	Reason to Hold Currency	**Important in...**	**Currency Will Appreciate If...**	**Equilibrium Condition**
Goods market	To acquire goods and services from that country	Long run (years to decades)	Lower prices Lower costs, esp. wages Higher productivity Higher quality/more desirable exports Greater natural resources Country has trade surplus	*Absolute PPP.*: Same price in all countries: Or *relative PPP*: prices move together across countries Balanced trade
Asset market	To acquire income-yielding asset in that country (bond, stock, business, land etc.)	Medium run (months to years)	Higher interest rates Higher profits (actual or expected) Asset prices expected to rise Assets seen as liquid, safe, secure, *and* greater fear/insecurity in markets	*Interest parity*: Equal interest rate across countries
Foreign exchange market	To profit from appreciation of currency	Short run (minutes to months)	It is expected to appreciate	Exchange rate follows *random walk*: impossible to predict future changes from current value

Relative prices of goods and services are most important in determining exchange rate changes over the long run; over medium periods, interest rates play a larger role, and over the short run exchange rate changes are dominated by speculation in the foreign exchange market.

Floating exchange rates are determined by market demand – by the desire to use one currency to buy a different one. There are three main reasons to buy a foreign currency. First, one might want to purchase goods or services from a country where that currency is used. Second, one might wish to buy an asset in a country where the currency is used, in order to receive an income from it – a bond which will yield interest payments, a stock which will yield dividends, a business which will yield profits, or real estate which will yield rents. Third, one might wish to hold the currency itself, in the hopes that it will increase in value, or appreciate. So we can think of demand for a currency coming from the goods market, from the asset market, and

Floating. Describes an exchange rate that is determined by private trading in the foreign exchange markets. The alternative is a fixed exchange rate, which is set by the government.

from the **foreign exchange** market.

A currency will **appreciate** when there is more demand for it relative to other currencies, and **depreciate** when there is less demand for it. So looking at the goods market, the asset market, and the foreign exchange market shows different reasons why a currency might change in value. When demand for different currencies is just balanced, there is no reason for any of them to change in value. We describe this as an **equilibrium**. We can also think of it as a "no-arbitrage" condition. **Arbitrage** means buying something where it is cheap and selling it where it is more expensive. For example, if a car from Japan costs less than an equivalent one made in the US, there is an "arbitrage opportunity" to buy cars in Japan and sell them in the US. Since Japanese cars are sold in yen, importing Japanese cars to the US requires selling dollars and buying yen. This increases demand for yen, and reduces demand for dollars, so over time, the yen will tend to gain value (or appreciate) and the dollar will tend to lose value. Since a rise in the value of the yen makes Japanese cars more expensive, eventually this exchange rate movement will make the cars from both countries equally expensive, eliminating the arbitrage opportunity. So one no-arbitrage or equilibrium condition for exchange rates is that similar goods have the same price everywhere. There are several different possible equilibrium conditions, as described in the table.

Foreign exchange. The money of a country other than one's own. The foreign exchange market is the activity – mostly carried out by large financial institutions – of trading one currency for another.

Appreciate. An increase in value of one currency relative to another one. We can also say it has gotten stronger.

Depreciate. An decline in value of one currency relative to another one. We can also say it has gotten weaker.

Equilibrium. A situation where, given the actions of everyone else, no one wants to change their own actions. Or, a situation that does not have any tendency to change on its own – that will persist until disturbed from outside.

Arbitrage. Taking advantage of two different prices for the same good or asset by buying it where the price is low and selling it where the price is high.

It is important to remember that no theory can predict foreign exchange movements with any precision. At best we can describe general tendencies.

In the long run, a country's currency should appreciate when its goods are cheaper than similar goods elsewhere, or when it runs a trade surplus.

Demand from the goods market depends on demand for a country's products. A country that produces higher-quality goods, or goods that are more desired in higher-income countries; that sees its prices fall, or at least rise more slowly than in its trade partners; a country that is more **competitive** – that is, that produces goods at lower cost thanks to lower wages or greater productivity; or a country that gains access to new natural resources, will see more demand for its goods, and will tend to see its currency appreciate. Another way of looking at it is that if for whatever reason a country sells more to the rest of the world than it buys from it – that is, runs a trade surplus – there will be more demand for its currency, and it will appreciate. While greater competitiveness and a trade surplus often go together, they are not the same thing, since other factors also influence the trade balance.

Competitiveness. The cost of producing a good in one country compared with the cost of producing similar goods elsewhere. A country will be more competitive if its costs – especially wages – are lower than elsewhere, or if its industries are more productive.

If we think of the goods market in terms of competitiveness, we will predict that exchange rates will adjust so that the same goods have the same real price everywhere. This prediction is **absolute purchasing power parity** (PPP). It says that over the long run, prices should converge to the same level elsewhere. (In other words, all **real exchange rates** should be equal to one.) This does not seem to be borne out in reality. A weaker prediction is **relative purchasing power parity**. This says that while price difference may exist between countries (for example, more labor-intensive goods will be cheaper in poor countries) these differences depend on economic "fundamentals" and will be stable over time. Relative PPP predicts that real exchange rates will be constant in the long run – that changes in nominal exchange rates will just offset differences in inflation rates between countries. There is better support for this version, especially when differences in inflation rates are large. A country with very high inflation will almost always have a depreciating currency in nominal terms, and vice versa.

Absolute purchasing power parity. The theory that over the long run, a representative basket of goods should have the same price in every country, regardless of what currency is used.

Real exchange rate. The price of a basket of goods in one country relative to the same basket in a different country. Or equivalently, the nominal exchange rate adjusted for inflation.

Relative purchasing power parity. The theory that differences between the price of a representative basket of goods in different countries depend on economic fundamentals and therefore should be stable over time. Equivalent to claim that real exchange rates will be constant.

If we think of the goods market in terms of the trade balance, we will predict that exchange rates will adjust to eliminate trade surpluses and deficits. Most economists believe that a weaker currency will boost exports and reduce imports, because it makes the country's goods cheaper relative to the rest of the world's. So if surplus countries see their currencies appreciate, and deficit countries see theirs depreciate, then eventually trade will be balanced everywhere. We can observe these tendencies in the real world, but they operate very slowly. A country that has a trade deficit for ten years will probably see its currency depreciate, but a country that has a trade deficit for just one year is as likely to see its currency gain or lose value.

In the medium run, a country's currency will appreciate when its assets becomes more attractive to foreign investors, and in particular when its interest rate rises relative to other countries'.

Demand from the asset market depends on the attractiveness of a country's assets to foreign investors. Businesses, banks and other financial institutions, and wealthy individuals have a choice about what country's assets to hold. In general, they will seek out assets which promise the highest return, but this may be balanced against other factors – investors may accept a lower **yield** on assets that are perceived as safer, more secure, or more **liquid**. For example, a pension fund or insurance company may have government bonds from a number of countries in its portfolio. When the managers of the fund decide which bonds to hold, they will look at the interest rates available in various countries. If bonds in one country now offer a

Yield. The income received by the owner of an asset – interest on a bond, dividends from a stock, rent from real estate, and so on. The total return on an asset is the yield plus capital gains.

Liquidity. The degree to which an asset can be used to make payments reliably and at short notice.

higher interest rate, they may decide to increase their holdings of bonds from that country. This will require them to first purchase the country's currency; increasing demand for it. Note that the current exchange rate does not matter in this case, since both the bond and its interest payments are denominated in the same currency.

While there are various different kinds of assets, we think that interest rates are most important for exchange rate movements. The decision to buy or establish a business in a foreign country depends on many factors, and takes a lot of preparation and planning; it can't be easily changed with every change in expected yield. Bonds, on the other hand, are held simply for income, not as part of a larger business plan, and they are easily bought and sold, so investors may try to change their bond holdings every time interest rates change. This means that higher interest rates will usually cause a currency to appreciate, as investors try to buy more of that country's bonds. Note that what matters is *relative* interest rates – interest rates in this country compared with the alternative. In Europe, this may mean bonds of other European countries, but elsewhere it usually means US treasury bonds. So an increase in interest rates in the US is likely to make bonds in countries like Turkey, Brazil, Indonesia less attractive, and cause their currencies to depreciate. And a decrease in interest rates here is likely to make those currencies appreciate.

Borrowing in a currency is the opposite of lending it – people try to borrow in countries where interest rates are low, and that reduces demand for their currency. Borrowing in a currency with low interest rates and lending in a different currency where interest rates are higher is known as the **carry trade**.

Carry trade. Borrowing in a currency with low interest rates and lending in a different currency where interest rates are higher.

Interest rates are not the only thing that affects asset demand. Safety (against financial risk), liquidity (the ability to easily sell the bonds, or convert them to some other currency), and security (against unfavorable changes in tax or regulation, or other government actions) make a country's assets more attractive. In recent decades, these factors have particularly favored the US – largely for these reasons, foreign investors are willing to hold US asset at an average return about 3 points below the return American investors receive on their investments abroad. A few other countries – Germany, Switzerland, Japan – benefit from a similar "safety premium." This factor is most important when investors are most frightened. So the dollar and similar currencies tend to appreciate when there is an increased perception of danger in financial markets. For example, there was a steep appreciation of the dollar (20 percent in one year) during the financial crisis of 2008-2009. Foreign investors may also buy assets with lower yield because they expect **capital gains** – an increase in the assets' price in the future. This is especially important for stock

Capital gain. Profit that comes from an increase in the price of an asset, rather than from the income it generates.

purchases. This factor is a source of instability in international financial markets, because expectations about capital gains can change rapidly.

If we focus on interest rates, then the simplest version of the equilibrium condition will be equal interest rates everywhere – as long as bonds yield more in one country than in another, investors will be selling the lower-yielding currency and buying the higher-yielding one. While the **interest parity condition** does not hold in this strong form, it is widely believed that there is some tendency for interest rates to converge between countries.

Interest parity. The theory that arbitrage across countries will result in expected returns being the same on similar bonds in all countries.

In the short run, changes in exchange rates are driven by speculation in foreign exchange markets. An implication of this is that short-run changes in exchange rates are random and unpredictable.

Speculation means buying something not in order to use it or get an income from it, but in the hopes of selling it later at a higher price. Many participants in the foreign exchange market are speculators – they hold foreign exchange not in order to use it to buy something else, but in the hopes that the currency itself will appreciate. Over the short run (periods much less than a year) this speculation is the dominant factor in exchange rate movements. In other words, the main reason why the dollar strengthened today, or the yen weakened over the past month, is changes in investors' beliefs about what those currencies are likely to do in the future.

Speculation. Buying an asset in order to resell it later at a higher price, rather than to use it or get an income from it.

Speculation dominates exchange rate movements because the gains from correctly guessing exchange rate changes are very large. For example, on March 30, 2016 the dollar **index** declined in value by one percent. That is equivalent to an annual return of 3,700 percent! So if you are buying and selling foreign exchange every day, it makes sense to focus on predicting future exchange rates. For instance, if you are confident that the dollar-euro exchange rate next week will be $1.20 per euro, then you will want to buy euros and sell dollars if the exchange rate today is $1.10 per euro, and sell euros and buy dollars if the exchange rate today is $1.30 per euro. Since in the first case you expect the euro to appreciate against the dollar, and in the second case you expect it to depreciate.

Exchange rate index. The average of a country's exchange rate against a number of other currencies.

The dominance of speculation in foreign exchange markets implies that short-term exchange rate changes follow a **random walk** – that is, they are fundamentally unpredictable. Consider the euro-dollar case just described. If the dollar-euro exchange rate today is $1.30 per euro, but most market participants think that next week it will be $1.20 per euro, then they will try to sell euros and buy dollars (since the euro is worth more dollars today than they expect it to

Random walk. A statistic whose future changes cannot be predicted from its current or past values. If a variable follows a random walk, then the best guess for its future value is always its current value, whatever that may be.

be next week). But if most people in the market are trying to sell euros and buy dollars, then the value of the euro will fall against the dollar. Similarly, if most market participants expect the euro to appreciate next week, they will buy euros today – causing the euro to appreciate today. If markets are dominated by speculation, then the only exchange rate than can be stable is the same exchange rate that is expected to hold in the near future. Some traders may expect a change in one direction, some may expect a change in the other direction, but the market as a whole must expect the same exchange rate tomorrow as today. And if today's exchange rate is always equal to the best guess of tomorrow's, it follows that the best guess for tomorrow's exchange rate is today's – that is, we cannot predict appreciation or depreciation based on today's exchange rate. This is the definition of a random walk – you cannot predict future changes based on today's value.

The view that exchange rates follow a random walk in the short run is well supported by the data. The same behavior is found in other markets will most trades are for speculation, such as stock markets. But the fact that exchange rates or stock prices follow random walks in the short run does not mean they are unpredictable over longer periods. While it is easy to bet on the value of a stock or exchange rate tomorrow, or next week, or next month, it is harder to speculate on prices many years from now. So there is no contradiction between saying that exchange rates are completely unpredictable in the short run, and that they respond predictably to interest rates, competitiveness and the trade balance over longer periods. Speculators may also take these longer-run factors into account when guessing about future exchange rate movements. For instance, the value of a currency is often affected by changing expectations about interest rates in that country over coming months.