# *Foreign Currency Quotes*

Confusingly, FX rates are quoted in different ways.

A quote of "USD/JPY **100**" means 1 United States Dollar (USD) equals 100 Japanese Yen (JPY), or 100 JPY = 1 USD.

Often, the slash (/) character is removed, so the same quote could be expressed as "**USDJPY 100** "

Here, the USD is the **base** currency, also called the:

- primary, transaction, price or currency 1 (CCY1).

The JPY is the **term** currency, also called the :

- quote, counter or currency 2 (CCY2).

Beware, because many of the methods of quoting currencies are not consistent with how scientific units are normally quoted.

# *Scientific Units*

Mathematical manipulations of foreign currency are best done by listing the units **after** the number, similar to how engineers and scientists do with, say, a car that travels at a speed of 10 m/s, which means it covers 10 metres per second. So if the car travelled for 3 seconds it would cover:

$$3s \times \frac{10m}{s} = \frac{3s \times 10m}{s} = 30m$$

Notice how the seconds units can be cancelled to get the result which is clearly a distance with units of metres (m). Using this convention we can easily do mathematical manipulations of foreign exchange.

# *Mathematical Manipulations of FX*

If a quote of "**USDJPY 100**" is given, this means that 1 USD equals 100 JPY.

The exchange rate as a mathematical quantity would be:

100 JPY/USD.

To avoid confusion, some economists write this as:

100 JPY per USD, where per means divide.

To convert 50 USD to JPY:

$$50\ USD = 50\ USD \times 100 \frac{JPY}{USD}$$

$$= 50 \times 100\ JPY = 5{,}000\ JPY$$

To convert 50 JPY to USD:

$$50\ JPY = 50\ JPY \div 100 \frac{JPY}{USD}$$

$$= 50\ JPY\ /\ \left(\frac{100\ JPY}{1\ USD}\right)$$

$$= 50\ JPY \times \left(\frac{1\ USD}{100\ JPY}\right)$$

$$= \frac{50}{100}\ USD$$

$$= 0.5\ USD$$

# *Currency Quotes: European Terms and American Terms*

Traders in the inter-bank FX market often quote currencies against the USD and these quotes may be given in 'European terms' or 'American terms'.

By convention, most currencies are quoted in 'European terms', such as 100JPY = 1USD and 0.9630CAD = 1USD. Confusingly, FX quotes in 'European terms' have nothing to do with the EUR currency or Europe at all. It only means that the FX quote is given as the amount of currency that can be traded for one USD. Other examples are or 6.8RMB = 1USD and 47INR = 1USD.

Conversely, currencies quoted in 'American terms' are expressed as the number of USD per one unit of the currency. By convention, the 'Queen's currencies' (GBP, AUD, NZD) and the euro (EUR) are normally quoted in American terms. Examples are:

- 1.5 USD per GBP;
- 0.73 USD per AUD;
- 0.67 USD per NZD; and
- 1.1 USD per EUR.

# *Currency Quotes: Direct and Indirect*

Direct quote: domestic currency per one unit of foreign currency.

Indirect quote: foreign currency per one unit of domestic currency.

The following are all given in 'European terms' (or 'per USD'), which are **direct** quotes of the JPY currency from a Japanese person's perspective, and **indirect** quotes from an American's perspective:

| | |
|---|---|
| 100JPY/USD | 100 JPY per USD |
| 100 JPY = 1 USD | USDJPY100 |

The following are all given in 'American terms' (or 'in USD') which are **indirect** quotes of the JPY currency from a Japanese person's perspective, and a **direct** quote from an American's perspective:

| | |
|---|---|
| 0.01USD/JPY | 0.01 USD per JPY |
| 0.01 USD = 1 JPY | JPYUSD 0.01 |

The Australian Dollar (AUD) is usually given in American terms (0.9686USD/AUD or 0.9686USD = 1AUD) which is an:

- Indirect quote from an Australian’s perspective; and a
- Direct quote from an American's perspective.

Since the same numerical quote can be direct to one person and indirect to another, it's best to avoid these labels.

Instead, many banks and FX dealers prefer to state a currency quote as either:

- 'per USD' which is European terms, like 100JPY = 1USD, or
- 'in USD' which is American terms, like 0.8USD = 1AUD.

| Currency Quote Types | | | | |
|---|---|---|---|---|
| American terms: USD in numerator<br>Indirect quote from local's perspective. Direct quote from American's perspective | | | | |
| Currency | Algebraic ratio form | Per or ratio form | Equality form | Trader form |
| JPY | 0.01USD/JPY | 0.01 USD per JPY | 0.01 USD = 1 JPY | JPYUSD0.01 |
| AUD* | 0.8USD/AUD | 0.8 USD per AUD | 0.8 USD = 1 AUD | AUDUSD0.8 |
| GBP* | 2USD/GBP | 2 USD per GBP | 2 USD = 1 GBP | GBPUSD2 |
| RMB | 0.1666USD/RMB | 0.1666 USD per RMB | 0.1666 USD = 1 RMB | RMBUSD0.1666 |
| European terms: USD in denominator<br>Direct quote from local's perspective. Indirect quote from American's perspective | | | | |
| Currency | Algebraic ratio form | Per or ratio form | Equality form | Trader form |
| JPY* | 100JPY/USD | 100 JPY per USD | 100 JPY = 1 USD | USDJPY100 |
| AUD | 1.25AUD/USD | 1.25 AUD per USD | 1.25 AUD = 1 USD | USDAUD1.25 |
| GBP | 0.5GBP/USD | 0.5 GBP per USD | 0.5 GBP = 1 USD | USDGBP0.5 |
| RMB* | 6RMB/USD | 6 RMB per USD | 6 RMB = 1 USD | USDRMB6 |
| * Normal methods of quotation. | | | | |