Christiano 362, Winter, 2003 January 10

Lecture #2: Notes on Balance of Payments and Exchange Rates

1. Balance of Payments.

Last time, we talked about the current account, CA, and how it can be expressed in two ways by manipulating the national income identity:

$$CA = S - I = S^{private} + S^{public} - I$$

= Y - (C + I + G).

If domestic investment exceeds domestic saving, then the current account is negative, that is, net exports are negative. Alternatively, if domestic output is less than total purchases by domestic agents (households, business and government), then net exports are negative.

A negative current account means that the flow of goods and services across borders results in more payments from domestic residents to foreigners than the other way around. As a result, on net foreigners are accumulating domestic currency. Foreigners could choose to simply hold on to this currency. Indeed, in large parts of the world foreigners pass US currency around amongst themselves, using it for their transactions. Dollars flowing into most parts of the world as a result of a negative US current account do not just remain there, however. Residents of those countries tend to send their dollars back to the US in exchange for US assets that generate a monetary return: equity, bonds, office buildings, etc.

(a) The Current and Capital Accounts

Governments keep records of the flow of payments that arise from the international flow of goods and services and of claims on assets. These records are called the Balance of Payments. The current account in the balance of payments records the flow of dollars reflecting the flow of goods, while the capital account reflects the flow of dollars corresponding to the flow of assets. The following Table describes the general structure of the balance of payments.

Balance of Payments						
Current Account						
		Credit		Debit		
(1) Exports		+				
	Merchandise and Services		+			
	Investment Income Received		+			
(2) Imports				-		
	Merchandise and Services				-	
	Investment Income Paid				-	
Capital Account	·					
(3) Increase in US Holdings				-		
of Assets Located Abroad						
("US Assets Held Abroad")						
(4) Increase in Foreign Holdings		+				
of Assets Located in US						
("Foreign Assets Held in US")						

A '+' indicates a positive number which corresponds to a payment by foreigners to the US. A '-' indicates a negative number, and corresponds to a payment by US residents to foreigners. For example, suppose that in one year exports were zero, while imports were \$100. No investment income flows across borders. Thus, there is an entry of 0 in the Exports row, and its two subcomponents. There is a -\$100 in the Imports row and in the subcomponent that corresponds to Merchandise and Services. The current account, which is exports minus imports, is -\$100. The capital account records the flow of assets. The extra \$100 accumulated by foreigners could be held in currency form, or in the form of foreign holdings of US bank deposits. Or, it could be exchanged for another US asset, one which generates earnings. Either way, there is an entry for \$100 in the row corresponding to 'Increase in Foreign Holdings of Assets Located in the US'. Sometimes this entry is abbreviated in the way indicated in parentheses. The abbreviation is somewhat confusing, but it is the one that is adopted in official tables published by the US government. The phrase, 'current account', sometimes refers to the first part of the above table. At other times it is used to refer to a number. In this case, the number is the sum, (1) + (2). Similarly with the phrase, 'capital account'. Sometimes it is used to refer to the second part of the above table. At other times it is used to refer to a number. In this case, it refers to (3) + (4). Obviously, when the table is

constructed correctly, the current account plus the capital account must sum to zero. In practice, since sources for the entries in the capital and current account differ, these two do not sum to zero. The difference is called 'statistical discrepancy'. The statistical discrepancy is usually quite large.

The balance of payments in the previous example looks like this:

Balance of Payments							
Current Account							
		Credit		Debit			
(1) Exports		0					
	Merchandise and Services		0				
	Investment Income Received		0				
(2) Imports				-100			
	Merchandise and Services				-100		
	Investment Income Paid				0		
Capital Account							
(3) Increase in US Holdings				0			
of Assets Located Abroad							
("US Assets Held Abroad")							
(4) Increase in Foreign Holdings		100					
of Assets Located in US							
("Foreign Assets Held in US")							

(b) Investment Income

Let's think about the 'investment income' terms in the current account. Investment income received corresponds to earnings on assets (equity, bonds, buildings, etc.) held by domestic residents that are located abroad. We can illustrate this by thinking about the world economy of the previous example in later years. Suppose that in later years merchandise exports and merchandise imports are both zero. Suppose that in the first year, the increase in foreign holdings of assets located in the US corresponds to holdings by foreigners of US government debt that pays 5% per year. Thus, in the next year, the current account is -\$5, corresponding to the \$5 in investment income paid. These \$5 flowing abroad correspond to a \$5 increase in foreign holdings of assets located in the US. Thus, the balance of payments in the next year looks like this:

Balance of Payments							
Current Account							
		Credit		Debit			
(1) Exports		0					
	Merchandise and Services		0				
	Investment Income Received		0				
(2) Imports				-5			
	Merchandise and Services				0		
	Investment Income Paid				-5		
Capital Account							
(3) Increase in US Holdings				0			
of Assets Located Abroad							
("US Assets Held Abroad")							
(4) Increase in Foreign Holdings		5					
of Assets Located in US							
("Foreign Assets Held in US")							

Note, again, how the capital and current accounts sum to zero. Notice that eventually there must be a rise in net exports to pay for loan in the first year. Otherwise, the current account will tend to spiral off to minus infinity (think about why this would happen).

(c) Examples

The lifecycle of a typical person can be used to illustrate the basic ideas in balance of payments. Young people typical run current account deficits: their 'merchandise imports' (i.e., purchases of new homes and consumer durables like cars and appliances) exceed their 'merchandise exports' (i.e., sales of their services). As a result of this negative current account, foreigners (i.e., banks) accumulate claims (e.g., mortgages, car loans) on them, which they have to make payments on (i.e., investment income paid), which adds to the current account deficit. As the person grows older, exports of merchandise increase and they start developing a merchandise trade surplus. Eventually the surplus exceeds the deficit in the current account from investment income paid, and the current account itself turns into a surplus. At this point, the person is starting to accumulate more claims on foreigners than the other way around. Finally, in old age merchandise exports drop to zero when the household retires and income drops to zero. Although at this point there is a huge deficit in net merchandise exports,

the current account might nevertheless still be in surplus. This would be the case if the person's investment income exceeded their merchandise imports.

This model of the dynamics of the current and capital account is sometimes applied to countries. For example, the US was a young country in the middle of the 19th century when it began its industrial revolution. Merchandise exports were very negative and so was the current account. Foreigners accumulated claims on the US quickly. In the late 19th century, the merchandise trade balance started to go into surplus. However, the current account was still negative because investment income paid to foreigners was large. In the middle 20th century, the US starts to own more assets abroad than foreigners own in the US, so that net investment income is flowing into the country. At that point, the US is able to have a merchandise trade deficit even with a positive current account.

The attached figures give a sense of the direction of the flow of financial capital in the late 19th century. Note how the rich countries then, Britain, France and Germany, experienced capital outflows. Domestic absorption in those countries - the amount of domestic output 'absorbed' by domestic consumption, investment and government spending - was less that what was produced. So, goods flowed abroad in the form of positive net exports. The financial counterpart of this is that these countries accumulated financial claims against the countries with which they had export surpluses. That is, these countries 'experienced a capital outflow'. The second set of figures gives a sense of which countries received those capital inflows: Australia, Sweden, Canada, Norway, US, and Italy. These countries absorbed more goods than they produced and the used the capital inflows to pay for the difference. The bar chart in the third figure gives a sense of the fraction of investment that was financed by capital inflows in countries that received capital. That this is an interesting statistic is motivated by rewriting the national income identify:

$$I = S - CA.$$

When there is a capital inflow, then CA is negative. The left side of the equality indicates how much financing is required. The right side indicates the sources: S is domestic saving and -CA(>0) is foreign 'saving' into domestic financial markets. So, the fraction of investment financed by foreign saving when CA < 0 is -CA/I. The bar chart in the third set of graphs displays -CA/I for several different countries. Note that nearly 25 percent of Australia's investment was financed by capital inflows in the period 18701914. In the case of Canada the figure is much higher, nearly 35 percent.

Figure 12-2, taken from page 303 in the text, shows how the net foreign asset positive of the US has moved with the persistently negative current account over the past couple of decades. The negative current account has caused the foreign asset position to fall.

- 2 Exchange Rates
 - (a) Definition: spot exchange rate, s = units of domestic currency needed to buy one unit of foreign currency. Appreciation: $s \downarrow$, Depreciation: $s \uparrow$. This is the usual definition of s, although sometimes s = units of foreign currency per unit of domestic currency.
 - (b) They move around a lot!
 - i. Example 1: US dollar, Japanese Yen (see attached figure)¹ During 1982-1985, exchange rate was roughly s = 250 yen per dollar, after which the dollar depreciated significantly. This is tough on foreigners exporting to the US. Consider a car manufacturer whose costs of making one car is C = 2million yen. Suppose the manufacturer was making 10% profits, i.e., charging 2.2million = (1+m)C, with m = 0.10. The price in the US of the car is $P^{US} = (1+m)C/s = \$8,800$. Now, in the (brief!) period, 1985-mid 1986, the dollar depreciated (Yen appreciated) to 150 yen per dollar. The manufacturer has a couple of choices:
 - A. keep the profit margin unchanged and charge (1+m)C/s' = \$14,667. In this case, the Japanese car maker can expect to lose a lot of market share in the US.
 - B. keep the US price unchanged. But, then Japanese revenues are $88,800 \times 150 = 1.32$ million yen. This does not even cover costs, and implies a negative profit margin, as the following algebraic expression shows:

$$\frac{sP^{US}}{C} - 1 = m$$

Both margins hurt the exporters. As it turned out, the Japanese raised US prices only a little. This did not cost them much

¹Discussion taken from Backus and Roubini's new book, to be found at http://equity.stern.nyu.edu/~nroubini/NOTES/CHAP7.HTM#topicx

market share because US automakers raised prices too. It did not cost a lot in terms of profit margins because of two reasons. First, the Japanese found ways to cut costs. Second, they actually started out the period with very high profit margins (perhaps as high as 50%) due to the effects of the appreciating dollar that preceded 1982 (see attached figure, and note how the previous formula implies that m is increasing in s.)









Figure 59. Net Capital Inflows, 1880–1913

(In percent of GDP)

Source: Bloomfield (1968).

Figure 60. Contributions of Capital Flows to Investment, 1870–1914 versus 1980–90s

(Ratio of capital flows to investment)



Sources: Bloomfield (1968); and International Monetary Fund, World Economic Outlook.

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A string of current account deficits in the 1980s reduced America's net foreign wealth until, by the decade's end, the country had accumulated a substantial net foreign debt. Source: U.S. Government Printing Office, *Economic Indicators*, March 1998, April 2001. Japanese Yen Per US Dollar



Years