exchange rate), binding the contracting parties to exchange one currency for another at a certain future time. Guinan (2009) shows that the forward rate is grounded on the spot rate with modifications for the cost of carry. Madura and Fox (2011) assert that the benefits of specifying a future date and the predetermined forward rate are broadly used for hedging reasons, since these contracts on the forward market are independent of the actual rate of exchange in the spot market at that time.

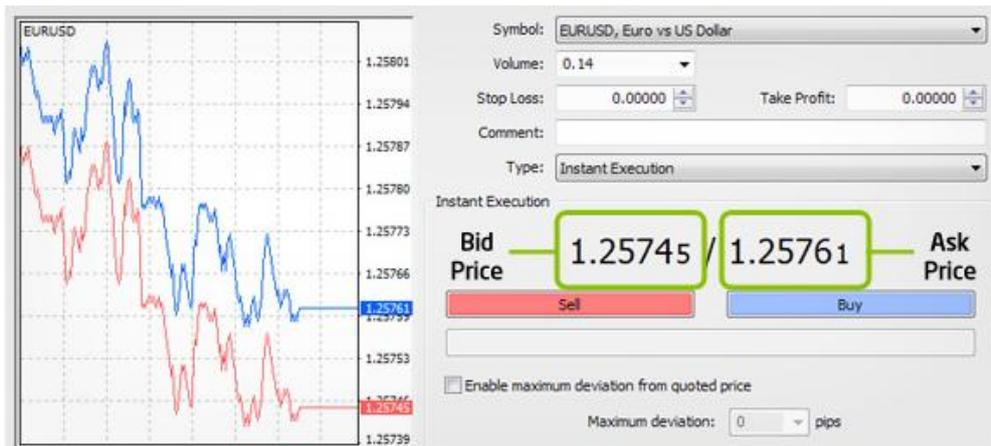


Figure 1: Example of a foreign exchange order (Alpari UK Limited, 2012)

As seen in Figure 1, a currency has its specific exchange rate in relation to other currencies. Therefore, it is significant to be aware of different currency quotations in order to avoid misinterpretation. Consequently, Eiteman *et al.* (2013) explains that the professional interbank market uses more than one standardized quotation system.

### 1.1 Direct and Indirect Quotation

An exchange rate of  $\text{€}1 = \text{£}0.81$  signifies that the price of one British Pound in the currency of the European Monetary Union is  $\text{€} (1/0.81) = \text{€}1.23$ . As well  $\text{£}1 = \text{€}1.23$  as the reciprocal  $\text{€}1 = \text{£}0.81$  are acceptable methods of stating the identical exchange rate. The difference in the representation is known as direct and indirect quotation. In contrast to continental Europeans, according to Copeland (2005) both the British and Germans typically use the indirect quotation. Therefore, people in the United Kingdom (UK) would express the exchange rate as  $\text{£}1 = \text{€}1.23$  or in short form just  $\text{€}1.23/\text{£}$ . It shows the purchasing power of the Pound per Euro. In the used example the first part “ $\text{€}1.23$ ” is a foreign currency value, according to Guinan (2009) also known as base currency, of an entity of the home currency “ $\text{£}$ ” which refers Guinan (2009) as the quote currency or counter currency. Respective to the definition of the direct and indirect quotation pair, Eiteman *et al.* (2013) emphasis the critical point of view in regard to the home or base country of the currency. As mentioned before  $\text{€}1.23/\text{£}$  is an indirect quote in UK. Exactly the unchanged quotation,  $\text{€}1.23/\text{£}$ , is a direct quotation when used in a country of the European Monetary Union. In this case, the rate of

exchange €1.23/£ is the price of the foreign currency (Pound Sterling) shown in the home currency (Euro). For that reason Eiteman *et al.* (2013) refers a direct quote as an external value of the foreign currency, the previous direct quote example €1.23/£ may be denoted as the value of one pound sterling outside of UK. Appendix A. provides an illustrative calculation involving direct and indirect quotation

**1.2 Cross Rates**

According to Copeland (2005) most of the currencies are quoted against the U.S. dollar (\$) and therefore it could be required to determine the cross rates for currencies besides the U.S. dollar. In contrast to this, Guinan (2009) lists a wider scope of currencies including the British pound, Euro, U.S Dollar and Japanese yen as the major quote currencies for exchange rates, which matches with the list in Figure 2. In case the exchange rate between the Hong Kong dollar (HK\$) and the Swiss franc (SFr) is needed, such a calculation is necessary since both currencies are not traded actively against each other. The global decentralized foreign exchange market (often abbreviated to forex or FX) as published by Forexpros (2012) lists such a pair in the group “exotic-cross” to emphasis the rate of exchange determination by using the correlation to a broadly traded third currency. In financial publications like The Financial Times (2012) cross rates are often published in the style of a cross matrix, as presented below in Figure 2.

Currencies ^	GBP £	EUR €	USD \$	JPY ¥
Australia 1.00 AUD	0.64910	0.80040	1.04040	85.67000
Canada 1.00 CAD	0.62800	0.77420	1.00630	82.88000
European Union 1.00 EUR	0.81090	N/A	1.29960	107.06000
Hong Kong 1.00 HKD	0.08052	0.09926	0.12902	10.62890
Japan 1.00 JPY	0.00757	0.00934	0.01213	N/A
Switzerland 1.00 CHF	0.67260	0.82910	1.07840	88.77000
United Kingdom 1.00 GBP	N/A	1.23250	1.60210	131.96000
United States 1.00 USD	0.62400	0.76930	N/A	82.34000

Figure 2: Currency cross rates matrix (The Financial Times, 2012)

In case the requested cross rate is not listed, a calculation needs to be performed. Corresponding to Copeland (2005), the cross rate between two currencies can be computed as the relationship of the exchange rate of the first currency to the U.S. dollar, divided by the exchange rate of the second involved currency to the U.S. Dollar. In a more general definition Eiteman *et al.* (2013) recommends the usage of a widely traded third currency as the quote currency. By using the example stated in the beginning of this subsection, this cross rate would be obtained as follows:

$$\frac{\text{Swiss franc}/\text{U.S. dollar}}{\text{Hong Kong dollar}/\text{U.S. dollar}} = \frac{\text{SFr}1.07840/\$}{\text{HK}\$0.12902/\$} = \text{SFr}8.35840/\text{HK}\$$$

The quotes used in the calculation are listed in Figure 2. Relating back to sub chapter 1.1 every currency rate quotation, including the cross rate, can be stated in an indirect or direct rate. Therefore, the reciprocal of the performed calculation would also lead to a valid cross rate:

$$\frac{\text{Hong Kong dollar}/\text{U.S. dollar}}{\text{Swiss franc}/\text{U.S. dollar}} = \frac{\text{HK}\$0.12902/\$}{\text{SFr}1.07840/\$} = \text{HK}\$0.11964/\text{SFr}$$

Nowadays, according to Guinan (2009) a so called cross currency, a pair of currencies not including the U.S. Dollar, is traded in forex in order to bypass the step of the calculation of the cross rate.

## **2 FEASIBILITY OF ESTIMATING EXCHANGE RATES**

According to Madura and Fox (2011) almost each operation of a multinational corporation (MNC) can be affected through variations in the currency exchange rate. This makes it necessary to perform exchange rate forecasts in order to negotiate decisions related to marketing, production or finance. However, Clements and Lan (2010) express that estimating exchange rates is widely agreed as an extremely difficult undertaking.

### **2.1 Parameter selection for exchange rate forecasts**

In order to gain most precise forecast values, accurate parameters need to be chosen. As well Wu and Wang (2013) as Shirov and Gusev (2011) bring up the importance of those parameters, since the quality of the estimated rate of exchange is mainly depending on the input parameters. Wu and Wang (2013) specify three groups of parameters: Indicator displaying the external environment, parameters in regards to the economic policy (e.g. state expenses, tax rates) and target factors regarding the economic development (e.g. inflation level, currency rate).

### **2.2 Exchange rate forecasting techniques**

Meese and Rogoff's (1983) research paper is seen as the seminal work in the exchange rate forecasting literature. It shows that structural economic models are not capable to surpass the random walk model. In Meese and Rogoff's (1983) random walk conclusion they state that the ordinary spot exchange rate is a more proficient forecaster compared to the future exchange rate. Meese and Rogoff (1983) specifically indicate the difficulty to predict exchange rates for short to medium perspectives. However, Frankel (1987) emphasis that this influential finding did not verify a nonexistence of a convex combination of the forward rate and the spot rate which could out-predict the simple spot rate. The theory of the academic exchange rate models, Interest Rate Parity (IRP), International Fisher Effect (IFE) or Purchasing Power Parity (PPP) is fundamental sound, but in practice Madura and Fox (2011) point out that only 10% or less of the variance in the rates of exchange could be

derived of those models. Nevertheless, Eiteman *et al.* (2013) and Kilian and Taylor (2003) indicate the existence of a fundamental equilibrium path for a currency's value with a predictability of the spot exchange rate in the long-run. Kilian and Taylor (2003) identify that the nearer the exchange rate is towards its equilibrium value, the less foreseeable are changes in the spot exchange rate. They consider the introduction of a nonlinear model in the short term to adapt to these deviations of the spot exchange rate. The composite forecast approach, pointing in a similar direction, cited by Clements and Lan (2010), suggests using weighted averages of predictions from different methodologies to improve forecast accuracy. Eiteman *et al.* (2013) summarizes the practical application of exchange rate forecasting as a mixture of fundamental methods together with technical forms of exchange rate analysis. Such a combination would utilize trends in economic variables to forecast upcoming exchange rates (fundamental forecasting methods) joint with the usage of past tendencies in exchange rate movements to recognize future trends (technical forecasting). Nonetheless, it should be highlighted that exchange rate forecasting is not a strict science and as Daniels *et al.* (2009) point out several unexpected events can cause the best of forecasts, using well defined parameter and forecast techniques, to differ significantly from reality.

### **2.3 Application for multinational corporations**

Since corporations are able to hedge their currency risk, Brealey *et al.* (2011) notes that the decision to invest internationally does not mandatory involves currency forecasts. However, Daniels *et al.* (2009) states the need for every manager to be able to analyse exchange-rate forecast factors in order to express an overall idea of the timing, scale, and tendency of exchange rate progressions. Therefore, according to Daniels *et al.* (2009), companies are typically relying on banks to perform forecasts for exchange rates, since due to their capabilities more accurately forecasts value are derived. In order to be still able to perform financial budgeting with foreign cash flows, Madura and Fox (2011) recommends to use the spot rate for budgeting. Transitions in economic environments are hard to guess, and following to Madura and Fox (2011) the spot rate mirrors the best prediction of the future spot

rate in case the economic environment is not changing. An opposing view is needed for exchange rate forecasts regarding countries with high inflation, Shapiro and Sarin (2009) recommends in this cases the forward rate to forecast, since it is influenced through the nominal interest rate differential. Madura (2012) clarifies, that a high nominal interest rate indicates also a greater position of expected inflation. According to Shapiro and Sarin (2009), such currencies will have pronounced discounts, since those are grounded at the interest rate parity. The forward rate should provide a more precise forecast of exchange rates with countries facing high inflation, because it maps the inflation differential.

### **3 HEDGING TECHNIQUES**

Currency threats are defined by Eiteman *et al.* (2013) as the discrepancy of projected cash flows, emerging from fluctuations of exchange rates. Companies are able to mitigate endangerment of foreign currency rate variations through hedging activities. Such hedging contracts enable corporations to secure the exchange rate of a specific currency for their payables or receivables. Ryan (2007) specifies internal hedging (i.e. natural hedging) as techniques created inside the company to reduce its exposure to risk. External hedging is defined by Ryan (2007) through transactions outside the company, where derivatives (i.e. financial contracts) purchased or sold to reduce the financial risk caused by depreciation or appreciation of exchange rates. Following, the most frequent used internal and external hedging techniques are described.

#### **3.1 Internal Hedging**

Natural hedging does not require external parties and is therefore in contrast to external hedging connected to relatively low cost. For completeness, it is to point out, that pre-payment, price adjustment and asset liability management are additional internal hedging techniques, which are further described by Popov and Stutzmann (2003). However, the following internal hedging techniques are most frequently used:

##### *3.1.1 Netting*

Netting is according to Popov and Stutzmann (2003) one of the most used hedging techniques. It aims to decrease the quantity of financial transactions a corporation is performing to cover an exposure. In order to perform netting most efficiently, the requirement of subsidiaries in various nations is highlighted by Daniels *et al.* (2009). Within these subsidiaries, cash flows are grouped together and only the netted amounts are interchanged.

##### *3.1.2 Leading and Lagging*

The lead strategy is described by Daniels *et al.* (2009) as either collecting foreign currency in case the currency rate is expected to drop or paying early when the foreign currency is

expected to build up. The opposite is meant with the lag strategy, which aims collecting or paying late in case of an expected strengthen or weaken of foreign currency. Popov and Stutzmann (2003) notes that while performing leading or leading a corporation needs to consider the occurring cost of changing the liquidity.

### **3.2 External Hedging**

In case internal hedging is not sufficient enough to control the exchange rate risk, external hedging is used to hedge translation exposure. It is performed in cooperation with banks, which leads to higher transaction costs and a more complicated transaction in contrast to the internal hedging. In addition to the following most frequent used external hedging techniques, money market contracts and swaps are also possible hedging techniques which are explained in detail by Popov and Stutzmann (2003).

#### *3.2.1 Forward rate contract*

As mentioned in chapter 1, in a forward contract a guaranteed specific exchange rate (i.e. forward rate) for future transactions on a specified transaction date is secured, tailored in accordance to the company's needs. Copeland (2005) specifies the forward contract duration to be one month, three months, or twelve months, with an availability for most major currencies. On one hand, Daniels *et al.* (2009) point out the disadvantage of forward contracts preventing possible gains through more favourable exchange rates, but on the other hand, this hedging contract narrows also future deficits due to the secured future forward rate. This committed binding to all contracting parties puts the company in a neutral position.

#### *3.2.2 Futures*

Futures are a limited form of forward contracts. In contrast to the forward contract, trade attributes cannot be specified by the company. The contract defines, according to Madura and Fox (2011), a standard volume of a certain currency traded on a specific date in the future. This contract contains, as stated by Daniels *et al.* (2009), a predetermined exchange

rate for the specified currency. The stated inflexibility could be hindering for the company, but on the other hand, the transaction costs are lower which could be benefiting for smaller corporations.

### 3.2.3 *Foreign-Currency options*

The foreign-currency option is in contrast to the forward rate contract a more flexible derivative. Daniels *et al.* (2009) defines currency options as the right, but not an obligation, guaranteeing access to foreign currency within a certain time period, for buying (so called “call option”) or selling (so called “put option”) purposes at a specified exchange rate.

#### **4 CONCLUSION**

From the evidence discussed in this paper it can be seen that multinational corporations need to be aware of the different translation possibilities for the exchange rate. A wrong application of indirect and direct quotation can lead to misjudgement of the related exchange rate. For international trading activities involving countries whose currencies are not actively traded against each other, the cross-rate calculation was presented in order to obtain the exchange-rate. The feasibility of estimating the exchange course is connected with the actual obtained accuracy of the forecast. The author believes, taking into considerations the evidence discussed in this paper that a company should not primary rely on predicted rates of exchange. In case a company needs to perform financial budgeting, the spot rate can be used as a point of reference. However, in regard to countries facing high inflation, the forward rate should be used as a predicted exchange rate. The various outlined techniques show the efforts of researcher to optimize forecasts. However, the accuracy especially for short-term forecasts is still not sufficient to rely fully on it. As noted, the forecast result relies on well-defined input parameters. The focus should therefore not be limited on the forecasting technique, but also on the input parameters in order to obtain a currency exchange rate forecast at the best possible rate. For these reasons, the writer recommends corporations to actively control the exchange rate risk by performing hedging activities. As far as possible and appropriate natural hedging activities should be performed and implemented into the corporations international financial transactions. In case internal hedging cannot sufficiently achieve to control the exchange rate risk, corporations need to perform external hedging which also involves higher transaction costs. The presented instruments enable companies to fix the exchange rate and minimize foreign exchange losses.

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