INTERMEDIATE MACROECONOMICS

IS-LM MODEL OF BUSINESS CYCLES

9. LM SUBMODEL

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TWO TYPES OF ASSETS

1. money: used for transactions but pays no interest

    - currency: coins & bills

    - checkable deposits: funds deposited in accounts at banks and other financial institutions against which checks can be written

2. bonds: pay a positive rate of interest (i) but cannot be used for transaction

- how do people allocate wealth between money & bonds?

DEMAND FOR MONEY FROM TRANSACTIONS

- people want to avoid selling bonds whenever they need money for transaction: people hold more money when they conduct more transactions
    - you have $50,000 in wealth and spend $3,000 a month
    - maybe you need 2 months of spending on hand
    - you keep in money: 2 × $3,000 = $6,000
    - you invest in bonds: $50,000 – $6,000 = $44,000
    - you would keep more money if you spent more

INTEREST RATE

- bonds pay an interest rate: the higher the interest rate, the more beneficial it is to hold bonds, and the more costly it is to hold money
  - bonds are held through money-market mutual funds
  - in the early 1980s, the interest rate on money-market funds reached 14% per year: people moved their wealth from checking accounts to these funds to earn interest
  - today interest rates are much lower (~0%) so it makes less sense to hold bonds in money-market mutual funds

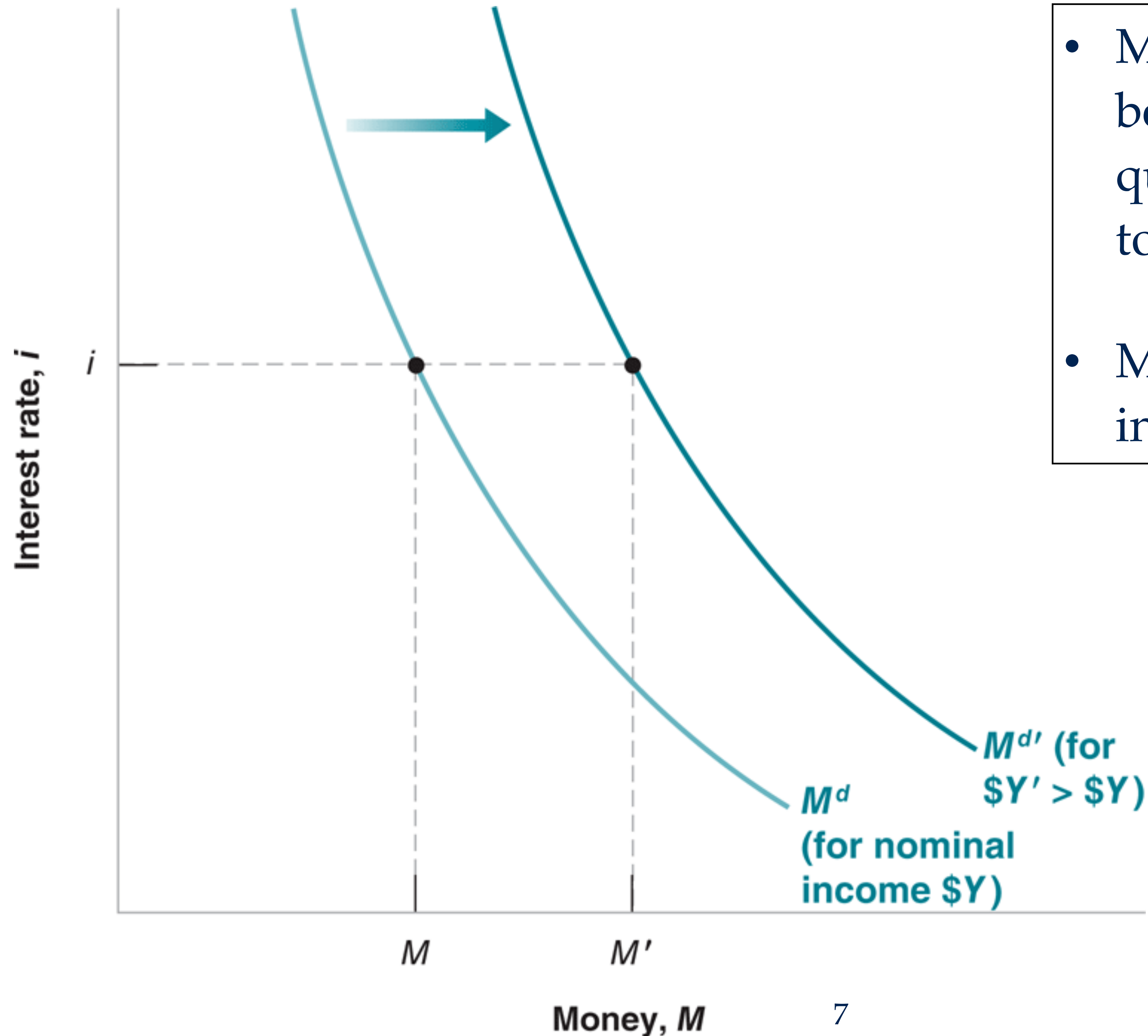
PRICE OF BONDS

- suppose a bond promises to pay $100 a year from now
- the price of the bond today is $P
- the interest rate i is the return on the investment of $P
    - by definition of a rate of return: $i = (100 - P)/P$
    - equivalently, $(1+i) \times P = 100$
    - bond price and interest rate are directly related: $P = 100 \ / \ (1+i)$
- higher bond price —> lower interest rate (lower return)
- lower bond price —> higher interest rate (higher return)

THE DEMAND FOR MONEY

- money demand increases with income (Y) but decreases with interest rate (i)
  - because more income means more transactions
  - and a higher interest rate makes holding money more costly relative to bonds
- shape of money demand: $M^d(i,Y) = Y \times L(i)$ with $L'(i) < 0$
  - Y: income in the economy
  - i: interest rate on bonds
  - L(i) : the fraction of income that consumers hold in money to conduct transactions (decreasing in interest rate i)

THE DEMAND FOR MONEY



- M^d is a demand curve because it links a quantity demanded (M) to a price (i)
- M^d is decreasing in i but increasing in Y

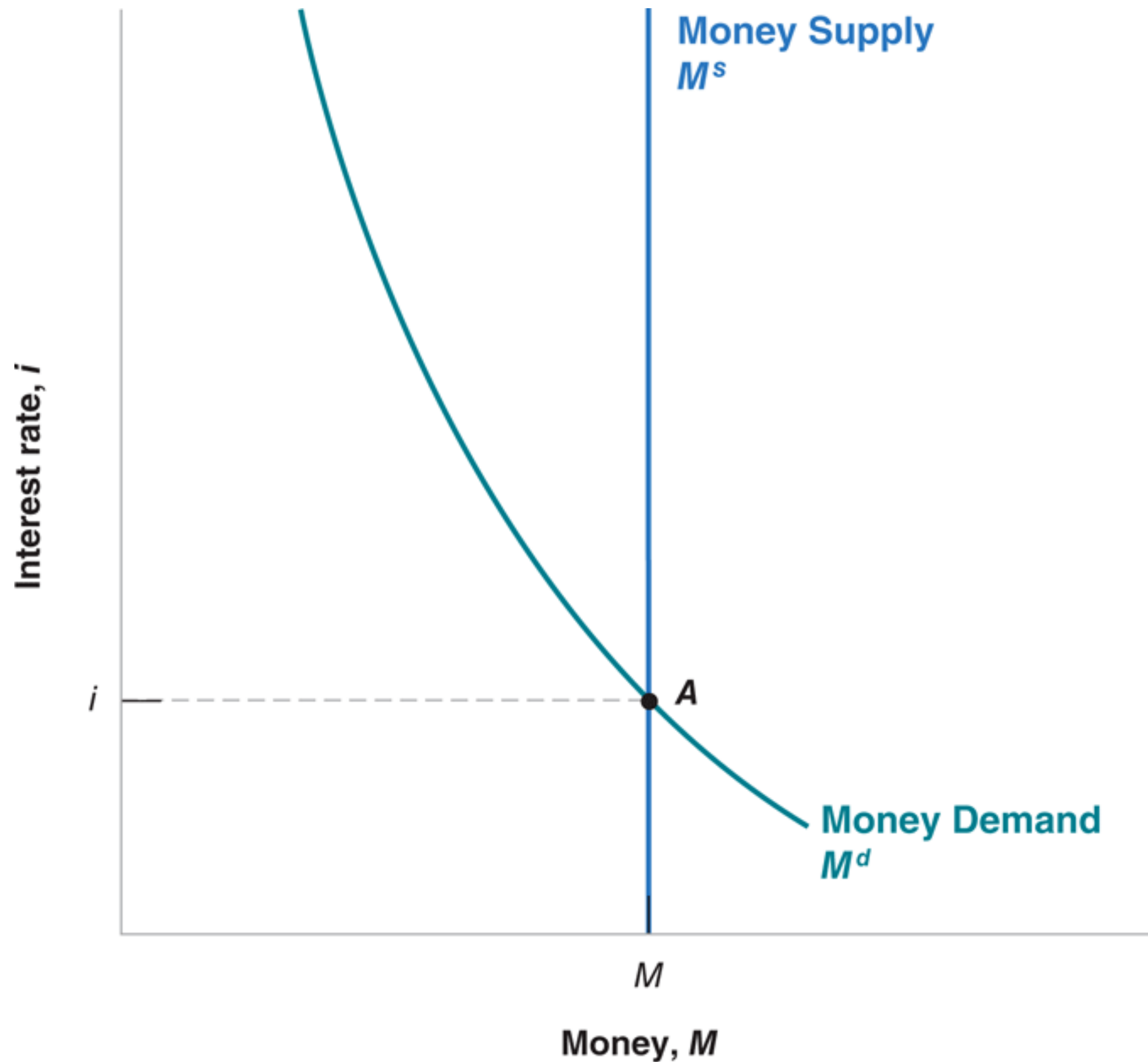
THE SUPPLY OF MONEY

- in reality, 2 types of money:
  - currency supplied by the central bank
  - checkable deposits supplied by banks
- assumption for now: the only money is currency
- the central bank supplies a quantity of money $M > 0$
  - then the money supply is $M^s = M$

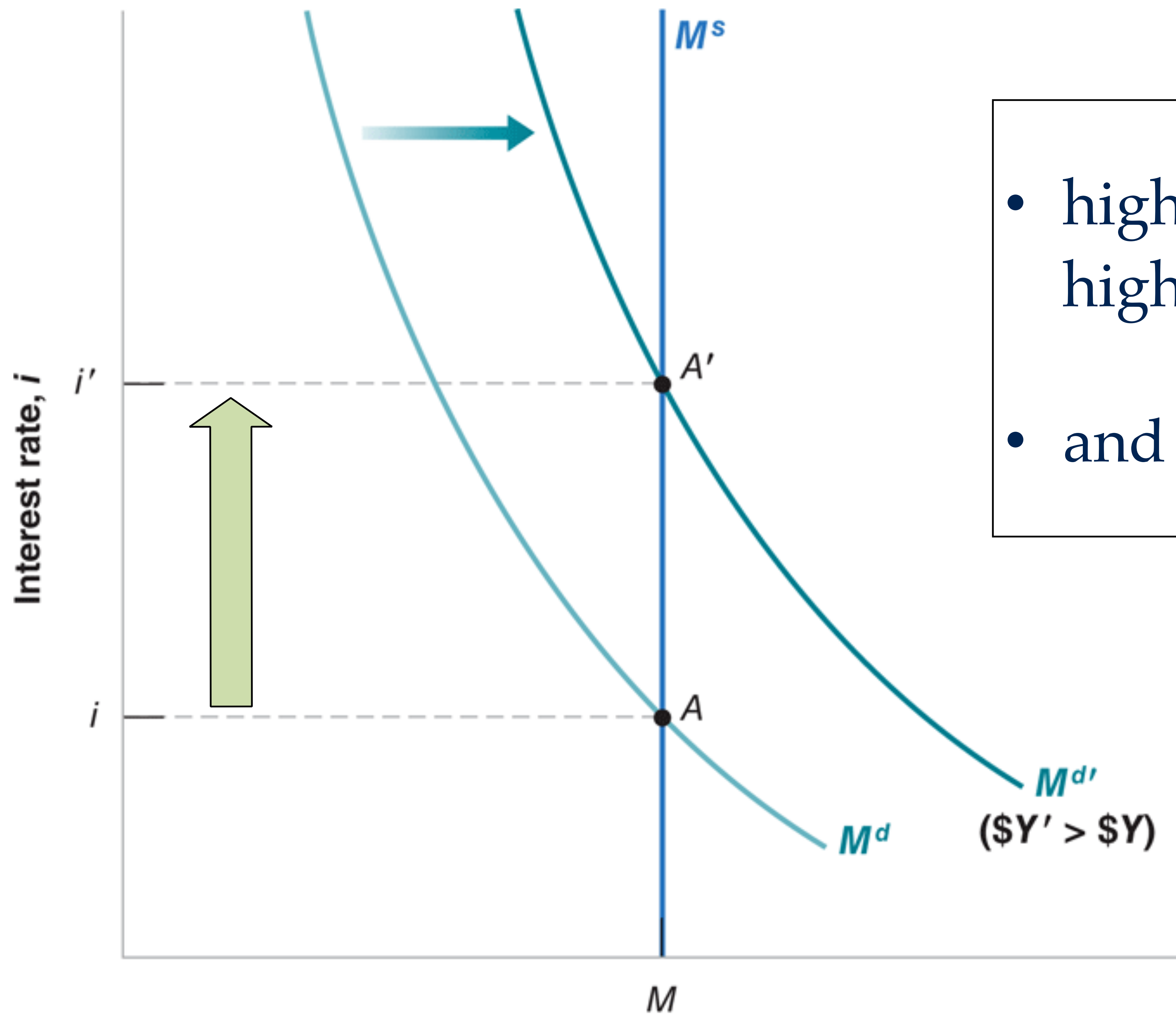
MARKET-CLEARING CONDITION

- the money market clears:
  - money supply = money demand
  - $M^s = M^d(i,Y)$ so $M = Y \times L(i)$
  - the market-clearing condition determines the interest rate i
- when the money market clears:
  - consumers are willing to absorb all the currency circulated by the central bank
  - consumers are able to get all the currency they desire

LM EQUILIBRIUM DIAGRAM

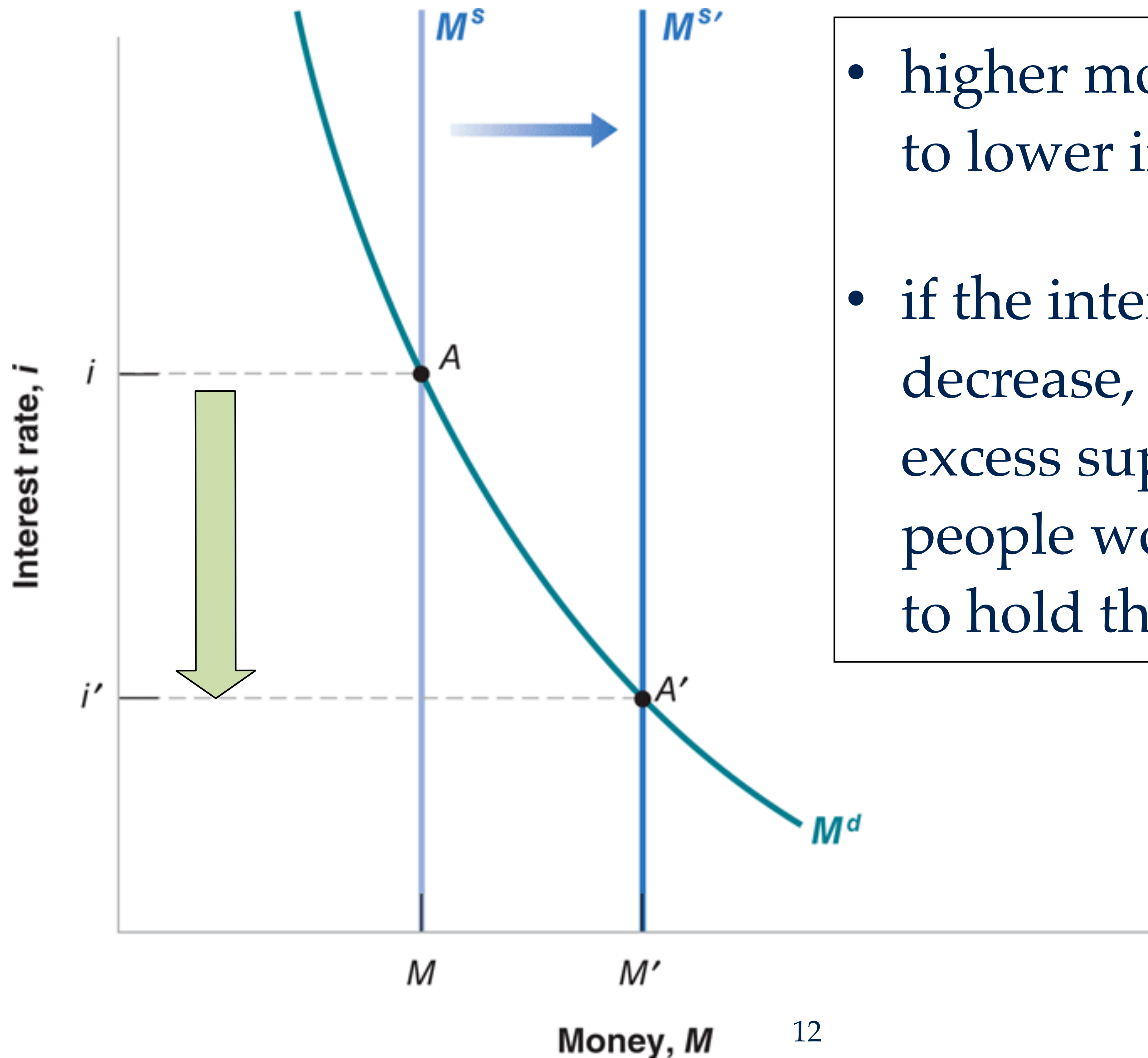


INCREASE IN INCOME



- higher income leads to higher money demand
- and higher interest rate

INCREASE IN MONEY SUPPLY



- higher money supply leads to lower interest rate
- if the interest rate did not decrease, there would be an excess supply of money: people would be unwilling to hold the extra money