Relative purchasing power parity

- It is a dynamic version of (absolute) purchasing power parity that links the change in the exchange rate with the foreign and domestic inflation rates.

- Define the <u>appreciation rate</u> as $E = \frac{e-e_{-1}}{e_{-1}}$ (this is just the rate of change of the exchange rate).

- According to purchasing power parity, $e \approx e_{PPP} = \frac{P^*}{P}$. Therefore, $E \approx \pi^* - \pi$, where π^* is the rate of change of P^* (the foreign inflation rate) and π is the rate of change of P (the domestic inflation rate).

Interpreting RPPP

- RPPP states that $E \approx \pi^* - \pi$: the rate of appreciation of a curreny is approximately equal to the differen-ce between foreign and domestic inflation rates.

- For instance, if $\pi > \pi^*$ (eurozone inflation rate higher than the US inflation rate), then the euro must depreciate ($E < 0$) against the dollar: if the cost of purchasing the eurozone representative basket of goods increases more than the cost of purchasing the US representative basket, then a depreciation of the euro with respect to the dollar is needed to bridge the gap. With $\pi = 5\%$ and $\pi^* = 3\%$, the euro must depreciate by about 2% .

Uncovered interest parity

- Let bank deposits constitute the representative financial asset in two economies. Bank deposits (i) can be freely created and liquidated in both economies and (ii) are perfect substitutes for each other (deposits have the same characteristics in the two economies except possibly for the interest rate).

- The (uncovered) interest parity relates the interest rates of the two economies (identified with the interest rates of bank deposits) and the expected evolution of the exchange rate. The parity then relates the domestic and foreign prices of currency.

Explaining the interest parity /1

- Let i be the interest rate of the domestic bank deposit (the eurozone interest rate) and i^* the interest rate of the foreign bank deposit (the US foreign interest rate). Suppose I want to deposit €1 at a bank.
- Option 1: to deposit at a domestic bank. The return of this operation is €$(1+i)$ at period $t+1$.
- Option 2: to deposit at a US bank. The euro must first be converted into dollars. Given the exchange rate e (in \$/€) at t, €1 becomes \$$e$. A deposit of \$$e$ at a US bank yields \$$(1+i^*)\cdot e$ at $t+1$. If at t I expect e^e at $t+1$, \$$(1+i^*)$ would be €$(1+i^*)\frac{e}{e^e}$.

Explaining the interest parity /2

- The interest parity holds that the outcome of the two options should be the same: $1 + i = (1 + i^*)\frac{e}{e^e}$.

- The parity is termed "uncovered" because the value $(1 + i^*)\frac{e}{e^e}$ is not certain: it is an <u>expected value</u> that depends on the expectation e^e.

- Define the <u>expected appreciation rate</u> as $E^e = \frac{e^e - e}{e}$, where e is the actual exchange rate at t and e^e is the value that is believed at t that the exchange rate will have at $t + 1$. Hence, $E^e = \frac{e^e}{e} - 1$ and $\frac{e}{e^e} = \frac{1}{1+E^e}$.

Explaining the interest parity /3

- The exact form of the interest parity is then

$$(1+i)(1+E^e) = (1+i^*).$$

- When all the rates are small enough, a good approximation is $i + E^e \approx \; i^*$. That is why the interest parity condition is typically expressed as

$$E^e \approx i^* - i.$$

- This says that the expected appreciation rate of the euro with respect to the dollar is approximately equal to the difference between the US interest rate and the eurozone interest rate.

Interpreting the interest parity

- When $i^* > i$, financial investment in the US is more attractive that in the eurozone. To offset the disavantage, an appreciation of the euro must be expected: $i^* > i$ implies $E^e > 0$.

- Converserly, if it is believed that the euro will appreciate ($E^e > 0$), $i^* > i$ is necessary to compensate the loss Europeans incur when they convert in euros the profits obtained in the US.

- Let $i = 10\%$, $e = 2\,\$/€$, and $e^e = 1.92\,\$/€$. This means that $E^e = \frac{1.92-2}{2} = -0.04$ (or -4%). Hence, $i^* \approx E^e + i = -4 + 10 = 6$.