

# Lecture 23

Money and Banking, Econ 345

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## A model of inside and outside money

- 2-period OLG model with fiat money, deposits, capital
  - details in the textbook
- Workers deposit  $s_i$  units of good with bankers at rate  $r^*$ 
  - $s_i$  ranges from large to small depending on individual endowment
- Bankers provide loans to entrepreneurs at rate  $r$
- Entrepreneurs invest in capital at rate  $x$
- Perfect competition (among entrepreneurs, among bankers) implies that

$$r = x$$

$$r^* = x$$

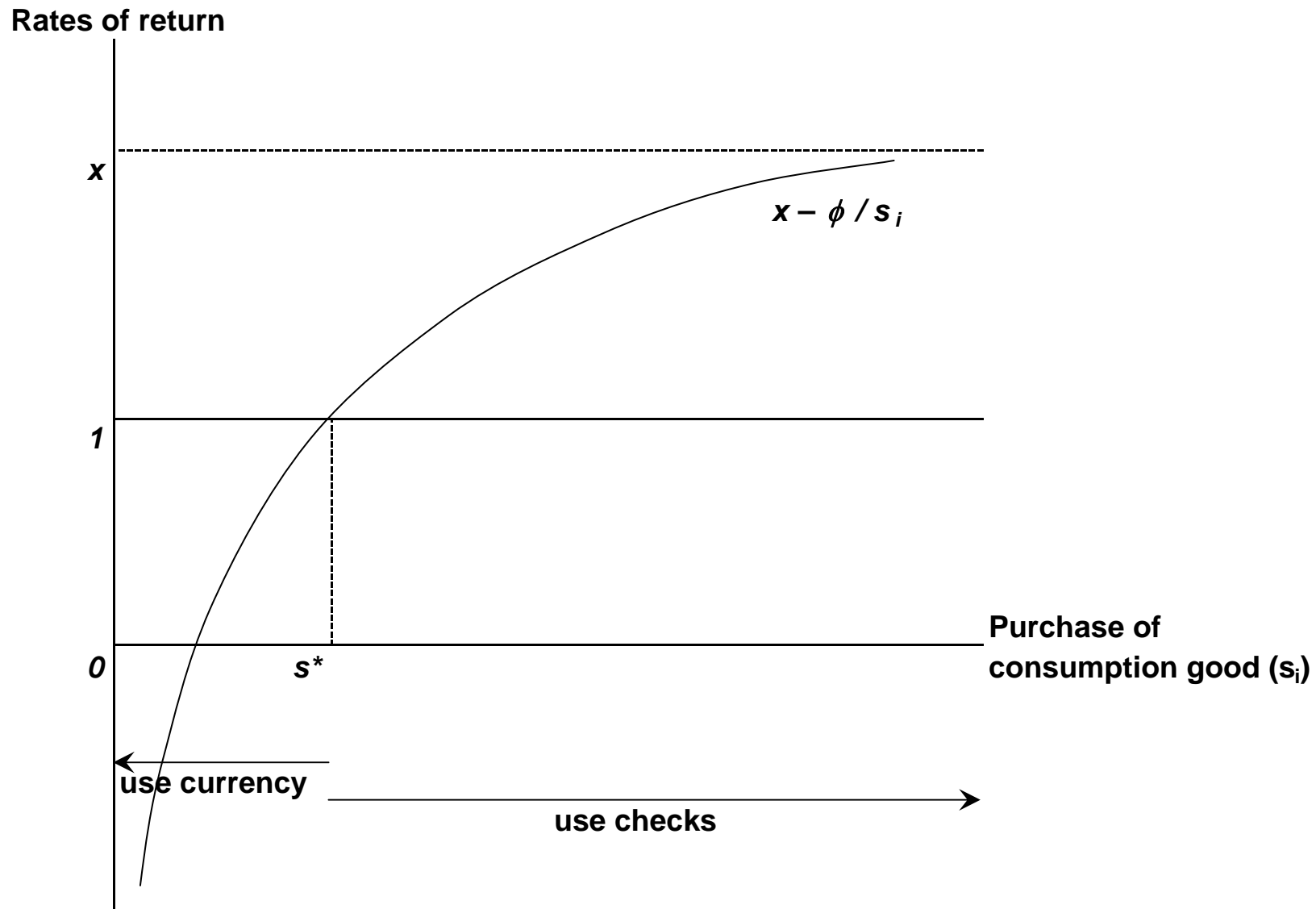
- Assume entrepreneurs cannot directly borrow from workers
- Transaction cost  $\phi$  on using deposits

## Average return on deposits

$$\Delta = \frac{xs_i - \phi}{s_i} = x - \frac{\phi}{s_i}$$

- if transaction cost is large, return  $\Delta$  is small, so acquire fiat money
- if transaction cost is small, return  $\Delta$  is large, so deposit with banker
- Let  $H_t$  denote real total inside money balances in  $t$
- Let  $Q_t$  be real total fiat money balances in  $t$
- Deposit-to-currency ratio is  $H_t/Q_t$

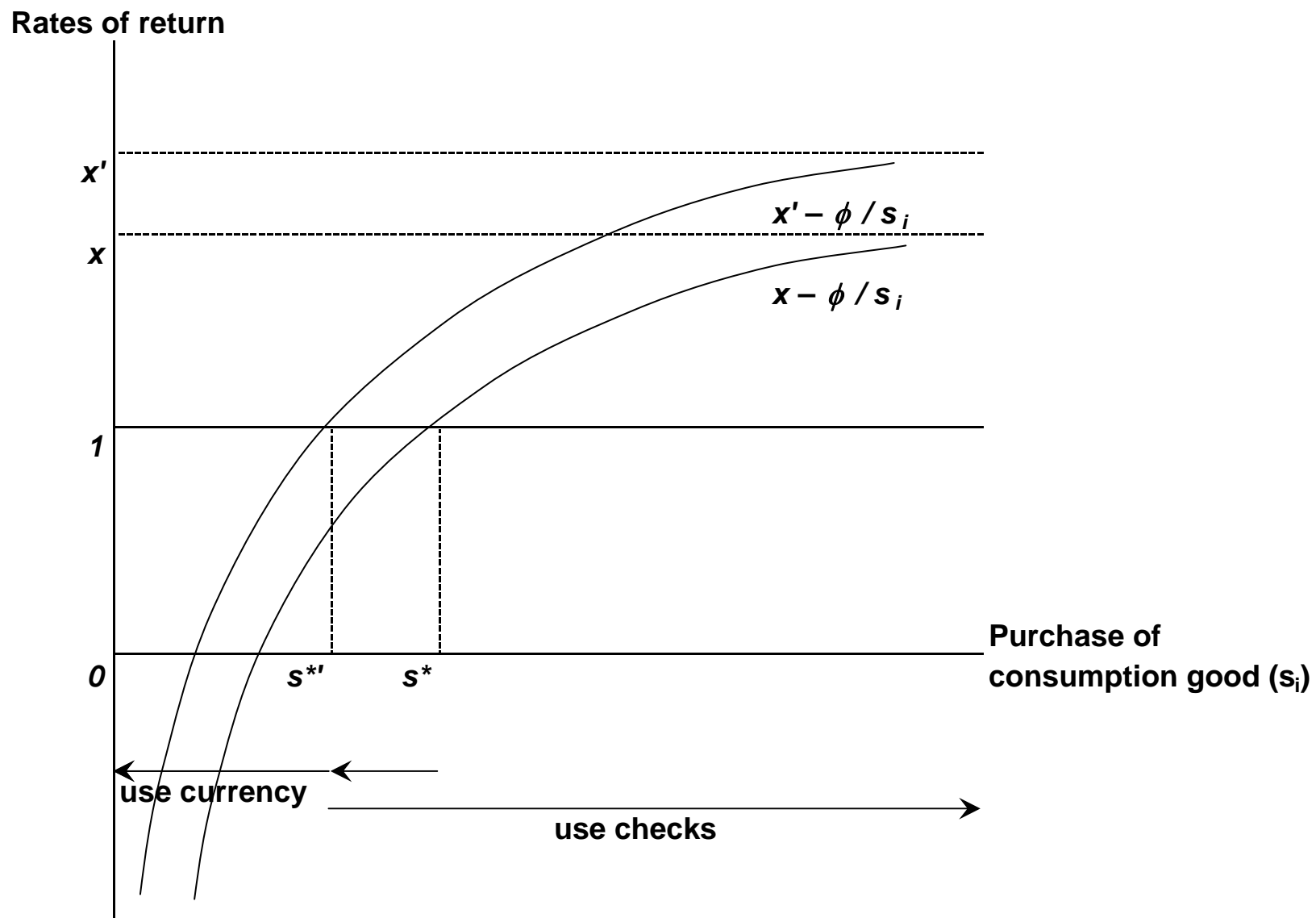
# The choice of using currency versus checks



# Macroeconomic variables

- Price level:  $p_t = \frac{M_t}{Q_t}$
- Total money supply:  $M1_t = M_t + p_t H_t = M_t \left[ 1 + \frac{H_t}{Q_t} \right]$
- Money multiplier  $1 + \frac{H_t}{Q_t}$  depends on deposit-currency ratio
- Money multiplier is no longer constant
  - depends on  $x, \phi$ , preferences, endowments

# Unanticipated increase in return on capital



## Effects of increase in capital productivity, $x$

- Deposits rise,  $H_t \nearrow$ , fiat money demand falls,  $Q_t \searrow$ 
  - money multiplier rises,  $1 + \frac{H_t}{Q_t} \nearrow$  (see figure)
- Price level rises (despite constant  $M_t$ ),  $p_t = \frac{M_t}{Q_t} \nearrow$
- Total money stock rises,  $M1_t = M_t \left[ 1 + \frac{H_t}{Q_t} \right] \nearrow$
- Investment in capital rises
  - Direct investment rises (bc higher return),  $K_t \nearrow$
  - Indirect investment rises (via bank loans),  $H_t \nearrow$
- Output rises,  $GDP_t = N_t y + x' H_t + x' K_t$ 
  - $x' \nearrow$ ,  $H_t \nearrow$ ,  $K_t \nearrow$