Foreign Exchange Markets

A Research Publication by DZ BANK AG

Methodological approach of foreign exchange research

FOREIGN EXCHANGE

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A **currency zone** denotes the area where a currency is actually accepted and/or used. This may be an individual country (in the case of national currencies) or a union of countries (in the case of supranational currencies, such as the euro) or a group of countries where issuance and/or other transactions may also regularly take place in a specific foreign currency (the US dollar for example). A currency zone is therefore not identical with the legal territory of a currency.

DZ Bank's foreign exchange research monitors and analyses the following **currencies** or currency zones: G10 currencies and selected emerging market currencies.

DZ Bank's foreign exchange research is primarily aimed at the following groups: cooperative and savings banks and their customers, provided that they have sufficient expertise and experience in the foreign exchange business, mid-size and large German-based companies, institutional clients in Germany and abroad as well as central banks.

The analysis of currency zones is based on theoretical model approaches (purchasing power parity and interest rate parity) and the evaluation of the resulting relevant fundamental factors. In addition, "soft" indicators, such as market sentiment, are also taken into account during the analysis. As approaches that focus solely on models are fraught with significant shortcomings, we no longer pursue any such approach. Instead, it is the job of the analyst to assess how relevant the individual factors identified are for the various currency zones while bearing in mind that the evaluation categories may change over the course of time and are largely dependent on the current fundamental (economic and political) environment.

THEORETICAL BASIS

Purchasing power parity and interest rate parity form the theoretical basis of any analysis of the foreign exchange markets.

Purchasing power parity (PPP)

PPP between two currency zones exists if goods and services contained in one consumer basket can be purchased for the same amount of money. If two different currency zones are compared with each other, the monetary amounts involved are made comparable via the exchange rates. In this case, purchasing power parity exists if the various currencies have the same purchasing power via the exchange rates, meaning that a consumer can purchase the same basket of goods and services at the same price. According to the theory of purchasing power parity, the exchange rates between two currencies fluctuate primarily in order to compensate for price level differences. This theory is based on the law of one price, which is the economic theory that a given commodity, asset or service has the same price anywhere in the world when exchange rates are taken into consideration. Otherwise, arbitrage opportunities would arise. According to this theory, a monetary unit must have the same purchasing power in all countries, i.e. it must have the same real value anywhere in the world. This is also referred to as **absolute purchasing power parity**.

The theory of purchasing power parity has its origins in monetary international economics. It computes how many units of the relevant currency are necessary to purchase the same representative basket that a consumer could buy for one US dollar in the United States. However, over the short or medium term, the exchange rate can differ significantly from purchasing power parity, as current market events can result in rapid changes in the exchange rate whereas the price level only changes at a relatively slow pace. That said, over the long term, the exchange rate should fluctuate around this value. This is called **relative purchasing power parity**.

Interest rate parity

Interest rate parity is a theory that stems from a widely used economic model devised by John Maynard Keynes. Firstly, this theory offers an explanatory approach for investor behaviour: investors invest where they will achieve the highest yield. Secondly, based on this approach, interest rate parity theory is a short-term explanatory model used in foreign trade to explicate exchange rate movements, which – according to this theory – are solely determined by the return demands of capital investors.

Interest rate parity implies that the domestic return equals the foreign return. Accordingly, interest rate parity is also the relationship between the national money market and the international money market, with the exchange rate being adjusted in such a way that the difference between domestic and foreign exchange rate corresponds to the difference between the effective and the expected exchange rate. The foreign exchange market is in equilibrium if the deposits in all currencies offer the same expected rate of return. Interest rate parity relates to the law of one price with regard to fixed-income homogeneous financial instruments, meaning that assets having a comparable risk are subject to the same return expectations, independent of the country in which they are traded. Any capital movements resulting from interest rate parity are reflected in the capital account. Together with the current account and the foreign exchange balance, the capital account constitutes a nation's balance of payments; it reflects both capital imports and exports.

RELEVANT FACTORS IN THE FOREIGN-EXCHANGE ANALYSIS

The detailed consideration of purchasing power parity and interest rate parity gives rise to a number of factors that are relevant for the analysis of currency zones. First of all, these include the fundamental economic developments of a country, the global monetary-policy environment, the bias of the central bank and the resulting capital flows. Additional factors that should also be included in the analysis of a currency or a currency zone are, for example, market sentiment, the political environment and market positioning. We will describe these factors in this study. However, it should be noted that the evaluation of these factors differs considerably not only from currency zone to currency zone, but also along the timeline. It is therefore not possible to determine periods of application for the various aspects or to quantify their relevance for the currency markets as a whole.

Fundamental factors

Both PPP and interest rate parity are based on the assumption that these fundamental developments are – at least over the medium to long term – decisive for the development of a currency zone. As a consequence, the focus is on classic fundamental factors such as GDP growth, the development of the labour market and the resulting inflationary development (which is, of course, influenced by external factors).

» **GDP growth**: A country's growth rates should be considered a) in relation to the growth rate of comparable economies, b) in relation to global growth, and c) in relation to the historic growth development of the respective country. Other factors to keep in mind are whether a positive growth rate is the result of a healthy sustainable development or rather the consequence of a deficit-based fiscal policy and thus unsustainable. This requires a more in-depth assessment of the individual components of GDP growth (consumption, public expenditure, investment activities, export and import).

» **Development of the labour market**: While the labour market is a lagging indicator (meaning that the unemployment rate will only decline once the economy has noticeably recovered), it nevertheless plays an important role. Declining unemployment rates and the often associated rise in wages have a significant impact on consumption (and thus growth) and the inflation rate.

» **Budget balance and fiscal policy**: The government's fiscal policy plays an important role and is of great significance to the economic development of a country. Moreover, a country's fiscal policy has a material impact on a) the liquidity of the local government bond market, b) the credit quality of government bonds and thus c) on government bond yields.

» **Inflation and inflation expectations**: The inflation rate is determined by both domestic and external factors (commodity prices). Inflation and growth critically determine the central bank's monetary policy and thus have a massive impact on the yield level as well as the currency zones. Inflation expectations also play a great role and may force central banks to act, even if the inflation rate is not at a critical level.

» **Balance of payments**: From a foreign-exchange analysis, within the balance of payments it is the capital account on the one hand, which measures the portfolio flows between a given country and the rest of the world, and the current account on the other hand, which measures the trade flows between a given country and

the rest of the world. A country, which has a massive current account deficit for example, must – by definition – show a significant surplus in its capital account. This means that both the yield level and the external value of the currency must be attractive enough for foreign investors.

Monetary policy

A country's monetary policy is determined by domestic factors (growth, inflation, labour market, financial market developments), its mandate (inflation target) and external global factors. With its monetary policy, a central bank directly influences the yield level and the external value of the country's currency.

» **Growth and inflation**: As previously mentioned, it is primarily growth, inflation and the prevailing inflation expectations that are decisive for the central bank. High growth rates and rising inflation tend to go hand and hand with a more restrictive monetary policy, while central banks usually respond with a more expansionary policy to low growth and declining inflation. While the former is usually positive for the currency, the latter is negative.

» **Mandate and credibility of central banks**: From the perspective of the currency market, a central bank's credibility (also with regard to its mandate) is of critical importance. The more credible a central bank is, the more effective its policy will be.

» **Global monetary policy**: Central banks must factor their projections regarding global monetary developments into their considerations. For instance, an extraordinarily restrictive stance can lead to an undesirable appreciation of the domestic currency.

» **Currency policy**: In many countries, the currency policy is determined – or at least executed – by the central bank. The possible exchange rate regimes range from floating via semi-floating to fixed. Under a floating currency regime, the currency's external value is freely determined by the market. In semi-floating systems, the central bank permits limited fluctuations around a fixed mean value. Fixed currency regimes set the price of a given currency in relation to one or more other currencies at a certain level.

» **Market interest rates**: The various central banks' monetary policies also have a decisive influence on the yields of the respective government bonds. The resulting interest rate differentials may also set the course for the further development of the relevant currencies.

MARKET SENTIMENT, MARKET EXPECTATIONS AND TECHNICAL INDICATORS

Fundamental factors resulting from the theoretical basis of PPP and interest rate parity only form one pillar of foreign exchange forecasts, with market sentiment (and thus market positioning), market expectations and other indicators, such as technical analysis, being other pillars.

» **Market sentiment**: Various indicators may assist in the assessment of general market sentiment. For instance, the V-Dax, i.e. the volatility index of the DAX, is considered a bell-wether of prevailing risk aversion. In contrast, the implied volatilities of individual currency pairs reflect the risk assessment of the market.

Another useful indicator is risk reversals, which show whether the market, at any given time, expects an upswing or a downswing in a particular currency.

- **Market positioning**: The positioning of the market is of great importance. In most cases, a positive economic development is, all else being equal, positive for the currency of a country. However, if the market has already assumed a long position, any further positive news may have hardly any impact on the exchange rate. On the other hand, surprisingly negative news could trigger dynamic depreciation.

- **Market expectations**: The same holds true for market expectations: positive news will only have a truly positive impact on the exchange rate if it exceeds general market expectations. Market expectations may already have an impact "before the fact": if the market, for example, starts to price in a rate hike in a given country, this market expectation will lead to the relevant currency appreciating.

- **Technical analysis**: Technical analysis is based on mathematical patterns and is used to identify patterns in exchange rate fluctuations. This may result in both short- and long-term trade recommendations. However, the basic requirement for any successful technical analysis is the initial blocking out of any fundamental factors. If both technical and fundamental analyses point in the same direction, this may be an indication of a dynamic movement within the exchange rate.

SOURCES: DATA, STUDIES, INFORMATION

Analysts of foreign exchange markets utilise a broad range of data and information. As the foreign exchange market is extremely liquid and transparent, it is important to filter such information from the wealth of data that will ultimately determine whether a currency rises or falls.

External data

- **Fundamental data**: Macro-economic data are largely obtained from data suppliers such as Datastream and Bloomberg. In addition, we also use data from third-party providers such as EIU (Economist Intelligence Unit) and international organisations (e.g. IMF or OPEC). What's more, national statistical offices and central banks also supply relevant data. Generally, every possible effort is made to use reliable data. In cases of doubt, the analyst should cross-check data from one source against data from another.

- **Market indicators**: Exchange rates, interest rates, spreads, share prices, commodity prices, etc., are obtained from Datastream, Bloomberg and Reuters. The same applies to volatility indices and other market indicators.

- **Market positioning**: For the analysis of overriding portfolio flows, usually data from Datastream and Bloomberg are used. In some cases, data are sourced directly from the national central banks and statistical offices.

Forecasts

- **Economic forecasts**: If available, these forecasts are obtained from DZ Bank's Economics department. For all other countries, the relevant data are sourced from EIU and the IMF.

- **Other forecasts**: To the extent available, forecasts prepared by the Research department are used. Where this is not feasible, other providers (EIU) or consensus forecasts (e.g. Bloomberg) are used. This is disclosed in the source references.

News

- **News services**: Current news is obtained from news services such as Bloomberg and Reuters.
- **Media**

FORECAST PROCESS

Foreign exchange forecasts

Given the many different input factors, the analysis of foreign exchange markets is highly subjective. Analysts monitor the various evaluation categories described above and must be able to assess which of these categories are or will be relevant to their respective currencies at different points in time. Over a 12-month forecast horizon, significant shifts may occur time and again.

Against this backdrop, analysts must not only keep an eye on their respective home currencies but in fact also on the entire currency universe. In addition, there is a multitude of external – in some cases – political factors that must been included in the forecast insofar as they are known. Should the situation change, the forecast must be reviewed and, if necessary, revised.

Total return expectation and "assessment of the currency zone"

Once an analyst has prepared a forecast, an "assessment of the currency zone" must be drawn up. For this purpose, the currency and rate forecasts for forecast horizons of +6M and +12M are used as a basis for the total return calculation. This calculation is carried out on the basis of a 5-year term to maturity and includes the expected exchange rate change, the expected price change and the yield (note: the yields we compute are gross yields, i.e. bond returns before deduction of taxes, remuneration, fees and any other costs of acquisition). Using a Sharpe ratio, we compute which currency zones are considered to be "**attractive**", "**unattractive**" or "**neutral**" over both a +6M term and a +12M term.

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"**Attractive**" refers to the expectation that an investment in a currency area can deliver an above-average and positive return over a horizon of six to twelve months.
"**Unattractive** " refers to the expectation that an investment in a currency area can deliver only very low returns or even losses over a horizon of six to twelve months.
"**Neutral**" refers to the expectation that an investment in a currency area can deliver low or average returns over a horizon of six to twelve months.
The aforementioned returns are **gross returns**. The gross return as success parameter relates to bond yields before deduction of taxes, remunerations, fees and other purchase costs. This compares with the net return of a specific investment, which is not calculated and can deliver significantly lower returns and which measures the success of an investment in consideration of / after deducting these values and charges.

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"**Stable**" is given if the agencies S&P, Moody's and Fitch are expected to leave their ratings unchanged in the next twelve months
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Share indices (technical daily):	publicationday
Currency areas:	six to twelve months
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Country weightings for covered bonds:	six months
Derivatives	
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Commodities:	one month

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