3543 Fiscal and Financial System in Japan A / KC3002 International Finance

Fall 2012

Lecture 6(Nov 20)
Exchange Rates(cont.)

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Exchange Rates

The exchange rate is the “price” of one currency measured in terms of another currency.

The yen/dollar exchange rate is the “price” of dollar measured in terms of yen.

Like prices of all the other goods, the yen/dollar exchange rate is determined by the demand and supply (of the dollar).

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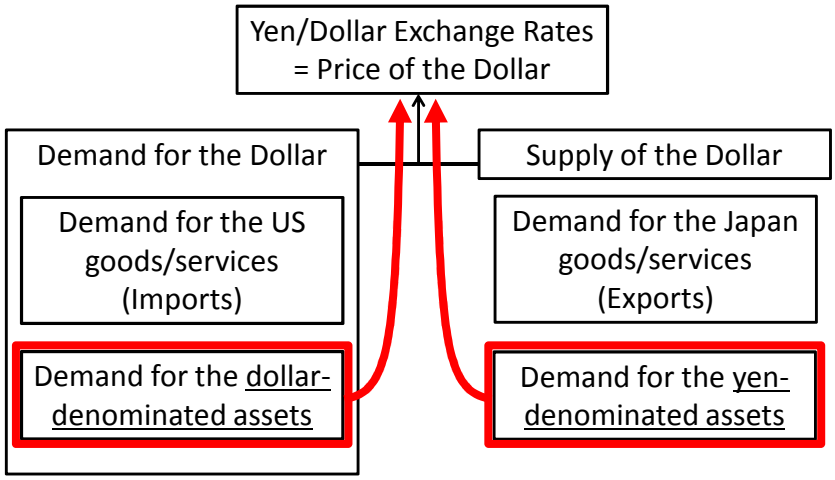
Demand and Supply of the Dollar: Asset Approach



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Asset Approach

"Export and import transactions are small relative to the amount of domestic and foreign assets at any given time. For example, foreign exchange transactions in the United States each year are well over 25 times greater than the amount of U.S. exports and imports. " (Mishkin, p.511)

For a short period of time, the demand and supply of the dollar mainly reflect the demand for the dollar/yen **assets**, rather than the demand for the US/Japan **goods**.

➔ *An Asset Approach* to the Short-term Exchange Rate Determination

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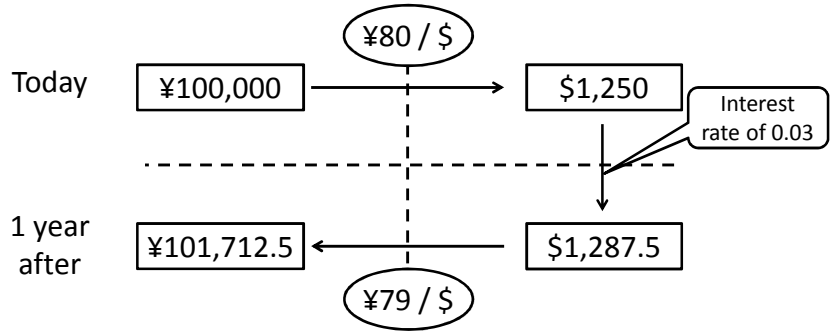
Interest Rates and Returns



Dollar return of dollar denominated asset
= interest rate of that asset (= 0.03)

Yen return of dollar denominated asset

$$= \frac{101{,}712.5 - 100{,}000}{100{,}000} = 0.017125$$

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Simple Rule for Returns on Foreign Assets

$$R^e \cong i^* + \frac{E_1^e - E_0}{E_0}$$

Expected rate of *yen* return of a dollar asset	≅	Interest rate of a dollar asset	+	Expected rate of dollar appreciation

All else equal,

- An increase in the interest paid on dollar-denominated assets raises the expected rate of yen return of the assets
- A depreciation of the "current" dollar raises the expected rate of yen return of the assets
- A depreciation of the "future" dollar lowers the expected rate of yen return of the assets

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Depreciation of the Current Dollar

How changes in the current exchange rate affect the expected yen return on dollar assets when $E_1^e = 80$

$$R^e \cong 0.03 + \frac{80 - E_0}{E_0}$$

Today's yen/dollar exchange rate	Expected yen/dollar exchange rate	Expected yen return on dollar assets
81	80	0.01765
80	80	0.03
79	80	0.04265
78	80	0.05564

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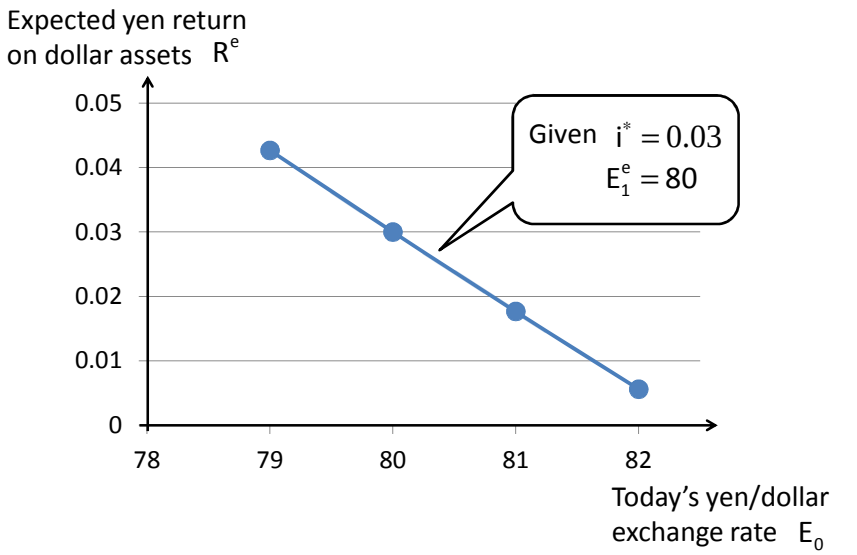

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Depreciation of the Future Dollar

How changes in the future exchange rate affect the expected yen return on dollar assets when $E_0 = 80$

$$R^e \cong 0.03 + \frac{E_1^e - 80}{80}$$

Today's yen/dollar exchange rate	Expected yen/dollar exchange rate	Expected yen return on dollar assets
80	81	0.0425
80	80	0.03
80	79	0.0175
80	78	0.005

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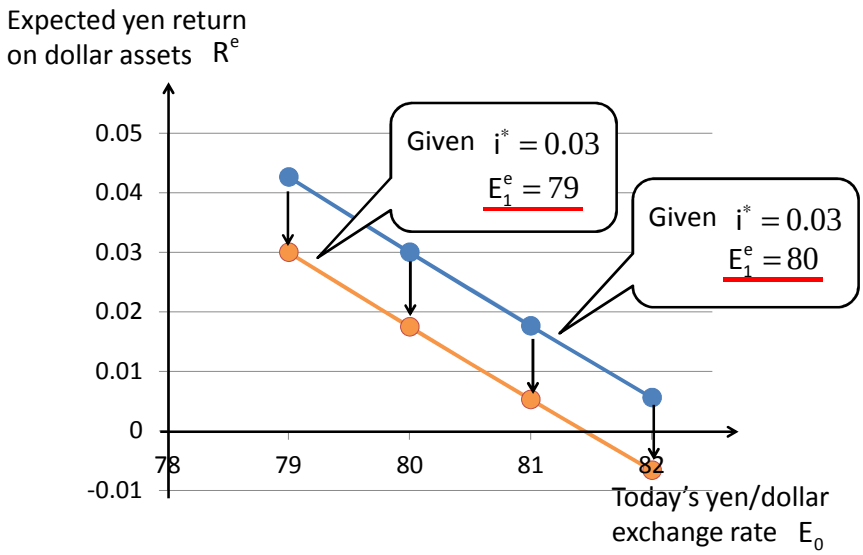

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Assumptions on the Investors' Behavior

Assumption 1: Perfect Substitutes

Investors view the dollar and yen denominated assets as equally desirable, if the returns are equal.
Investors do not prefer assets denominated by one particular currency to those denominated by another currency.

Assumption 2: Risk Neutrality

Investors care only for the expected returns, whatever the possible variations are.

A1 and A2 jointly imply that if the expected return on dollar assets is higher than yen, both US and Japan people want to hold only dollar assets and are never willing to hold yen assets.

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Equilibrium in the FX Markets

$E_1^e = 80 \qquad i = 0.02$

$E_0 = 78 \qquad i^* = 0.03$

$$R^e \cong 0.03 + \frac{80 - 78}{78} \cong 0.056 \quad > \quad i = 0.02$$

1. Investors try to replace all the yen assets with the dollar assets.
2. An upsurge in demand for the dollar.
3. The dollar begins to appreciate against the yen.

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Equilibrium in the FX Markets

$E_1^e = 80$ $\quad i = 0.02$

$E_0 = 82$ $\quad i^* = 0.03$

$$R^e \cong 0.03 + \frac{80 - 82}{82} \cong 0.0056 \quad < \quad i = 0.02$$

1. Investors try to replace all the dollar assets with the yen assets.
2. An upsurge in supply of the dollar.
3. The dollar begins to depreciate against the yen.

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Equilibrium in the FX Markets

$E_1^e = 80$ $\quad i = 0.02$

$E_0 = 80.8$ $\quad i^* = 0.03$

$$R^e \cong 0.03 + \frac{80 - 80.8}{80.8} \cong 0.02 \quad = \quad i = 0.02$$

1. The dollar and yen assets are equivalent for investors.
2. Investors are willing to hold both assets.
3. No more pressure on the exchange rates to change.

¥80.8/$ Equilibrium exchange rate

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Interest Parity Condition

Given E_1^e, i, i^*,

if the current exchange rate satisfies the interest parity condition,

$$i = i^* + \frac{E_1^e - E_0}{E_0}$$

assets of both currencies offer the same expected rate of return measured in one currency, no one has the incentive to replace assets of one currency with another, and the exchange rate stays.

Given E_1^e, i, i^*,

the interest parity condition, determines the equilibrium yen/dollar exchange rate.

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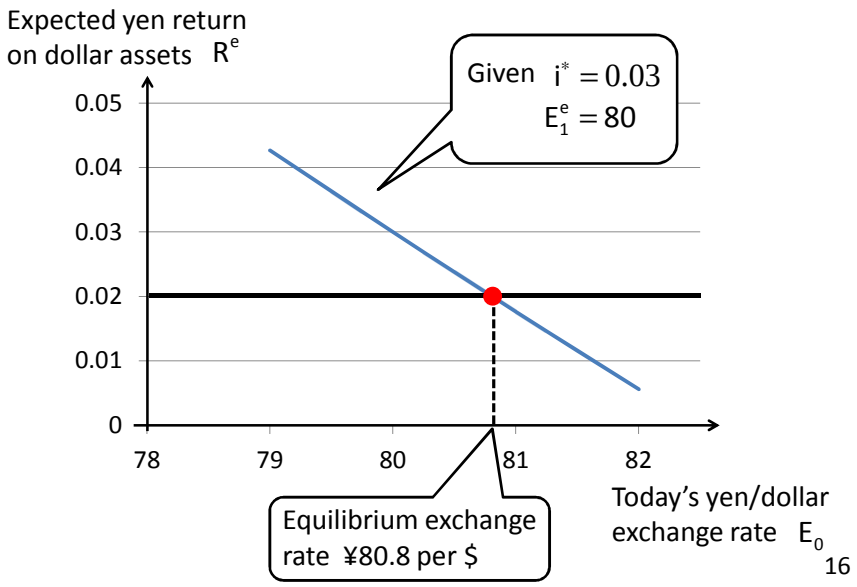

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Changes in yen interest rates

$E_1^e = 80$ $\quad i = 0.02 \rightarrow 0.03$

$E_0 = 80.8$ $\quad i^* = 0.03$

1. The higher expected return on the yen assets.

$$R^e \cong 0.03 + \frac{80 - 80.8}{80.8} \cong 0.02 \quad < \quad i = 0.03$$

2. Investors try to replace all the dollar assets with yen, and the dollar begins to depreciate against the yen.

3. At ¥80 per dollar, both assets have the same expected return measured in one currency, and the exchange rate stays.

$E_0 = 80.8 \rightarrow 80$

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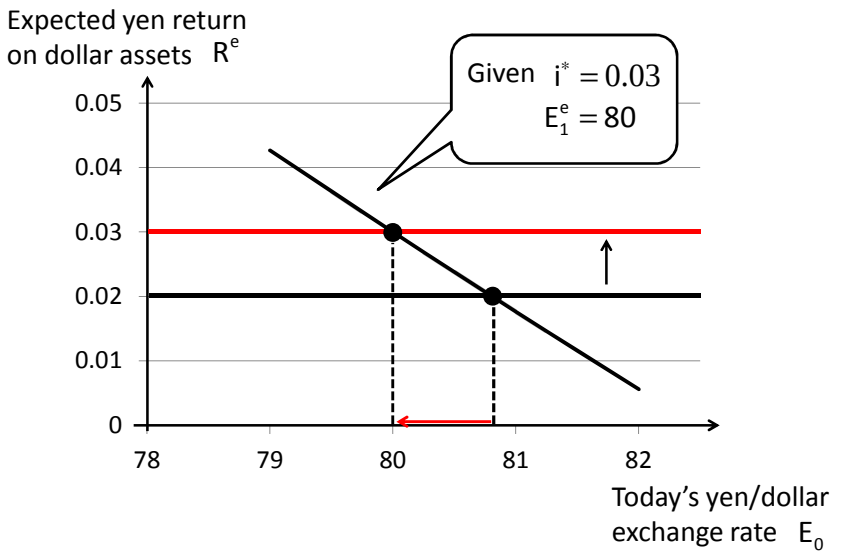

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Changes in dollar interest rates

$E_1^e = 80$ $\quad i = 0.02$

$E_0 = 80.8$ $\quad i^* = 0.03 \rightarrow 0.04$

1. The higher expected return on the dollar assets.

$$R^e \cong 0.04 + \frac{80 - 80.8}{80.8} \cong 0.03 \quad > \quad i = 0.02$$

2. Investors try to replace all the yen assets with dollar, and the dollar begins to appreciate against the yen.

3. At ¥81.6 per dollar, both assets have the same expected return measured in one currency, and the exchange rate stays.

$$E_0 = 80.8 \rightarrow 81.6$$

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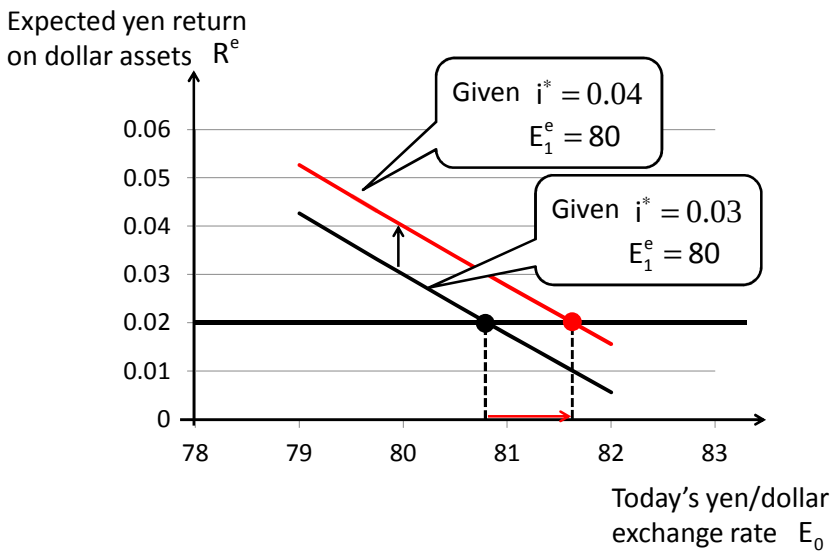

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Changes in the future exchange rates

$E_1^e = 80 \rightarrow 79$ $\quad i = 0.02$

$E_0 = 80.8$ $\quad i^* = 0.03$

1. The higher expected return on the yen assets.

$$R^e \cong 0.03 + \frac{79 - 80.8}{80.8} \cong 0.0077 \quad < \quad i = 0.02$$

2. Investors try to replace all the dollar assets with yen, and the dollar begins to depreciate against the yen.

3. At ¥79.8 per dollar, both assets have the same expected return measured in one currency, and the exchange rate stays.

$E_0 = 80.8 \rightarrow 79.8$

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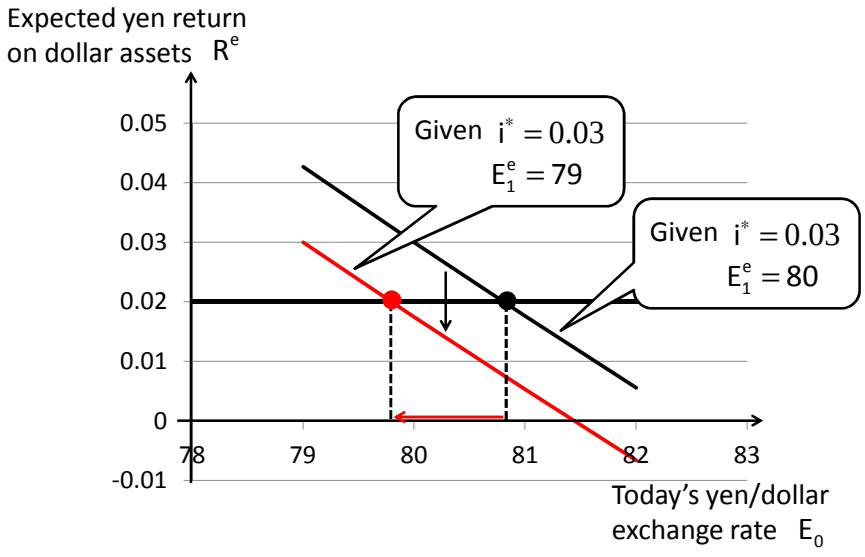

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Solving the interest parity condition

$$0.02 = 0.03 + \frac{80 - E_0}{E_0}$$ gives the original equilibrium.

$i = 0.02 \rightarrow 0.03$

$$0.03 = 0.03 + \frac{80 - E_0}{E_0}$$ gives a new equilibrium.

$E_1^e = 80 \rightarrow 79$

$$0.02 = 0.03 + \frac{79 - E_0}{E_0}$$ gives a new equilibrium.

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Exercises

$E_1^e = 80$ $\quad i = 0.01$ $\quad i^* = 0.04$

1. What is an equilibrium exchange rate?
2. When the yen interest rate rises to 0.02, find a new equilibrium exchange rate. Explain how a new equilibrium is attained.
3. When the dollar interest rate falls to 0.03, find a new equilibrium exchange rate. Explain how a new equilibrium is attained.
4. When the expected future exchange rate rises to 82, find a new equilibrium exchange rate. Explain how a new equilibrium is attained.

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