LECTURE 16: OPENNESS IN GOODS AND FINANCIAL MARKETS*

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For countries other than the U.S., open economy considerations have long had substantial effects on economic performance. In the U.S., open economy issues are becoming increasingly important. An open economy allows domestic residents to choose between domestic and foreign goods and between domestic and foreign assets. The first choice is governed by the relative price of foreign goods; the second by relative returns on foreign assets. This lecture describes the basic determinants of the trade balance and the implications of arbitrage between domestic and foreign bonds.

1 OPENNESS IN GOODS MARKETS

Exports and imports. Figure 1 below plots the evolution of the U.S. exports and imports as ratios to GDP. Two main conclusions follow: first, the U.S. economy is becoming more open over time;[1] second, since the 1980s imports have consistently exceeded exports.[2] Two main factors drive the cross country differences in export ratios:

- Geography. Distance from other markets partly explains the lower Japanese export ratio.
- Size. The smaller the country, e.g. Belgium, the more it must specialize in producing and exporting only a few products and rely on imports for the other products.

The choice between domestic and foreign goods. We compare consumers' decisions in a closed goods market and an open goods market:

- In a closed goods market, domestic consumers decide whether to save or to consume.
- In an open goods market, domestic and foreign consumers face a second decision—whether to buy domestic goods or foreign goods. Central to this decision is the price of domestic goods relative to foreign goods, called the **real exchange rate**.

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These are notes that I used by myself to lecture from and for educational purposes only. The material presented here is largely based upon the undergraduate textbook by Blanchard and Johnson (2012), *Macroeconomics*, 6th Edition, Prentice Hall. Please do NOT circulate.

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[1] A better index of openness than export or import ratios is the proportion of aggregate output composed of **tradable goods**–goods that compete with foreign goods in either domestic or foreign markets.

[2] Put another way, the U.S. has consistently run a trade deficit. Recall that trade balance is the difference between exports and imports: if exports exceed imports, there is a trade surplus; if imports exceed exports, there is a trade deficit.

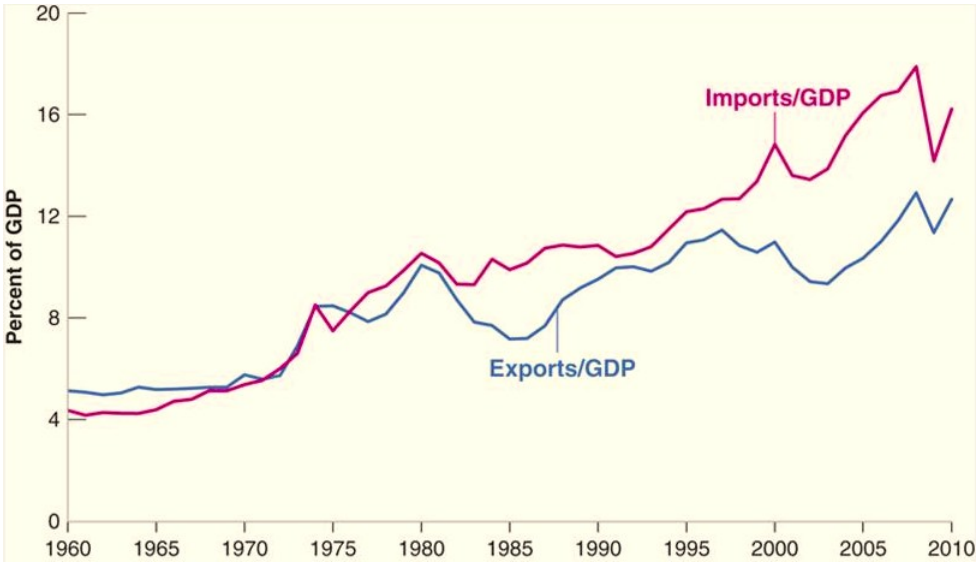

Figure 1. U.S. exports and imports as ratios of GDP since 1960

Nominal exchange rates. Let E denote the **nominal exchange rates** between two currencies, which can be quoted in two ways: first, as the price of the domestic currency in terms of the foreign currency; second, as the price of the foreign currency in terms of the domestic currency. We shall adopt the fist definition.[3] Nominal exchange rates change everyday:

- A **nominal appreciation** (an increase in E) of the domestic currency is an increase in the price of the domestic currency in terms of a foreign currency.
- A **nominal depreciation** (a decrease in E) of the domestic currency is a decrease in the price of the domestic currency in terms of a foreign currency.
- When countries operate under **fixed exchange rates**—a system in which two or more countries maintain a constant exchange rate—increases in E are called **revaluations** and decreases in E are called **devaluations**.

From nominal to real exchange rates. We construct the **real exchange rate** between the U.S. and the U.K.—the price of U.S. goods in terms of British goods. Let P be the GDP deflator for the U.S., P^* the GDP deflator for the U.K., and E the dollar-pound nominal exchange rate. See Figure 2 below. The real exchange rate ϵ is thus given by

$$\epsilon = \frac{EP}{P^*} = E\frac{P}{P^*} \tag{1.1}$$

which is an index number because the GDP deflators are themselves index numbers.[4] See Figure 3 below. Real exchange rates also move over time:

[3] For example, if dollar is the domestic currency and pound is the foreign currency, the exchange rate E between the U.S. and the U.K. denotes the price of one dollar in terms of pounds.

[4] Although the level of real exchange rate is uninformative, its rate of change is informative: if, for example,

- An increase in the relative price of domestic goods in terms of foreign goods (an increase in ϵ) is called a **real appreciation**.
- A decrease in the relative price of domestic goods in terms of foreign goods (a decrease in ϵ) is called a **real depreciation**.
- Nominal and real exchange rate can move in opposite directions. Also, the real exchange rate inherits the large fluctuations in the nominal exchange rate.[5]

Figure 2. The construction of the real exchange rate

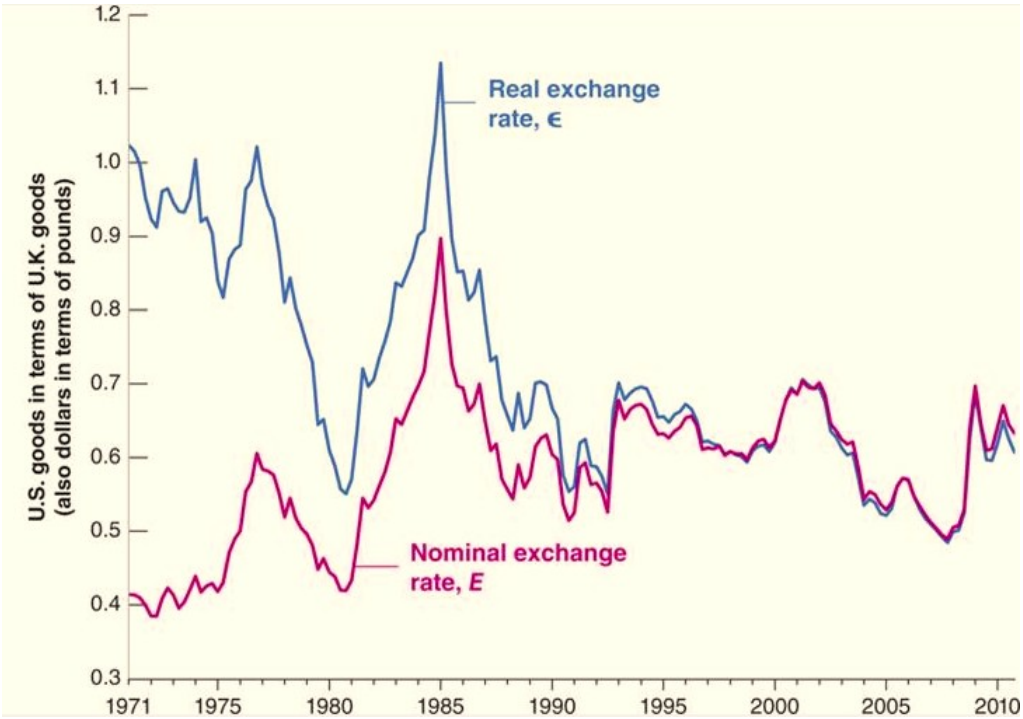

Figure 3. Real and nominal exchange rates between the U.S. and the U.K. since 1971

the real exchange rate between the U.S. and the U.K. increases by 10%, then U.S. goods are 10% more expensive relative to British goods than they were before.

[5] As (1.1) suggests, if the decrease in P/P^* is larger than the increase in E, ϵ will decrease, leading to both a nominal appreciation and a real depreciation. Moreover, because movements in P/P^* are typically small compared to movements in E, movements in ϵ tend to be driven mostly by movements in E.

From bilateral to multilateral exchange rates. Though constructing the **multilateral real U.S. exchange rates** is complicated, its principle is simple: we construct the weight of a given country to incorporate not only how much the country trades with the U.S. but also how much it competes with the U.S. in other countries.

2 OPENNESS IN FINANCIAL MARKETS

Openness in financial markets not only allow financial investors to hold both domestic and foreign assets, but also countries to run trade surpluses and deficits. A country running a trade deficit must borrow from the rest of the world by making it attractive for foreign financial investors to increase their holdings of domestic assets. We will look at the determinants of the financial flows among countries.

Current Account		
Exports	1838	
Imports	2338	
Trade balance (deficit = −) (1)		−500
Income received	663	
Income paid	498	
Net income (2)		165
Net transfers received (3)		−136
Current account balance (deficit = −) (1) + (2) + (3)		−471
Capital Account		
Increase in foreign holdings of U.S. assets (4)	1260	
Increase in U.S. holdings of foreign assets (5)	1005	
Capital account balance (deficit = −) (4) − (5)		255
Statistical discrepancy		216

Source: Survey of Current Business, August 2011, Table F2

Figure 4. The U.S. balance of payments, 2010

The balance of payments. A country's transactions with the rest of the world, including both trade flows and financial flows, are summarized by a set of accounts called the **balance of payments**. You can download the balance of payments from the Bureau of Economic Analysis (BEA), http://www.bea.gov. See Figure 4 above.

- The sum of net payments to and from the rest of the world is called the **current account balance**. If net payments from the rest of the world are positive (negative), the country is running a **current account surplus (deficit)**.
- The net capital flows from the rest of the world are called the **capital account balance**. Positive (negative) net capital flows are called **capital account surplus (deficit)**. A

country that runs a current account deficit must finance it through a capital account surplus.

- In principle, the current and capital account balances should exactly balance out each other. But in practice, this is typically not true because they are constructed from different sources. The difference is called the **statistical discrepancy**.

- GDP measures value added domestically; GNP measures value added by domestic factors of production. To go from GDP to GNP, one must add income received from the rest of the world and subtract income paid to the rest of the world, i.e.

$$GNP = GDP + NI \tag{2.1}$$

  where NI are the net income payments from the rest of the world.

The choice between domestic and foreign assets. Consider, for example, the choice between U.S. (domestic) one-year bonds and U.K. (foreign) one-year bonds, from the point of view of a U.S. investor. Let E_t be the nominal exchange rate between dollar and pound and i_t^* be the one-year nominal interest rate on U.K. bonds.

- For every dollar we put in U.S. bonds, we get $(1 + i_t)$ dollars next year. For every dollar we put in U.K. bonds, it buys us E_t pounds today and we get $E_t(1 + i_t^*)$ pounds next year. Since we expect the nominal exchange rate next year to be E_{t+1}^e, we expect to receive $E_t(1 + i_t^*)/E_{t+1}^e$ dollars next year.

- Assume that financial investors care only about the expected rate of return. Because of arbitrage, the following relation must hold:

$$1 + i_t = (1 + i_t^*)\left(\frac{E_t}{E_{t+1}^e}\right) \tag{2.2}$$

  which is called the **uncovered interest parity condition**.

- The above analysis ignores two factors: first, the transaction costs associated with going in and out of U.K. bonds;[6] second, the risk of holding U.K. bonds because of the uncertain exchange rate next year.

Interest rates and exchange rates. Rearranging equation (2.2) gives

$$1 + i_t = \frac{1 + i_t^*}{1 + (E_{t+1}^e - E_t)/E_t} \tag{2.3}$$

[6] This requires three separate transactions: first, one must buy pounds using dollars; second, one buys U.K. bonds using pounds; third, one must convert pounds back into dollars.

which is a relation among the domestic nominal interest rate i_t, the foreign nominal interest rate i_t^*, and the expected rate of appreciation of domestic currency $(E_{t+1}^e - E_t)/E_t$, or equivalently, the expected rate of depreciation of foreign currency. A useful approximation of the above equation is given by

$$i_t \approx i_t^* - \frac{E_{t+1}^e - E_t}{E_t} \tag{2.4}$$

For example, if $i_t^* - i_t = 3\%$ and the uncovered interest parity condition holds, then financial investors are expecting, on average, an appreciation of dollar relative to pound of 3% over the coming year. Now we can compare the U.S. bonds and the U.K. bonds:

- Suppose $i_t = 2\%$ in the U.S. and $i_t^* = 5\%$ in the U.K. The choice between U.S. bonds and U.K. bonds depends on whether we expect pound to depreciate relative to dollar by more or less than $i_t^* - i_t = 3\%$ over the coming year.
- If we expect pound to depreciate by more (less) than 3%, investing in U.S. (U.K.) bonds is more attractive.
- As (2.4) suggests, if two countries commit to maintaining their bilateral exchange rates at a fixed value and markets have faith in this commitment, $E_{t+1}^e = E_t$ and the arbitrage condition implies that $i_t \approx i_t^*$. See Figure 5 below.

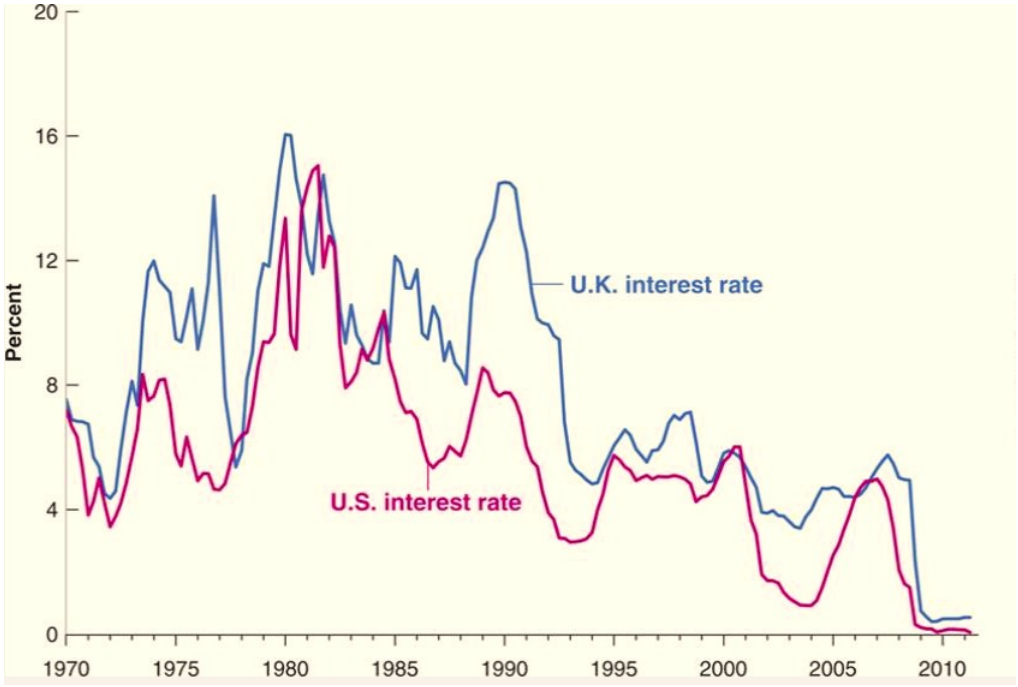

Figure 5. 3-month nominal interest rates in the U.S. and in the U.K. since 1970