

Nominal and Real Interest Rate

Macroeconomics /Global Economics

Nominal v. Real Interest Rates

- **Nominal interest rate** : The interest rate in terms of the national currency. It tells us how many euros (for example) one has to repay in the future in exchange for borrowing 1 euro today BAG 2013, p. 271
- **Real interest rate** : The interest rate in terms of goods. It tells us how many goods one has to repay in the future in exchange for borrowing the equivalent one good today, BAG 2013, p. 572.

Nominal v. Real Interest Rates

Definition and Derivation of the Real Interest Rate

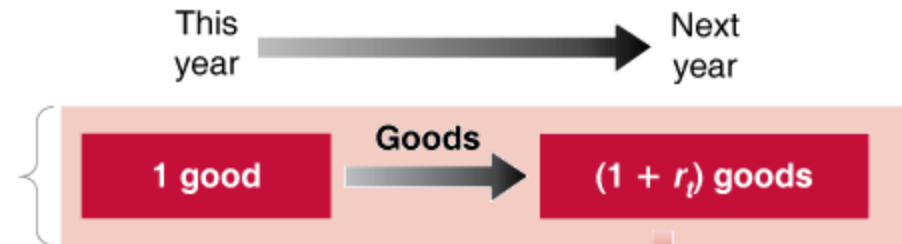
i_t = nominal interest rate

r_t = real interest rate

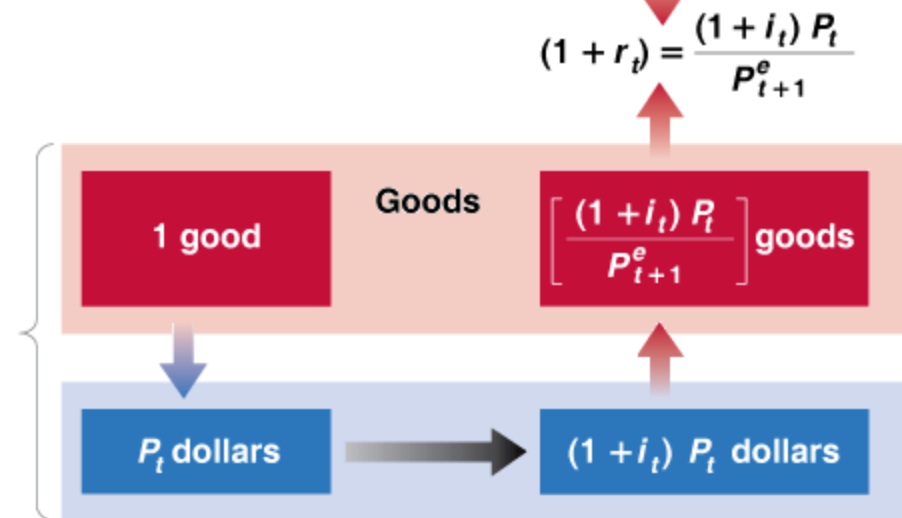
P_t = current price level

P_{t+1}^e = expected price level

Definition of the real rate:



Derivation of the real rate:



SOURCE: Figure 11.2, BAG 2013

Nominal v. Real Interest Rates

From

$$1 + r_t = (1 + i_t) \frac{P_t}{P_{t+1}^e}$$

given the definition of inflation

$$\pi_{t+1}^e \equiv \frac{(P_{t+1}^e - P_t)}{P_t} \quad \text{therefore} \quad \frac{P_t}{P_{t+1}^e} = \frac{1}{(1 + \pi_t^e)}$$

$$1 + r_t = (1 + i_t) \frac{P_t}{P_{t+1}^e}$$

If the nominal interest rate and the expected rate of inflation are sufficiently small then the real interest rate is simply:

$$r_t \approx i_t - \pi_{t+1}^e$$

Nominal v. Real Interest Rates

$$r_t \approx i_t - \pi_{t+1}^e$$

Clearly

— If

$$\pi_t^e = 0 \Rightarrow i_t = r_t$$

— If

$$\pi_t^e > 0 \Rightarrow i_t > r_t$$

— If for a given nominal interest rate the expected rate of inflation increases, then the real interest rate decreases.

$$\bar{i}_t \Rightarrow \uparrow \pi_t^e \rightarrow \downarrow r_t$$