

International Finance

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#3. Chapter 3: The determination of the exchange rate: an asset market approach

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Introduction

- We learned in Chapter 1:
 - The exchange rate is determined by (1) the interest rates of two countries and (2) the expected future exchange rate.
- For further understanding of EXR:
 - How the interest rate is determined (domestic → money market).
 - What affects the expectations about future exchange rates.

Outline

- Money (definition, etc.)
- Aggregate real money demand
- Equilibrium in the money market
- Simultaneous equilibrium in forex and money markets
- The Money Supply and the Exchange Rate in the Short Run
- Money, the Price Level, and the Exchange Rate in the Long Run
- Inflation and Exchange Rate Dynamics

Money

- Roles of Money:
 - Medium of Exchange (means of payment)
 - Unit of Account (measure of value)
 - Store of Value (money is held to transfer purchasing power from the present into the future).
- Definition of Money:
 - Money supply = the monetary aggregate, M1 (the total amount of currency and checking account deposits held by households and firms).

Money Supply

- How the money supply is determined:
 - Money supply is controlled by the central bank.
 - Assumption: the central bank simply sets the size of the money supply at the level it desires.
- Note: Although the procedures of controlling money supply are in fact more complex, we make this assumption.)

Money Demand

- The Demand for Money by Individuals:
 - Determined by (1) the expected return on assets, (2) the riskiness of the assets' return, (3) the assets' liquidity.
- The Aggregate Money Demand:
 - The determinants can be derived on the analogy of the Individuals' demand for money.

Aggregate Money Demand

- Three main factors determine aggregate money demand (M_d ; the total money demand in the economy).
 1. The interest rate. (R rises $\rightarrow M_d$ falls)
 2. The price level. (P rises $\rightarrow M_d$ rises)
 3. Real national income (Y rises $\rightarrow M_d$ rises)
- Aggregate money demand equation:
 $\rightarrow M_d = P \times L(R, Y) \quad <14-1>$

Aggregate Real Money Demand

- Aggregate Real Money Demand (by rearranging <14-1>):

$$M_d/P = L(R, Y) \quad <14-2>$$

→

- Why M_d is assumed to be proportional to the price level (P)?
 - If all prices doubled, other things being equal, the money value of individuals' transactions would simply double.

Aggregate Real Money Demand (cont'd)

- Fig. 14-1 shows:
 - How aggregate real money demand is affected by the interest rate, given a fixed level of real income.
- Fig. 14-2 shows:
 - How changes in real income causes the schedule to shift.

Interaction of Money Supply and Demand

- Equilibrium in the money market:

$$\rightarrow M_s = M_d \quad \langle 14-3 \rangle$$

$$\rightarrow M_s/P = L(R, Y) \quad \langle 14-4 \rangle$$

- Fig. 14-3:

- The aggregate real money demand schedule intersects the real money supply schedule to give an equilibrium interest rate.
- If there is initially an excess supply of (demand for) money, the interest rate falls (rises).

Figure 14-3: Determination of Equilibrium Interest Rate

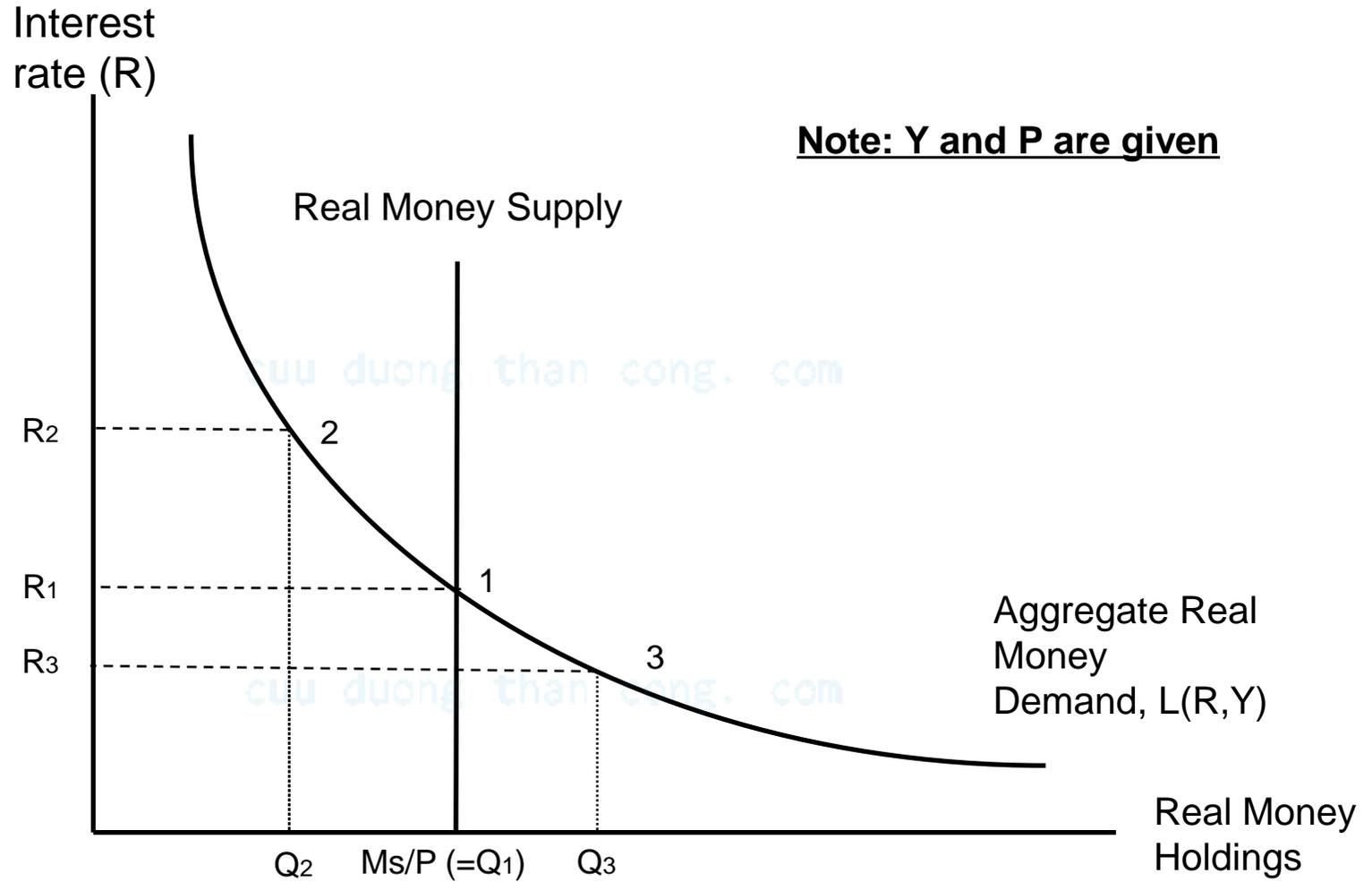


Figure 14-4: Effect of an Increase in the Money Supply on the Interest Rate

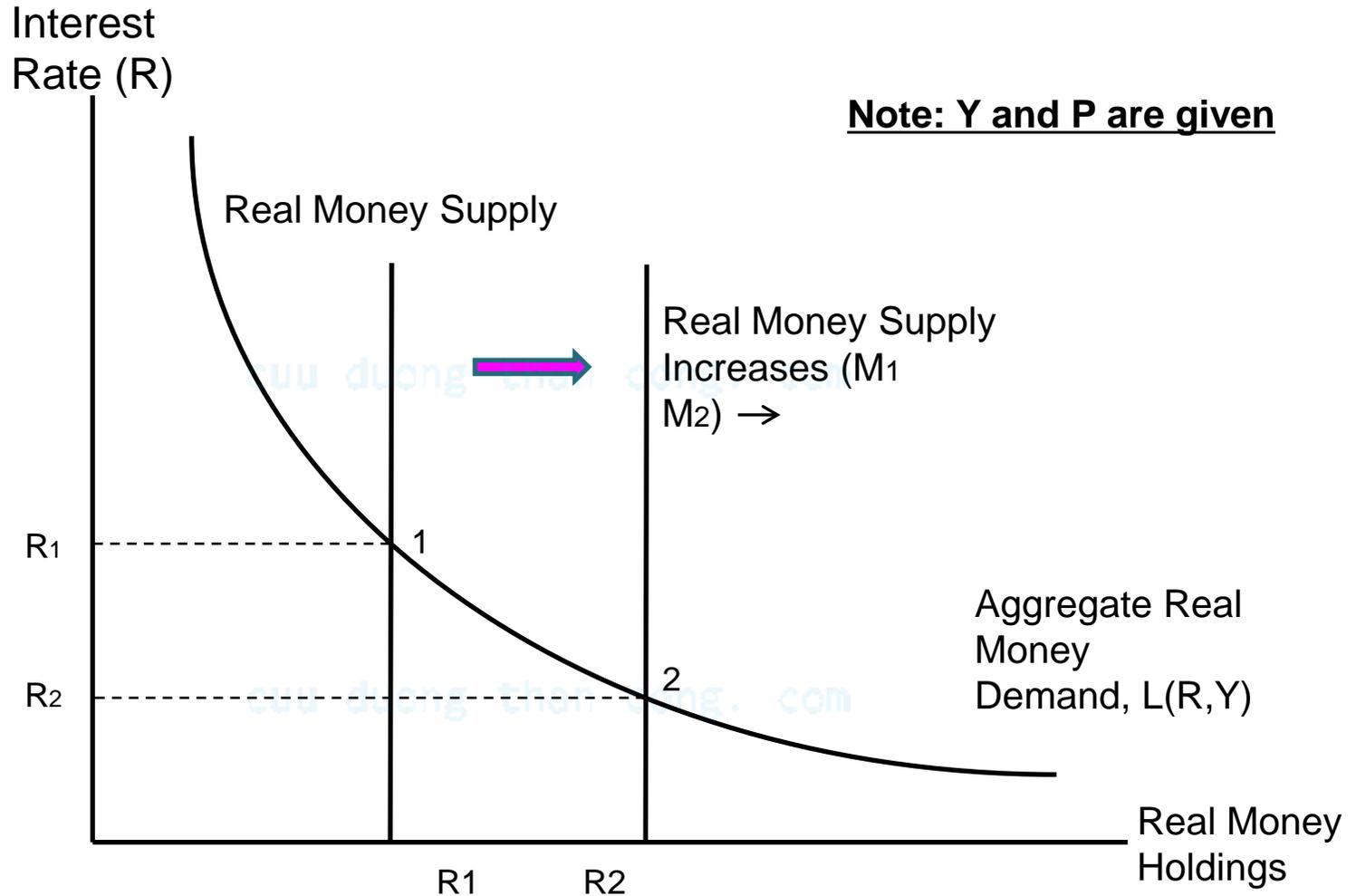
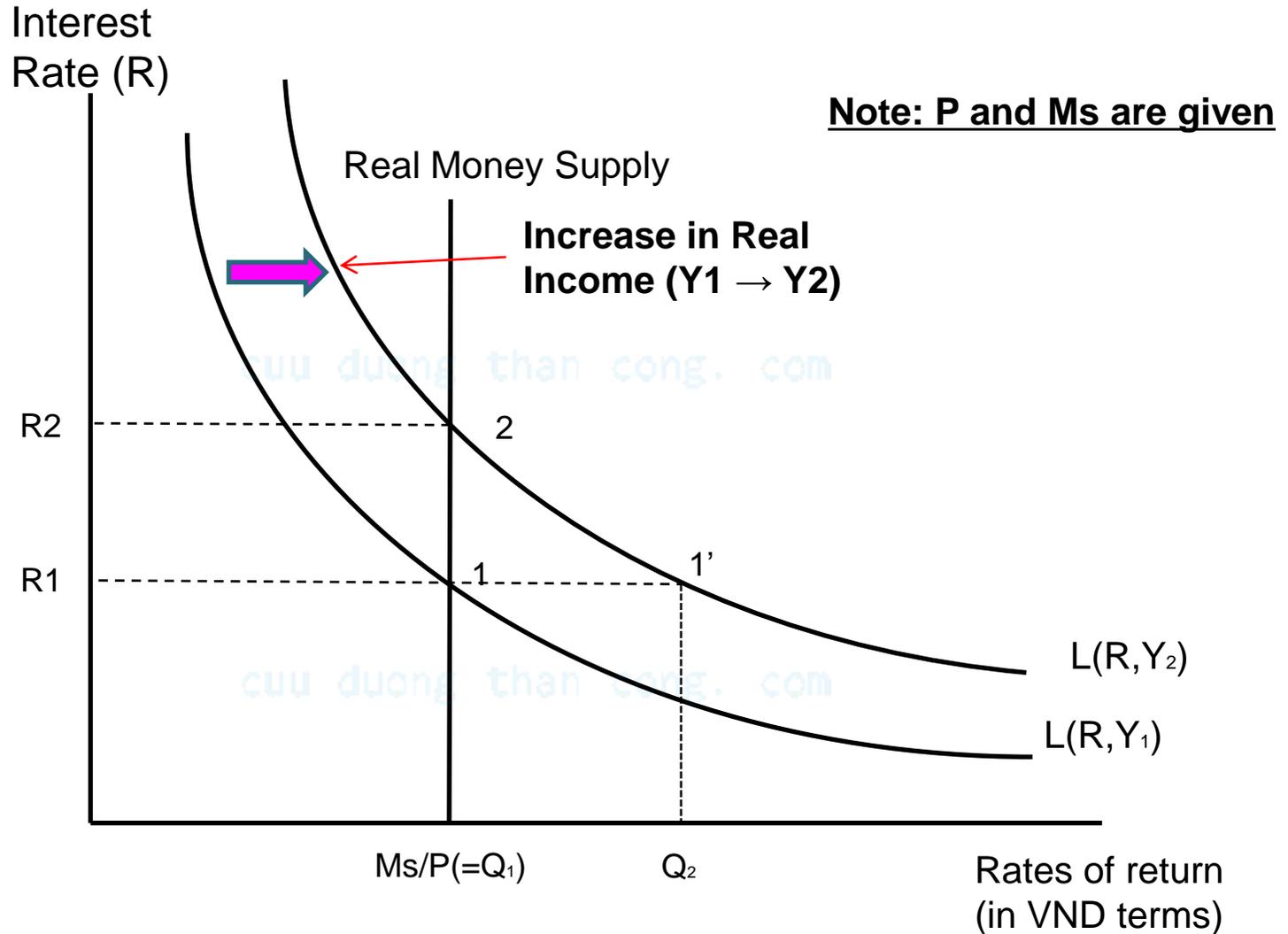


Figure 14-5: Effect of a Rise in Real Income on the Interest Rate



Interaction of Money Supply and Demand (cont'd)

- The effect of increasing Ms (Fig.14-4):
 - An increase (fall) in Ms lowers (raises) the interest rate, given the price level and output.
- The effect of a rise in Y (Fig.14-5):
 - An increase (fall) in Y raises (lowers) the interest rate, given the price level and the money supply.

Simultaneous Equilibrium in the Money Market and the Forex Market

- Question:
 - How monetary changes affect the exchange rate.
- Assumption:
 - The price level (and also real output) are taken as given. → The short-run analysis.
 - Note: The long-run analysis allows for the complete adjustment of the price level and for full employment of all factors of production.
- Fig. 14-6:
 - A combination of two diagrams (forex market and money market equilibrium).

Figure: Effect of changing expectations on current EXR

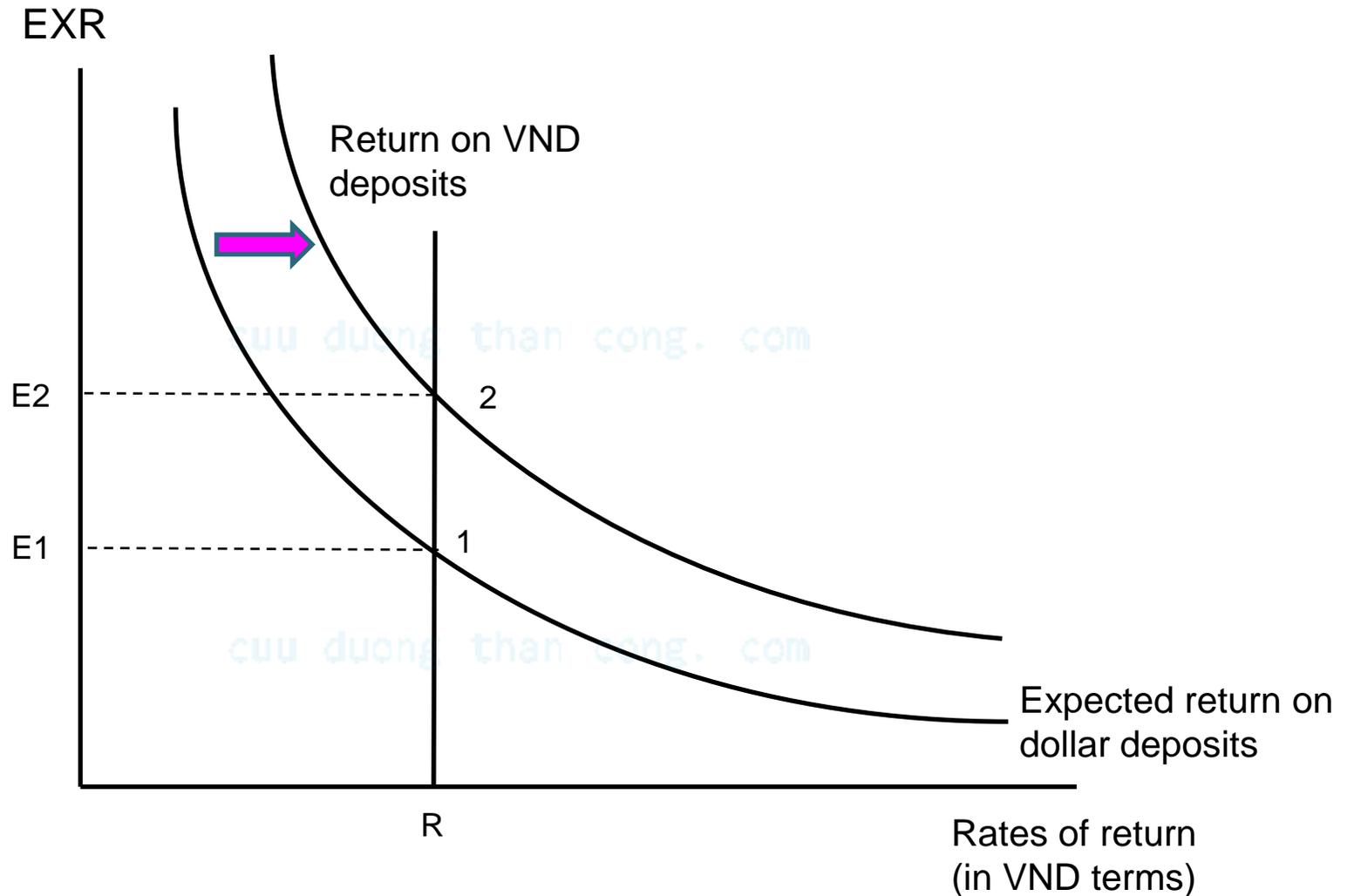
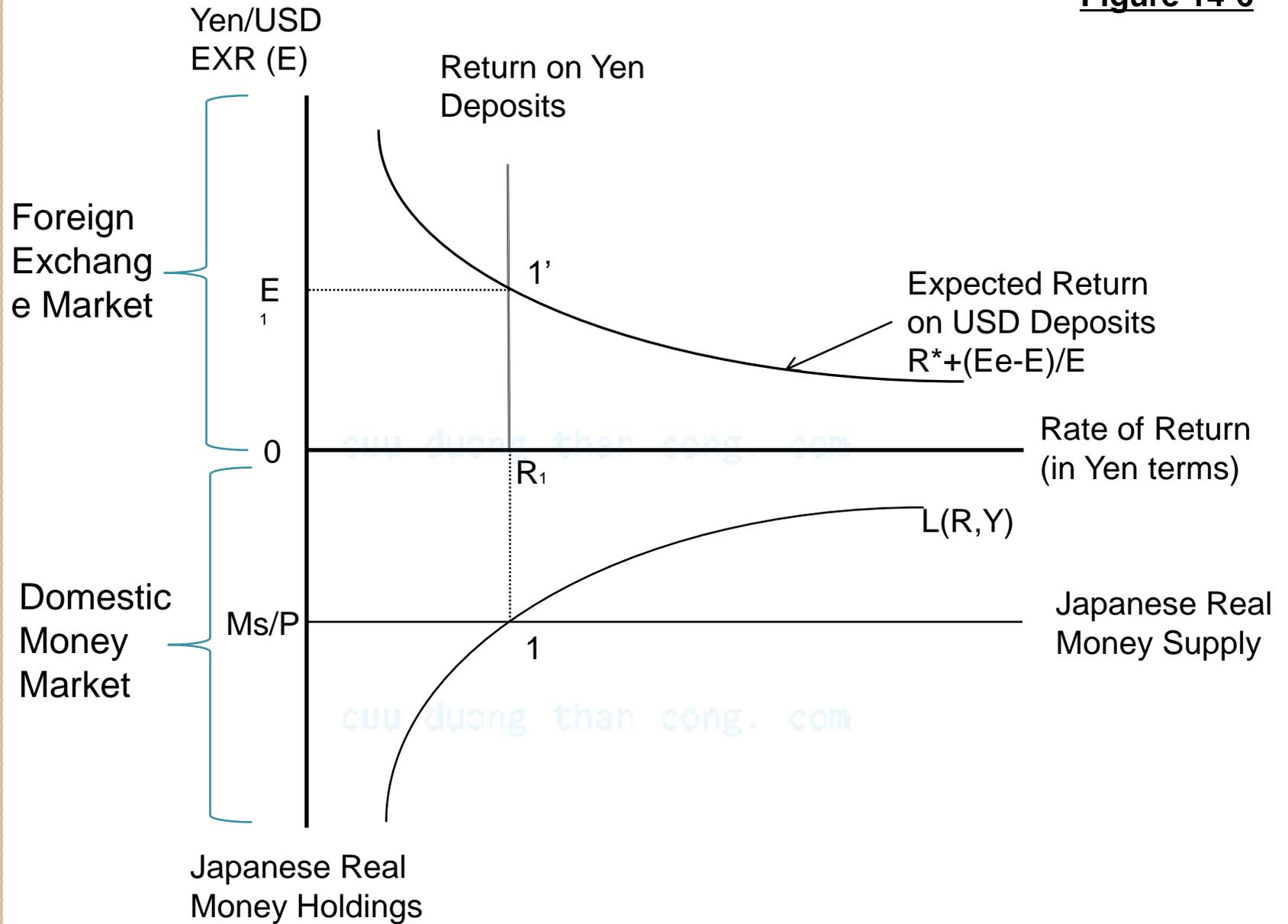


Figure 14-6

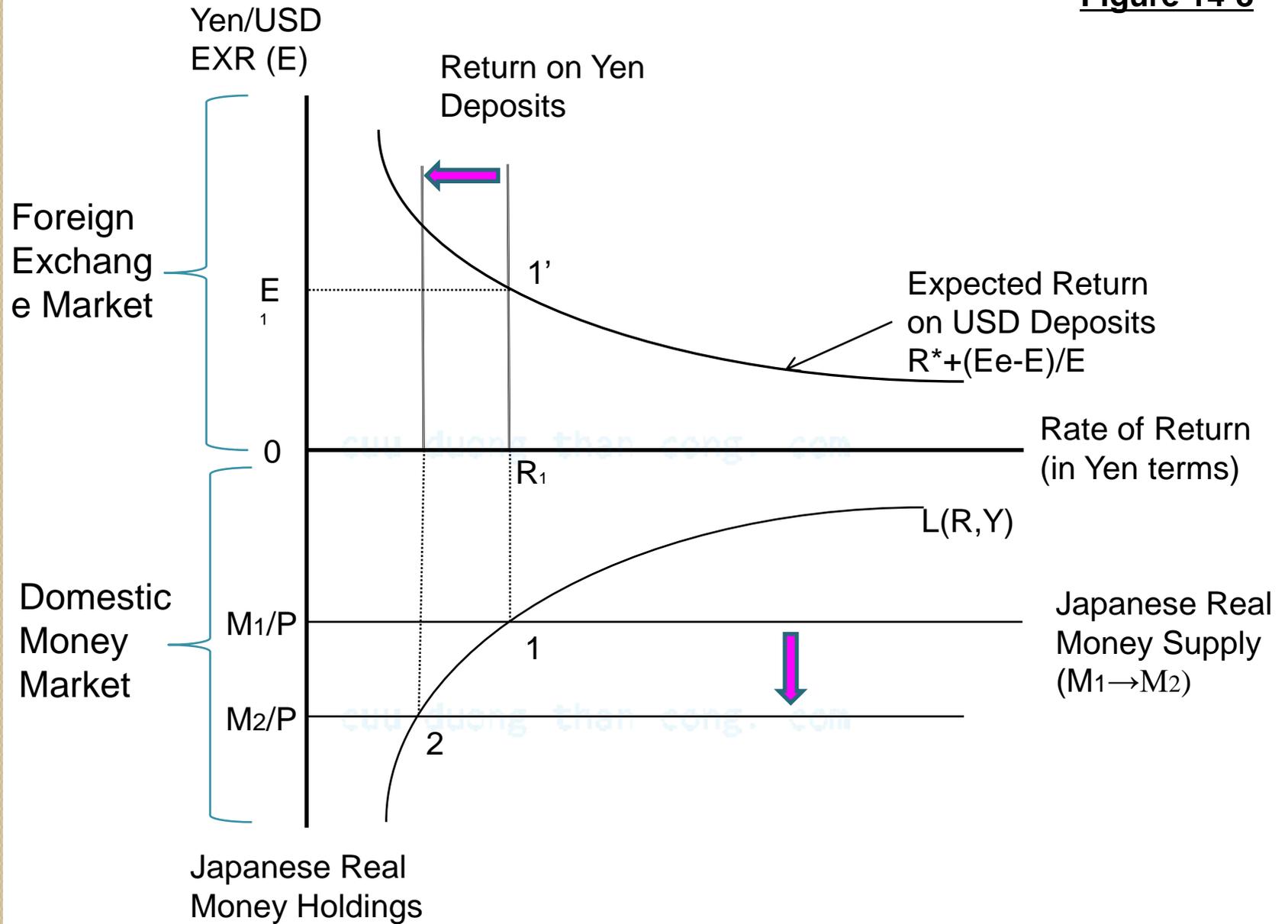


Effect of Money Supply Changes on the Exchange Rate

- The effect of increase in JP money supply:
- (Fig.14-8) Assumption:
 - Expected EXR is fixed.
 - No change in foreign money supply & interest rate.

1. Domestic Money Supply	2. Domestic Interest Rate	3. Exchange Rate (Domestic/Foreign)
Increase	Fall	Depreciation
Reduction	Rise	Appreciation

Figure 14-8



Effect of Money Supply Changes on the Exchange Rate (cont'd)

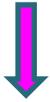
- The effect of increase in foreign (US) money supply on EXR (¥/\$): (Fig.14-9)
 - The change in foreign money supply does not disturb the domestic money market equilibrium.

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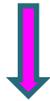
1. Foreign Money Supply	2. Expected return on foreign currency	3. Downward-sloping curve (top panel)	4. EXR (domestic/foreign)
Increase	Decrease	Shift leftward	Appreciation
Reduction	Increase	Shift rightward	Depreciation

Figure 14-9

On Point 1'' →
 $R_1 > R_2^* + (E_e - E_1) / E_1$

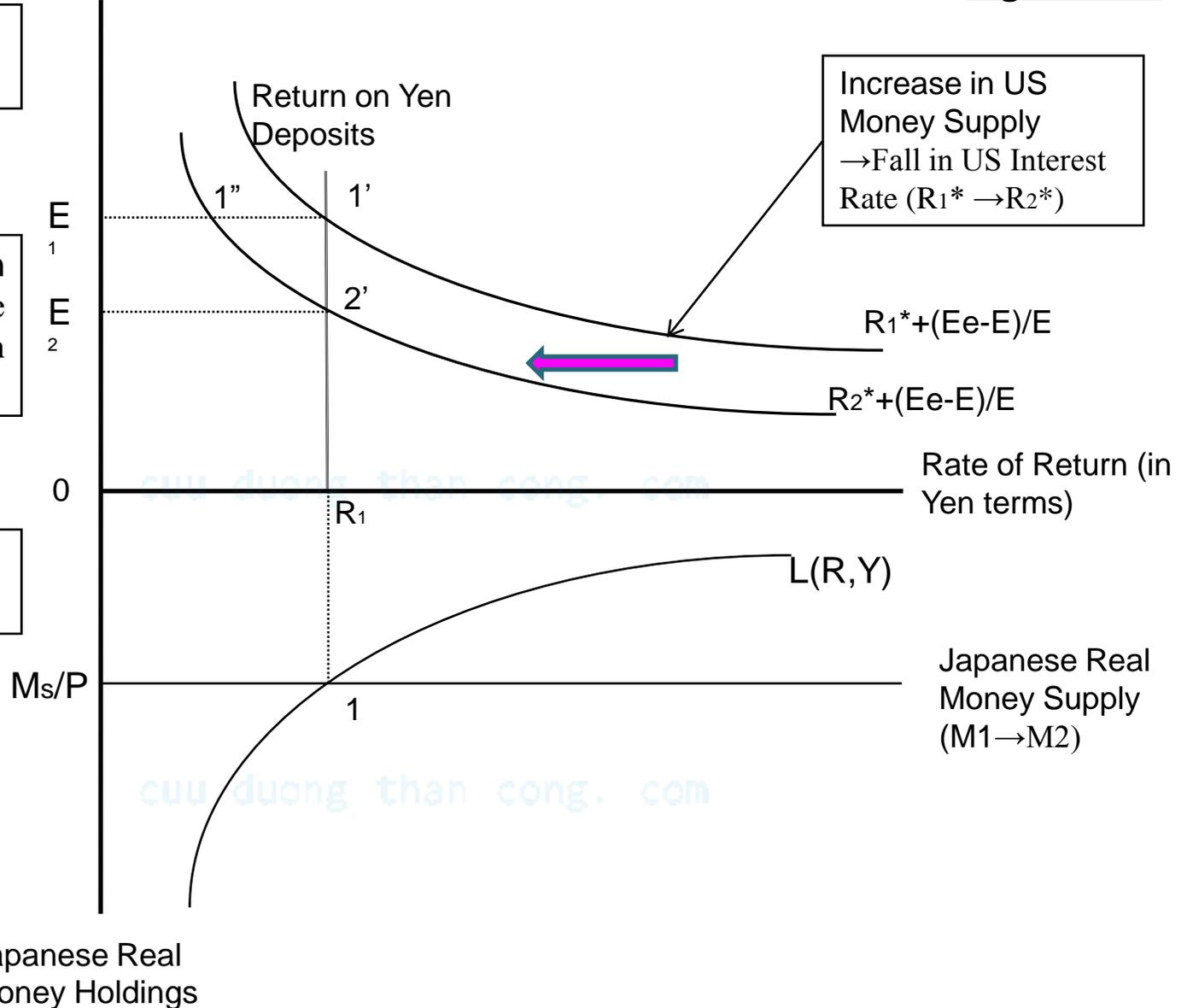


Excess demand on Japanese assets → More demand for Yen → Yen appreciation ($E_1 \rightarrow E_2$).



On Point 2' →
 $R_1 = R_2^* + (E_e - E_2) / E_2$

Yen/USD
 EXR (E)



Money, the Price Level, and the Exchange Rate in the Long Run

- Short-run analysis:
 - Relies on the simplifying assumptions:
 - → Price levels and exchange rate expectations are given (constant).
- For further understanding of exchange rate determination, we need to learn:
 - The long-run analysis of exchange rate determination.
 - How monetary factors affect a country's price level in the long-run.

The Long-run Analysis of the Exchange Rate Determination

- Long-run analysis:
 - Assumption: An economy maintains the long-run equilibrium where all wages and prices have adjusted to their market-clearing level.
 - Price are perfectly flexible and always adjust to preserve full employment.
- The Long-run Equilibrium Price Level:
 - The value of P that satisfies the condition (14-5):
 - $\rightarrow P = M_S / L(R_{LR}, Y_{LR})$, where the subscript, LR, denotes the long-run equilibrium level.

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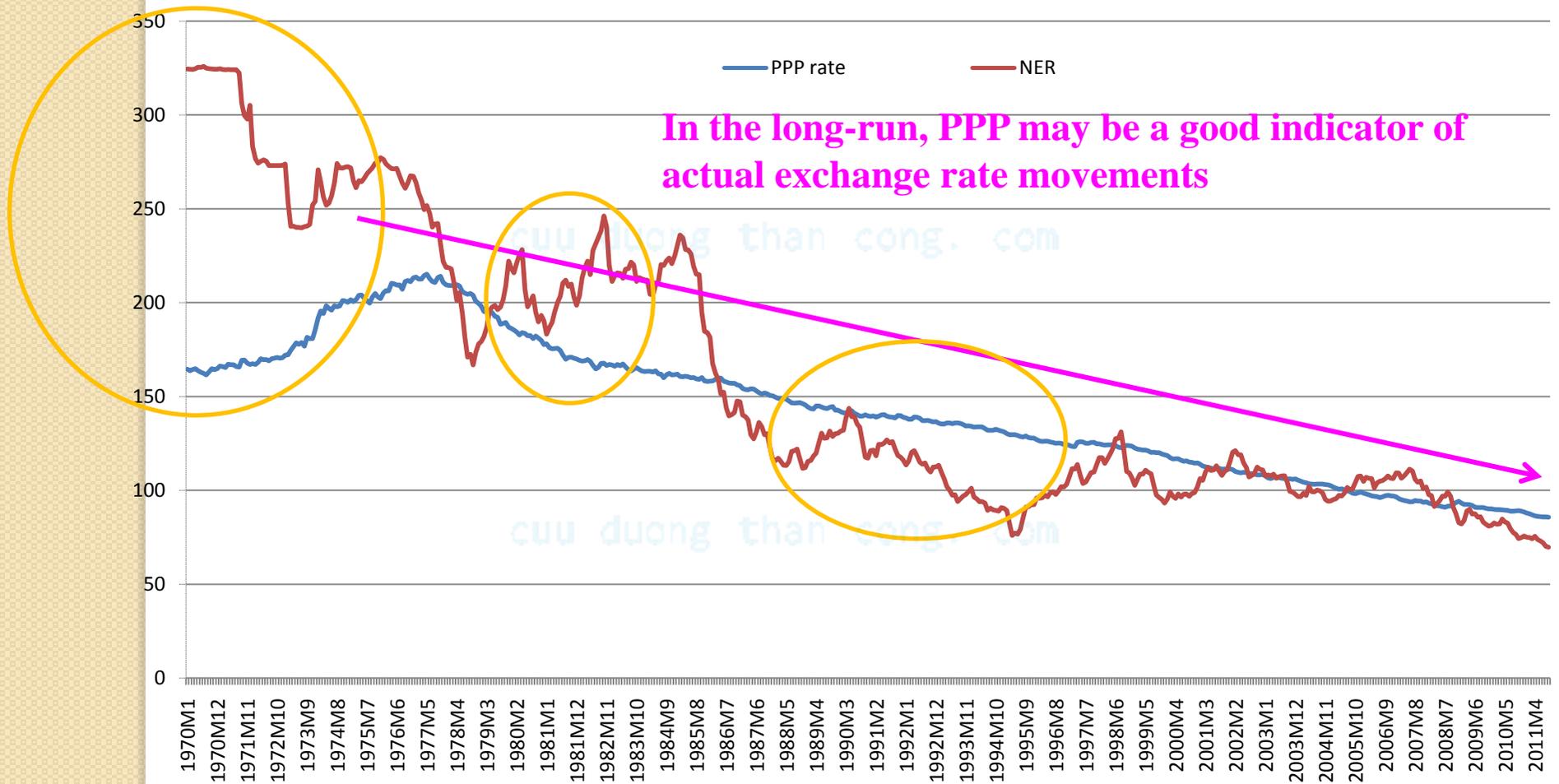
The Long-run Analysis of the Exchange Rate Determination (cont'd)

- Why no effect on the long-run values?
 - The full-employment output level is determined by the economy's endowments of labor and capital.
 - The interest rate is determined in the money market, where P increases in proportion to M_s in the long-run, which results in no change of the long-run level of the interest rate.
 - Example: Currency Reform (see pp.354-355 in Krugman and Obstfeld, 2006).

Inflation and Exchange Rate Dynamics

- Question?
 - Why we need to consider a long-run analysis?
 - See the next Figure.
- Two issues:
 - Exchange rate fluctuates in the short-run, but appears to follow the PPP in the long-run.
 - The interest parity condition and the PPP suggest different movement of exchange rate.

Nominal Yen/USD Exchange Rate and the PPP Exchange Rate 1970M1-2011M9 (2005 = 100)

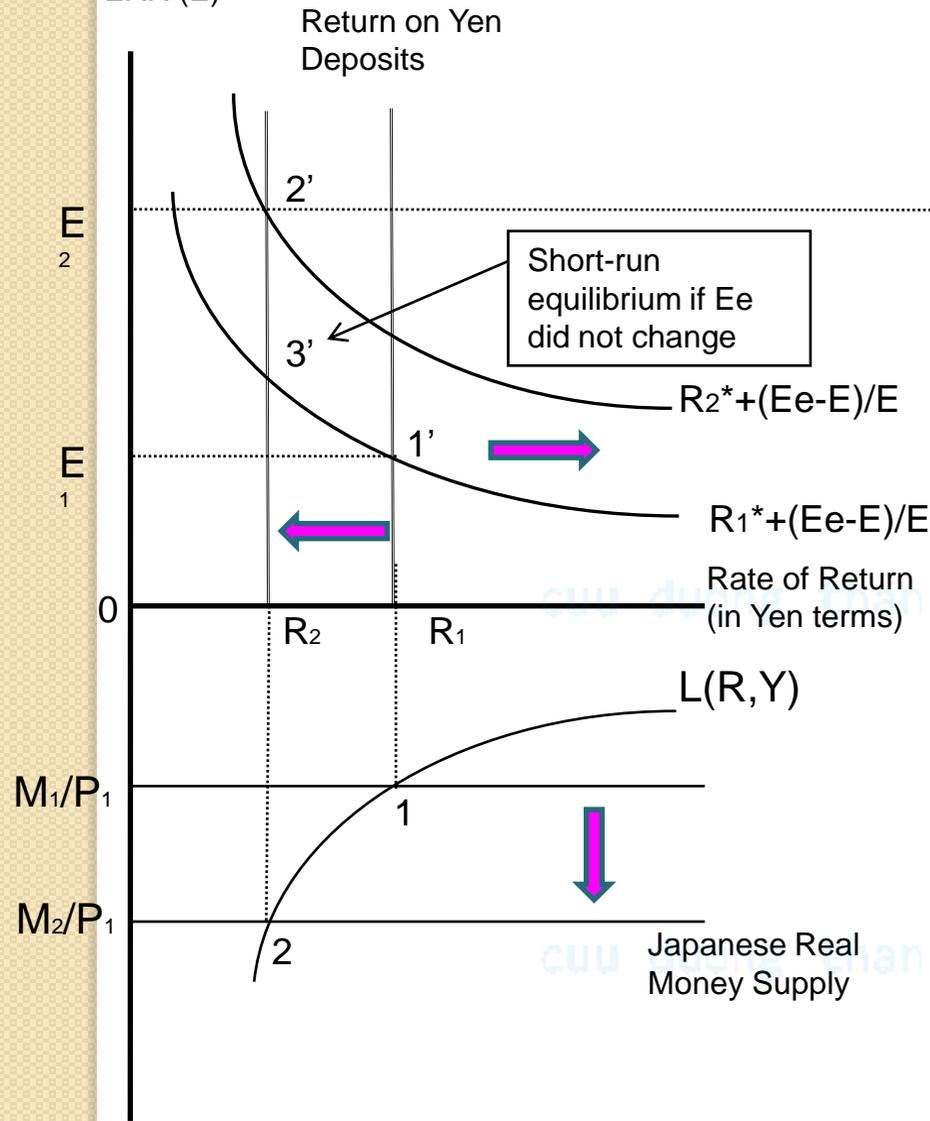


Permanent Money Supply Changes and the Exchange Rate

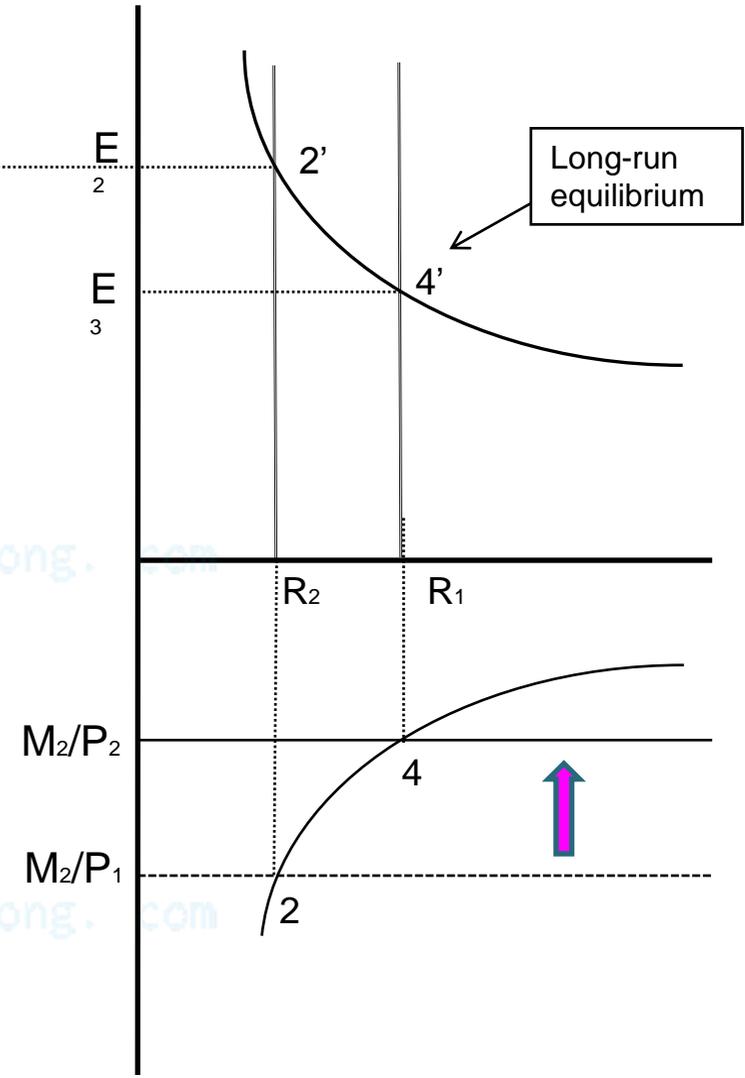
- The effect of a permanent increase in money supply on the exchange rate. (Fig.14-12)
 - Assumption (i): The economy starts with all variables at their long-run levels.
 - Assumption (ii): Output remains constant during the adjustment process.
 - (1) affects exchange rate expectations (E_e).
 - (2) A rise in E is greater than the case of no change in E_e .
 - (3) The price level adjust gradually to its long-run equilibrium.

Yen/USD
EXR (E)

Figure 14-12



(a) Short-run effects



(b) Adjustments to long-run equilibrium

Permanent Money Supply Changes and the Exchange Rate (cont'd)

- Short-run effects (1→4):
 - A permanent M_s increase affects expected EXR.
- Adjustment to long-run equilibrium (5→8):
 - Price level increase is proportional to M_s increase.

(1) Increase in M ($M_1 \rightarrow M_2$)	(2) Increase in R ($R_1 \rightarrow R_2$)	(3) Increase in E (point 3') If E_e is constant	(4) Increase in E (point 2') If E_e rises
(5) Increase in P ($P_1 \rightarrow P_2$)	(6) Increase in R ($R_2 \rightarrow R_1$)	(7) Decrease in E (point 4') If E_e does not change further.	(8) Long-run equilibrium EXR (point 4') where $E_3 > E_1$.

Permanent Money Supply Changes and the Exchange Rate (cont'd)

- Exchange Rate Overshooting:
 - Initial depreciation after a (permanent) rise in money supply is greater than its long-run response.
 - Overshooting is caused by the short-run rigidity of the price level, while the exchange rate changes instantaneously.
 - Finally, the long-run increases in the price level and the exchange rate are proportional to the increase in the money supply. → Why?