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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:

$$\begin{aligned} CA &= S - I = S^{private} + S^{public} - I \\ &= Y - (C + I + G). \end{aligned}$$

   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 Financial 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 financial 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				-
Financial 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 financial 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, 'financial 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 con-

structed correctly, the current account plus the financial account must sum to zero. In practice, since sources for the entries in the financial 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
Financial 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
Financial 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 financial 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. For a slightly more detailed treatment of the ideas in this paragraph, see the first set of four figures attached to these notes.

This model of the dynamics of the current and financial 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 (see Figure 58). 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 (Figure 59) 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 (Figure 60) gives a sense of the fraction of investment that was financed by capital inflows in countries that received capital.[1] 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

[1] These figures are taken from the IMF report available on the course website, with the material associated with lecture 1.

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 1870-1914. In the case of Canada the figure is much higher, nearly 35 percent.

Figure 12-2, taken from 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.

See the first of the last two attached figures for a graph of the Japanese exchange rate, which emphasizes how volatile the exchange rate is. Although when exchange rates are defined in the abstract (i.e., without reference to any two particular countries), s always means the domestic currency price of the foreign currency, in practice exceptions are made for individual exchange rates. This is done when, as in the case of the Japanese-Dollar exchange rate, the normal theoretical practice would involve working with tiny numbers. For example, the Japanese-Dollar exchange rate is around 0.008 in the late 1980s, if we use the normal theoretical convention. To avoid having to talk about such difficult-to-verbalize numbers, in cases like this the exchange rate is defined as units of the foreign currency per one unit of the domestic currency. This convention is followed in the case of the Japanese exchange rate. So, normally the Japanese exchange rate is presented as it is in the last attached figure.

(b) They move around a lot!

i. Example 1: US dollar, Japanese Yen[2]
During 1982-1985, the 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 $C = 2$million 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,

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

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 \$8,800×150 = 1.32million 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 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.

Current Account (Youth) < 0 (balance on merchandise and services)					
		Credit		Debit	
(1) Exports		small			
	Merchandise and Services		small		
	Investment Income Received		0		
(2) Imports				big	
	Merchandise and Services				big
	Investment Income Paid				0

Current Account (Older) < 0 (surplus on mechandise and services)					
		Credit		Debit	
(1) Exports		biggest			
	Merchandise and Services		biggest		
	Investment Income Received		0		
(2) Imports				2 big's	
	Merchandise and Services				big
	Investment Income Paid				big

In Youth, households have small income, but big expenses. Their income is low because this is typical in early career. Expenses are high as they buy a house, purchase furniture, car, higher education, etc. They have no investment income or earnings. When they become a little older their income jumps, say, to 'biggest' > 'big'. They haven't acquired any financial assets, so their investment income is still zero. But, the debts they undertook in youth are catching up to them, so investment income paid is high. Because income from salaries ('exports of services') is higher than expenditures, households have a surplus on merchandise and services, but still a current account deficit because of the interest on debt that they owe.

Current Account (Middle Aged) >0					
		Credit		Debit	
(1) Exports		biggest			
	Merchandise and Services		biggest		
	Investment Income Received		small		
(2) Imports				2 big's	
	Merchandise and Services				big
	Investment Income Paid				small

Current Account (Retired) = 0 (big deficit on merchandise and services)					
		Credit		Debit	
(1) Exports		big			
	Merchandise and Services		0		
	Investment Income Received		big		
(2) Imports				big	
	Merchandise and Services				big
	Investment Income Paid				0

When households move into middle age, they start to run a positive current account. Part of household debt is paid off, and some assets have been accumulated, which are starting to generate income. Now there are just surpluses. In retirement, the household earns zero on merchandise and services exports but receives a lot on investment income. It still makes big purchases of merchandise and services, but pays out no investment income. This household has a zero current account, and a huge deficit on merchandise and services. In practice, a retired household will actually run a negative current account too, by consuming more than its investment income and running down its assets. This strategy has to be pursued with care. If you live too long and run out of assets, you've got problems.

Figure 58. Net Capital Outflows, 1880–1913
(In percent of GDP)

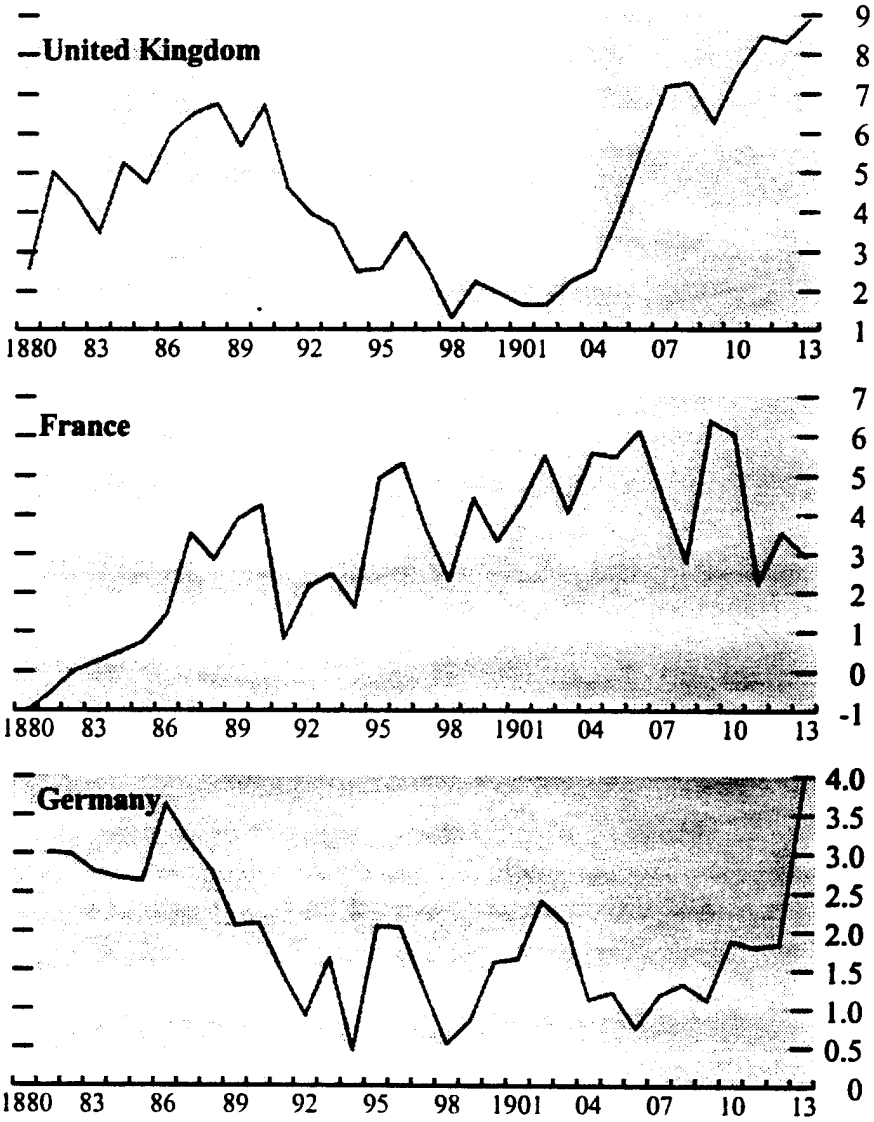
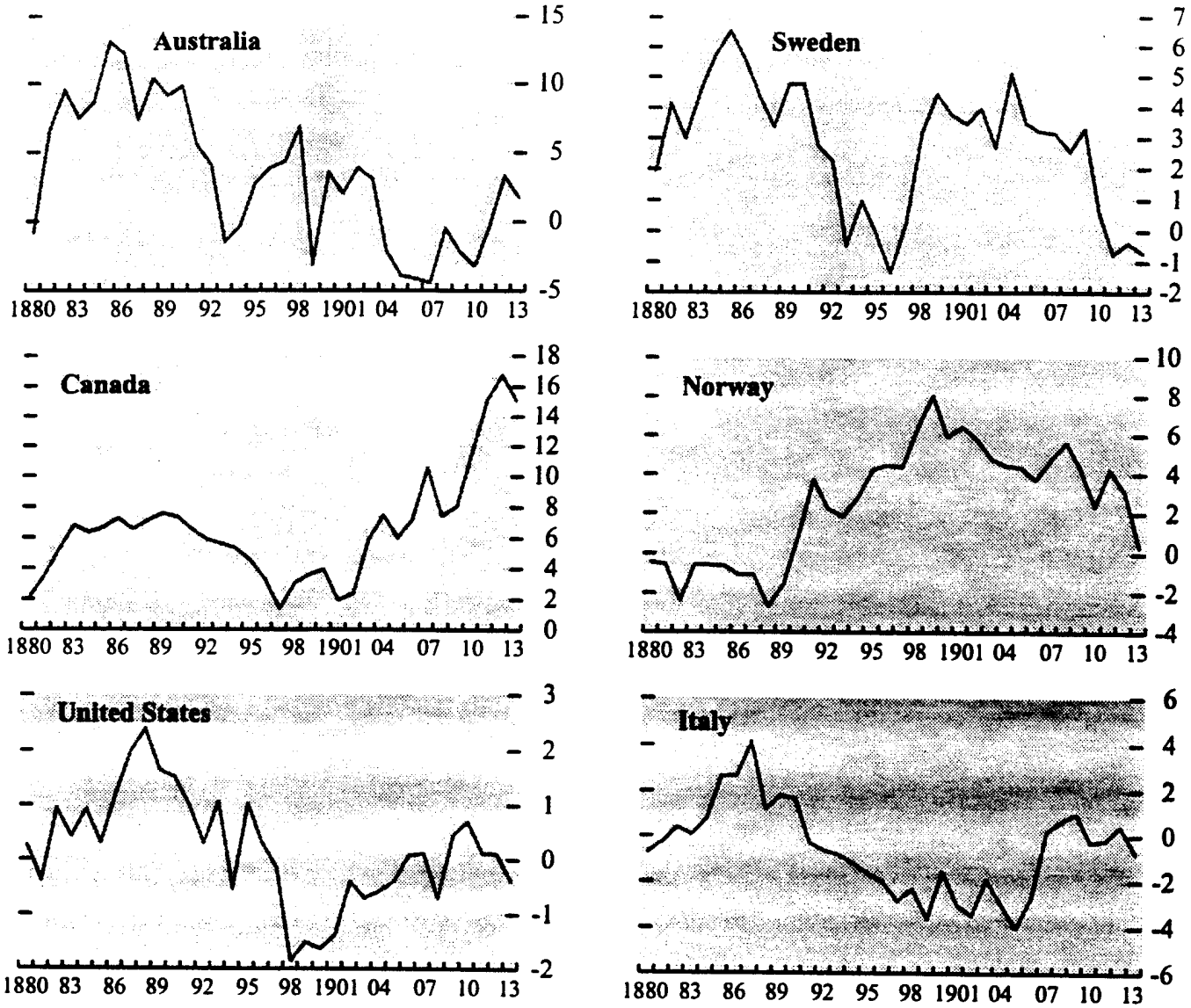
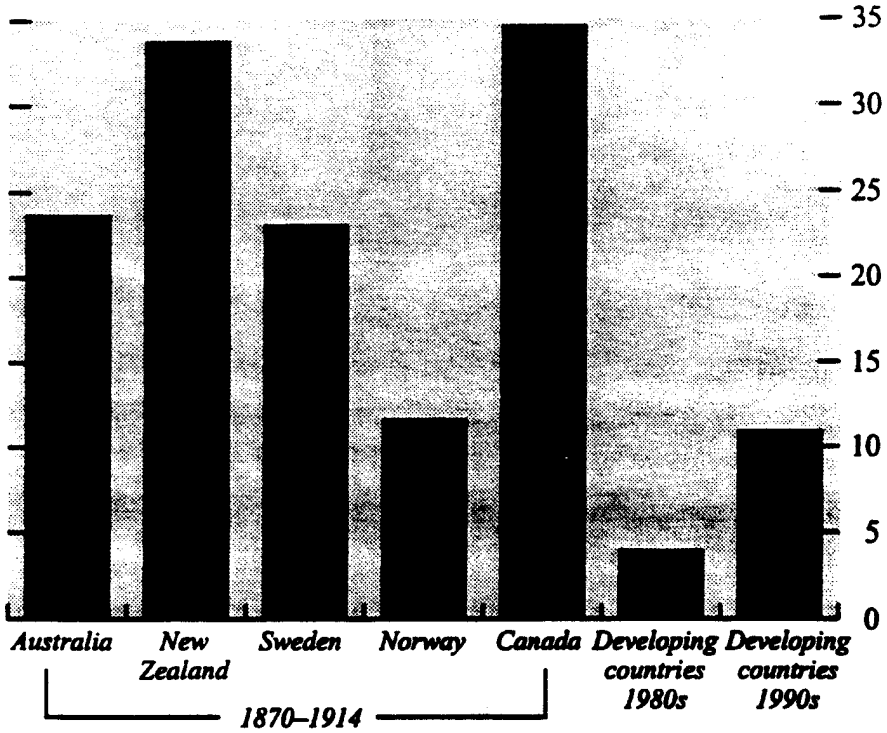


Figure 59. Net Capital Inflows, 1880–1913
(In percent of GDP)



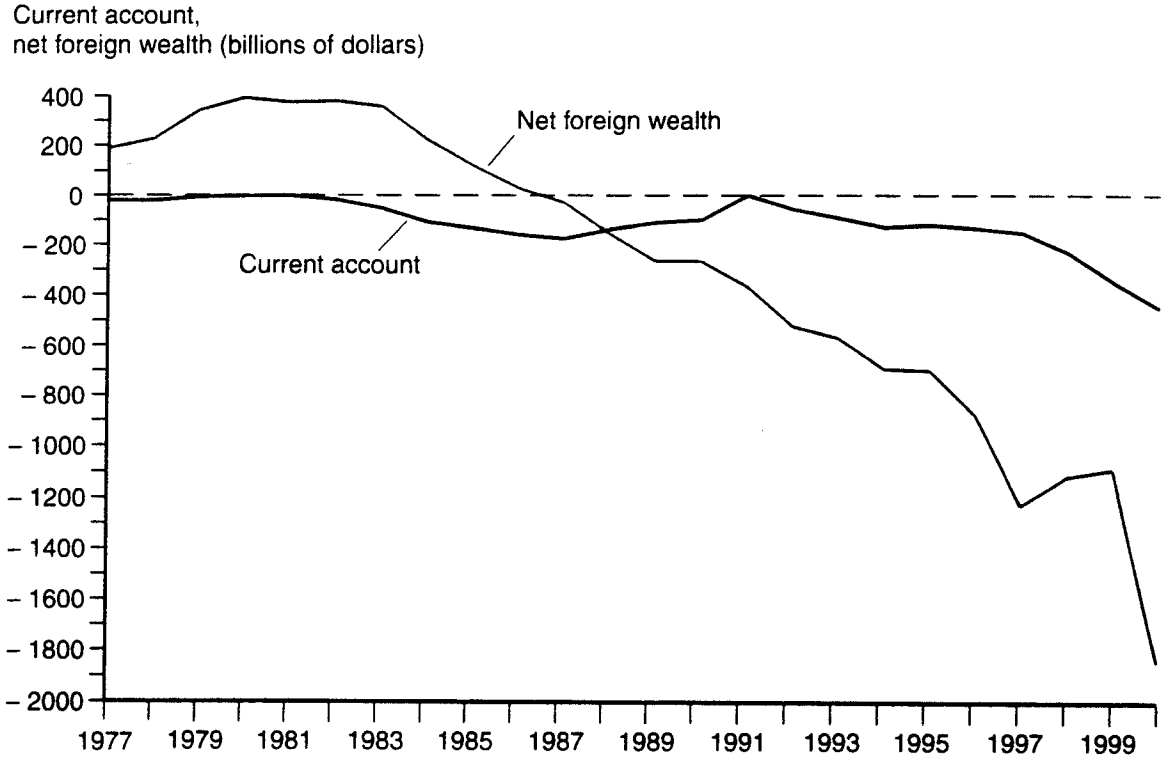
Source: Bloomfield (1968).

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*.

Figure 12-2 | The U.S. Current Account and Net Foreign Wealth Position, 1977–2000



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.

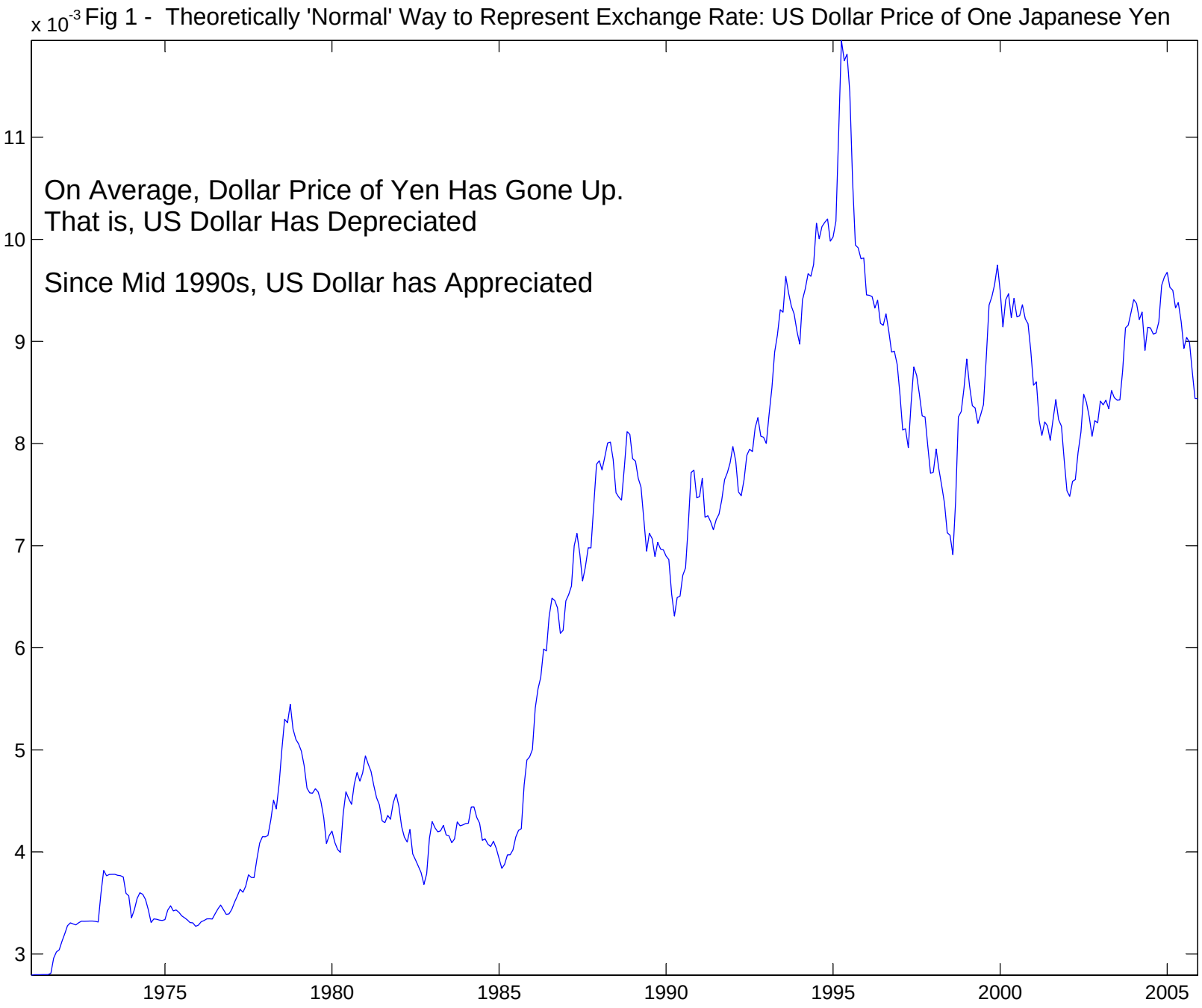

x 10-3
Fig 1 - Theoretically 'Normal' Way to Represent Exchange Rate: US Dollar Price of One Japanese Yen
On Average, Dollar Price of Yen Has Gone Up.
That is, US Dollar Has Depreciated
Since Mid 1990s, US Dollar has Appreciated
11
10
9
8
7
6
5
4
3
1975
1980
1985
1990
1995
2000
2005

Figure 2 - Customary Way to Present Japanese Exchange Rate: Yen per Dollar