



Exchange Rates and Parities

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Photo

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The role of nominal exchange rates

The prices of the goods and services and financial assets exchanged in international markets are measured in different national currencies (euro, dollar, yen, yuan,...).

Thus, international transactions require the exchange rates which determine the price at which different currencies are exchanged.

The nominal exchange rate (e) is the relative price of one currency in terms of another currency.

Nominal exchange rate

The exchange rate can be quoted directly or indirectly.

The quote is **direct** when the price of one unit of foreign currency is expressed in terms of the domestic currency. For example, $e_{\text{€}/\$} = 2 \text{ €}/\$$ means that 2 euros can be exchanged for 1\$.

The quote is **indirect** when the price of one unit of domestic currency is expressed in terms of foreign currency. The same exchange rate can be quoted indirectly in the following way: $e_{\text{\$/€}} = 0,5 \text{ \$/€}$, which means that 0,5\$ can be exchanged for 1 euro.

Pay attention to how the exchange rates are expressed!

Foreign exchange markets

The nominal exchange rate is determined on the foreign exchange market:

- Demand of foreign currency (Supply of domestic currency):

When the residents want to purchase foreign goods and services or foreign assets, they need to pay for them by using foreign currency (i.e. US dollars). Thus, residents will exchange euros per dollars in the foreign exchange market (offer euros and demand dollars).

- Supply of foreign currency (Demand of domestic currency):

When foreigners want to buy national goods and services or national assets, they need to pay us in our national currency (i.e. euros). Thus, foreign consumers will exchange dollars per euros in the foreign exchange market (offer dollars and demand euros).

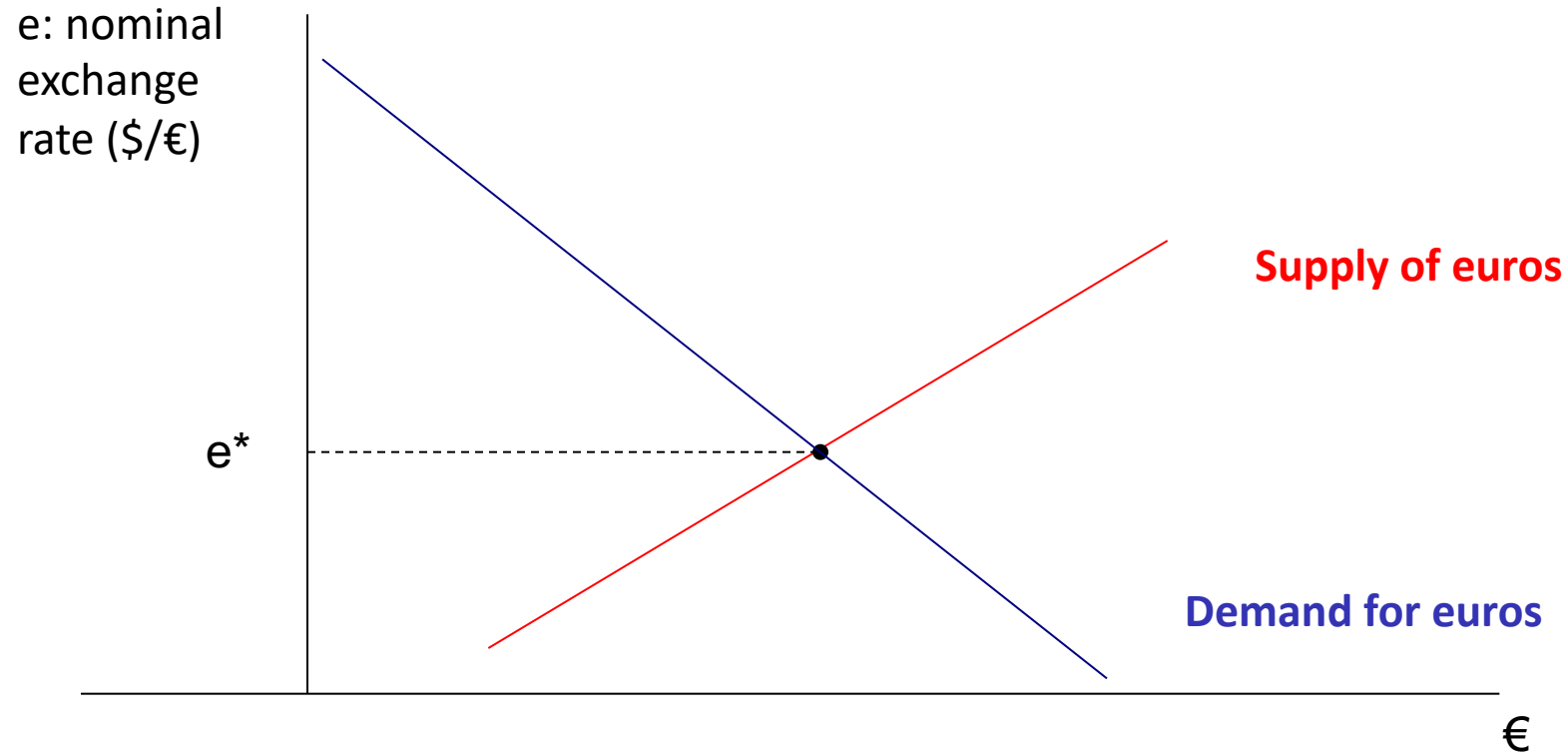
Foreign exchange markets

Supply of dollars (Demand for euros)	Demand for dollars (Supply for euros)
EU export	Import from US
Capital inflows	Capital outflows

$$\text{Exports} + \text{Capital inflows} = \text{Imports} + \text{Capital outflows}$$

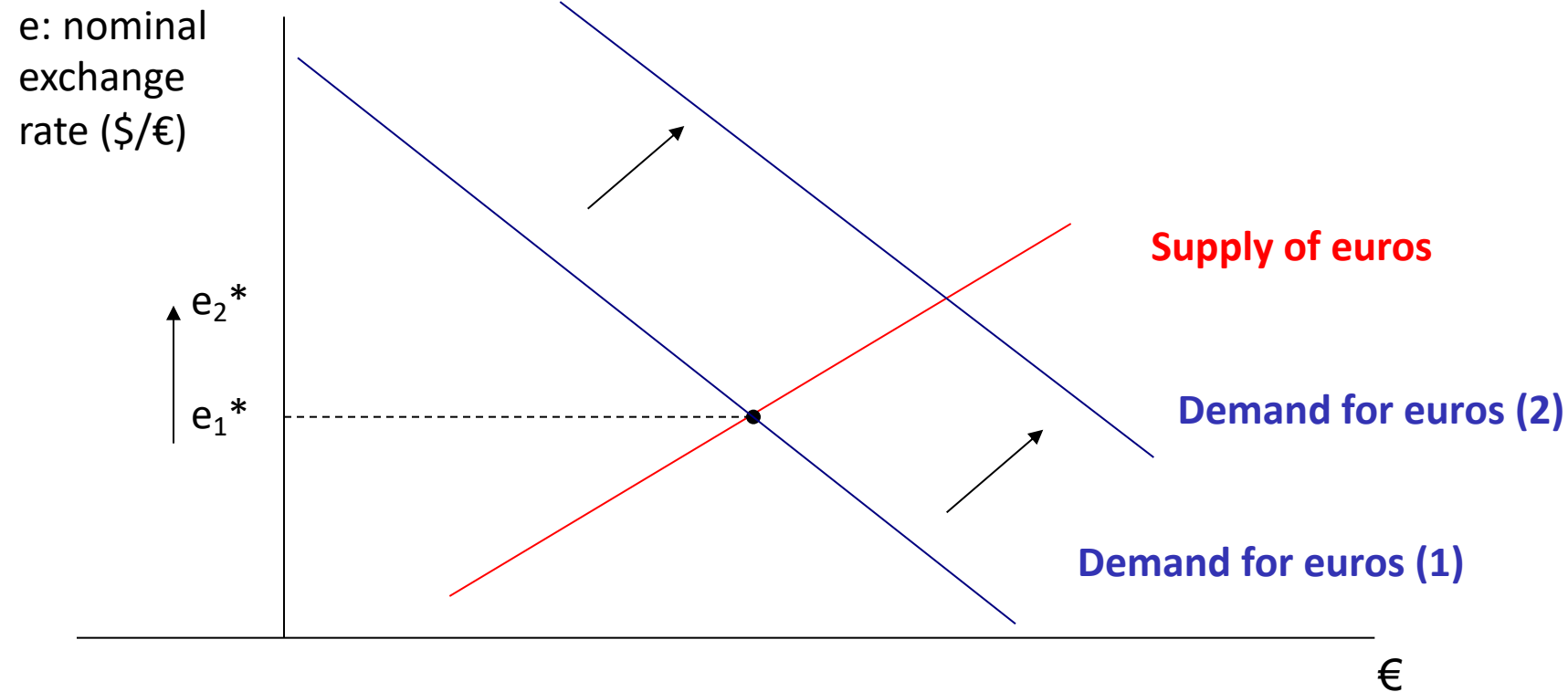
The balance of payments is an accounting of a country's international transactions over a certain time period, typically a calendar quarter or year. It shows the sum of the transactions between individuals, businesses and government agencies in that country and those in the rest of the world.

Foreign exchange market



The equilibrium exchange rate is an exchange rate at which quantity of euros demanded and supplied on foreign exchange markets is equal: $e^* = 1.25 \text{ \$/}\epsilon$

Changes in nominal exchange rate



An increase in German exports implies an increase in the demand of euros on foreign exchange markets. As a result, $\$/\epsilon$ exchange rate increases ($e^* \uparrow$): $e^* = 1.5 \ \$/\epsilon$

Changes in nominal exchange rate

When a currency becomes more valuable in terms of the other currency, it appreciates:

- $e^* \uparrow$ implies that euro appreciates related to dollar.

When a currency becomes less valuable in terms of other currency, it depreciates:

- $e^* \downarrow$ implies that euro depreciates related to dollar.

Note: Sometimes the exchange rate is measured as the price of a euro in terms of foreign currency and other times it is measured as the price of a foreign currency in terms of euro. Pay attention to how the exchange rates are expressed!

Changes in nominal exchange rate

EUR / USD

1,1016 ↑ 19,03 % +0,1761 Màx.

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Real exchange rate

The real exchange rate (R) is the relative price of national goods and services in terms of foreign goods and services (both measured at the same currency):

$$R = \frac{e_{\text{yen/euro}} \times P}{P^*}$$

where P is a price of national goods, P* is price of foreign goods.

Example: One Big-Mac costs 390 yens in Japan and 4,21 euros in Euro Area. Given nominal exchange rate e = 148 yen/euro, the real exchange rate is

$$R = 148 * 4,21 / 390 \\ = 1,6$$

Real exchange rate

If the real exchange rate decreases ($\downarrow R$), goods and services produced domestically become cheaper to foreign consumers. Thus, exports increase and imports decrease ($\uparrow NX$) and our competitiveness on international markets increases.

If the real exchange rate increases ($\uparrow R$), goods and services produced domestically become more expensive to foreign consumers. Thus, exports decrease and imports increase ($\downarrow NX$) and our competitiveness on international markets decreases.

Therefore, net exports are **inversely related** to the real exchange rate.

Purchasing power parity

PPP is a currency conversion rate that reflects the purchasing power of each currency in its respective country.

Purchasing Power Parity shows the rate at which two currencies should be exchanged to acquire an identical basket of goods and services in the two countries (each currency's purchasing power are equivalent).

In another way, the purchasing power parity is the currency conversion rate that eliminates the differences in price levels between countries.

Purchasing power parity

What does a nominal exchange rate of 0,9\$/€ mean?

- 0,9\$ can be acquired for 1€

What does a PPP of 0,9\$/€ mean?

- It means that what costs 0,9\$ in the U.S., approximately costs 1€ in Germany. With 0,9\$ a US citizen can acquire the same quantity of goods and services as a German citizen with 1€

Additionally, the ratio PPP/nominal exchange rate gives us the relative price level between countries.

	Price of the Big-Mac in n.m.u.	Effective exchange rate (n.m.u./\$)	Price of the Big-Mac in US\$	PPP (n.m.u./\$)
United States (US\$)	5,81	-		
Brazil (real)	22,9	5,31		
China (yuan)	24,4	6,37		
Norway (norwegian krona)	57	8,92		
Euro area (euro)	4,42	0,89		

Source: *The Economist* (Jan 2022)

n.m.u.: national monetary units

In which country the burger is more expensive?

	Price of the Big-Mac in n.m.u.	Effective exchange rate (n.m.u./\$)	Price of the Big-Mac in US\$	PPP (n.m.u./\$)
United States (US\$)	5,81	-	5,81	
Brazil (real)	22,9	5,31	4,31	
China (yuan)	24,4	6,37	3,83	
Norway (norwegian krona)	57	8,92	6,39	
Euro area (euro)	4,42	0,89	4,97	
Source: <i>The Economist</i> (Jan 2022)				
n.m.u.: national monetary units				

At what exchange rate the Big Mac would cost the same in each country?

	Price of the Big-Mac in n.m.u.	Effective exchange rate (n.m.u./\$)	Price of the Big-Mac in US\$	PPP (n.m.u./\$)
United States (US\$)	5,81	-	5,81	1
Brazil (real)	22,9	5,31	4,31	3,94
China (yuan)	24,4	6,37	3,83	4,20
Norway (norwegian krona)	57	8,92	6,39	9,81
Euro area (euro)	4,42	0,89	4,97	0,76
Source: <i>The Economist</i> (Jan 2022)				
n.m.u.: national monetary units				

How is the price level in each one of these countries w.r.t. US?

	Price of the Big-Mac in n.m.u.	Effective exchange rate (n.m.u./\$)	Price of the Big-Mac in US\$	PPP (n.m.u./\$)	Price level
United States (US\$)	5,81	-	5,81	1	1
Brazil (real)	22,9	5,31	4,31	3,94	0,74
China (yuan)	24,4	6,37	3,83	4,20	0,66
Norway (norwegian krona)	57	8,92	6,39	9,81	1,10
Euro area (euro)	4,42	0,89	4,97	0,76	0,85
Source: <i>The Economist</i> (Jan 2022)					
n.m.u.: national monetary units					

Conclusion

- Nominal exchange rate is a price of one currency in terms of the other currency. Nominal exchange rates are determined on the foreign exchange markets as a result of interaction of demand and supply
- Real exchange rate is a relative price of domestic goods and services in terms of foreign goods and services. Fluctuations in real exchange rates determine the competitiveness of domestically produced goods and services on international markets
- Purchasing power parity exchange rates are currency conversion rates that eliminate the differences in price levels between countries.