Christiano 362, Winter 2003 February 17

Lecture #11: The J-Curve, and Japan.

- 1. The J-Curve.
 - (a) Model issues. Our analysis up to now depends on there being a tight, contemporaneous, connection between q and CA. When we think about CA more carefully, it's not so obvious that there should necessarily be such a simple relationship Recall what the current account is:

CA=stuff sent abroad - stuff imported from abroad.

Both parts of this have to be measured in the same units. In practice, they are measured in units of domestically produced goods. Generally, we have tried to avoid thinking in detail about the multiplicity of goods out there. But, now we really can't avoid it. In the current account, there are foreign and domestic goods. We need to recognize this. But, let's do so without getting involved in all the complicated details that dealing with lot's of goods requires. The simplest thing we can do is just assume there are two goods: Americans produce apples and foreigners produce oranges. Then,

CA = apples sent abroad

- apple value of oranges imported from abroad.

The notation we have used for 'apples sent abroad' is EX. The oranges imported from abroad correspond to foreigners' exports. So, it makes sense to call this EX^* (often, the foreign value of a variable is indicated by an asterisk, although we have often used the superscript, f). Then:

$$CA = EX(q) - q \times EX^*(q, Y - T).$$

Here, we indicate that EX is a function of q (this is the *relative* price of oranges, i.e., the price of oranges, divided by the price of apples). Similarly, EX^* , the oranges imported from abroad is a function of q and Y - T, the relative price and the disposable income of domestic residents. We don't include Y - T in EX, because EX is decided by foreigners and so it is a function of their Y - T. But, we treat that as exogenous, and so we don't even bother to include it explicitly in the notation.

Why is the current account specifically $EX - q \times EX^*$? Why does q appear separately in this expression? It's because $q \times EX^*$ is the apple value of oranges imported from abroad. To see this, note first that $P^* \times EX^*$ is the foreign currency value of imported oranges. Then, $E \times P^* \times EX^*$ is the value of imported oranges in domestic (i.e., US dollar) units. Finally, $E \times P^* \times EX^*/P$ converts this US dollar value into quantities of US goods. For example, if you had \$100 and the price of US goods (i.e., apples) were P = 2, then the goods value of the \$100 is 100/P = 50 units of goods. But, $E \times P^*/P$ is just q. This explains why $q \times EX^*$ appears in the expression for the current account.

Now, it makes sense to think of EX(q) as increasing in q and EX^* as decreasing in q. When oranges get relatively more expensive compared to apples (i.e., q rises) then the amount of apples sold to foreigners will rise (i.e., EX will rise) and the amount of oranges bought from foreigners will fall (i.e., EX^* will fall). Notice that this is *almost* enough to get the result that CA is increasing in q. It is not quite enough because the rise in q itself, other things the same, drives CA down. When we assumed before that CA is increasing in q we were implicitly assuming that this latter effect of q has a smaller impact on CA than the effect of q on CA via EX and EX^* . We will continue to maintain this assumption in the long run. Empirical analysis suggests that this is appropriate.¹ However, the same empirical analyses suggest that the assumption that CA is increasing in q may not be appropriate for the short run of 6-months to a year or so. The reason is that in the very short run variables like EX and EX^* are slow to adjust to changes in q. To some extent, these variables are determined by long-run plans that, absent a dramatic change in circumstances, do not get changed right away when q changes. The idea is that when a change in q occurs that is in fact quite persistent, then EX and EX^* don't change at first, and then they change after a while. Under these circumstances, it follows that in the very short run CA falls with a rise in q, and then when EX and EX^* have a

¹In the abstract, it's just not obvious whether $q \times EX^*$ should be increasing or decreasing in q. To illustrate this point, consider some examples. Suppose the price, P, of telephone services were to rise. Presumably, the quantity demanded, Q, would fall, as people started substituting towards other means of communication (e.g., they might rely on email more or even use the internet for phone conversations.) In this case, it is not hard to imagine that Q would fall so much that the dollar amount of expenditures on telephone services, $P \times Q$, would fall. Consider instead the case where Q is medical services. In this case, one might imagine that Q is relatively unresponsive to P, so that $P \times Q$ might actually rise with a rise in P.

chance to adjust, the rise that we have been assuming all along occurs.

- (b) J-Curve. Here are two examples taken from recent history that give different perspectives on the J-Curve.
 - i. US in the 1980s. Figure a shows the US exchange rate and current account data for the 1980s. Note that until 1985, the US exchange rate appreciated sharply (i.e., 1/E rises, so E falls). Then, suddenly, the exchange rate started to depreciate from 1985 on (the depreciation occured right after central bankers from the major developed economies got together in the Plaza Hotel in New York, and resolved to make it happen). The exchange rate appreciation in the first episode began in the middle of 1980, but the current account didn't start to fall until late 1982. There is maybe only a tiny bit of evidence that the current account actually went the 'wrong' direction initially in 1980. In the second episode, in 1985, there is a little stronger evidence that the current account initially actually deteriorated a little after the exchange rate started to depreciate. About two years later, the current account really started to turn around and go up. So, these data suggest that it takes two years for the current account to respond in the direction assumed by the theory used in the class.
 - ii. The Asian 'crisis' countries and Mexico (see Figures b-k). In each of Indonesia, Malaysia, Thailand, and Korea the value of the currency dropped by a factor of 2 or so in late 1997 (see the attached figures). In the case of Mexico the crisis occurred in late 1994. In each case, the current account turned around immediately and was in surplus very quickly. There seems to be no evidence of any J curve in these data: the relationship, CA(q, Y - T), assumed in our theory kicked into action right away. One reason for the absence of a J-curve in the crisis countries may be due to the large size of the exchange rate changes that were involved. When prices change a really large amount, people may well be willing to revise their spending plans (i.e., EX and EX^*) quickly. In assessing the implications of these data for the J-curve, it is important to recall that a lot more was happening in the crisis countries, beyond the simple fact that the real exchange rate changed. This was a time when foreigners' were very reluctant to accept Asian financial assets, making it hard to import goods. If people suddenly cannot import, it's not so surprising that their current account suddenly swung into surface.

It is interesting to think why there was such a sharp recession in the Asian crisis countries. Take the case of Malaysia. Many businesses in Malaysia had taken out loans in US dollars, under the assumption that the Malaysian government would preserve the fixed exchange rate of around 2.6 Ringgit per US dollar. Then, in a short period of time, the Ringgit depreciated 46 percent, to 3.8 Ringgits per dollar. To see how big this is, imagine a Malaysian firm with 100 million Ringgits of assets (the value of their land, buildings and machinery) and 30 million US dollars of foreign debt. Before the exchange rate crisis, this firm was in a comfortable position, with 22 million Ringgits of net assets (i.e., 100 million Ringgits of assets, minus 78 million Ringgits worth of foreign debt). After the exchange rate crisis, the firm's net asset position is -14 million Ringgits (i.e., 100 million in assets minus $114 = 3.8 \times 30$ million Ringgits in foreign debt). Technically, the firm is now bankrupt.

The sharp depreciation of the Ringgit, by significantly reducing firms' net asset positions (in some cases, driving them into bankruptcy), made it difficult for firms to acquire funding for investment projects. The resulting fall in planned investment is captured by a drop in I in our model. Through the usual mechanisms in our model, such a fall produces a reduction in output. This fall in output would have contributed to the rise in CA (and the depreciation in E) by reducing Malaysians' demand for imports. The fall in imports is probably part of the story behind the sudden rise in CA in 1998 that occurred in Malaysia and the other crisis countries.

2. The Japanese Economy. Following is a discussion of the Japanese economy. This section provides a brief overview of Japanese economic developments since 1900. Policy issues are considered in sections 3-6 below.² Here is a summary of section 2. In terms of per-capita income, Japan was substantially below the US from 1900 to the second world war, and showed no signs of convergence to the US. Adding on to this the devastation of WWII, Japan was a very poor country in 1945-46. After this, there was an explosion of growth in Japan. The growth brought Japan back to its pre-war trend per capita income by the 1960s. One might have expected Japan to level off at this point, and resume its old prewar growth path. Instead, explosive economic growth continued, eventually bringing Japan into the club of wealthy, developed economies. As convergence occured, Japanese economic growth naturally slowed down. But then, beginning the early 1990s, its growth rate actually dipped below that of the other developed economies. Japan remains a

²The charts were taken from www.yardeni.com.

wealthy economy today, but if the slow growth continues long enough the Japanese standard of living will start to drop significantly below that of the wealthy countries. Besides the overall poor economic performance of Japan in the 1990s, there were business cycle fluctuations, with recessions occuring in the early, middle and late 1990s.

• The Early Period. Before World War II, Japanese per capita output was substantially below that of the US, and it showed no signs of converging to the US. (Data on US and Japanese per capita income are displayed in Figure 0^3 .) There was an enormous plunge in output right after the war, but then output started to grow very rapidly. The data show that Japanese per capita output had returned to its pre-war trend by the early 1960s.⁴ This was to be expected, as Japan proceeded to reconstruct its economy after substantial war damage.⁵ The amazing thing is that Japanese output continued to surge at a dramatic pace, even after reconstruction was complete. The phenomenal Japanese growth rate did not start coming down from its superhuman levels until 10 years later, in the early 1970s. And, even then growth remained strong by world standards. For example, in the 1980s the growth rate of per capita output in Japan was more than twice as high as it was in the developed economies. (See the Table.) All this rapid growth put Japan very close to the US, the world leader in per capita income, by the late 1980s. It's as though whatever had kept the economy down before WWII was removed after the war, freeing Japan to build a world-class economy for itself.⁶

³This figure is taken from Maddison's Dynamics of Capitalist Economic Development.

⁴The data are reported in logs, so that the slope of the lines (times 100) correspond to growth rates. Draw a straight line through the pre-1940 data, and extend it into the future, and you'll see that that trend line bumps into actual Japanese per capita output in the early 1960s.

⁵The Solow growth model predicts that this will happen after a war that results in extensive destruction of capital. This model is covered in most Econ 311 courses.

⁶The magnificent performance of the Japanese economy in the post-war period is a subject interesting in its own right. Presumably any explanation has to incorporate a discussion of the role of the American military forces under General MacArthur that occupied Japan in the early post-war period. Many institutional and other changes occured in Japan at the time.

Table: Growth Rate, Industrial Production				
	1960's	1970s	1980s	1990Q1-1998Q1
Japan	13.65	4.86	4.00	0.56
US	5.34	3.00	1.91	2.89
OECD	4.12	3.08	1.64	1.28

- Although growth had been slowing in the 1960s, 1970s and 1980s, in those decades it was higher than US growth and growth in the OECD economies.⁷ Average output growth in the 1990s virtually came to a halt. (See Table.)
- There were fluctuations in the 1990s, with low output around 1992-1993, again around 1998 and since 2001. Output growth was relatively strong in 1995-1996 and 1999-2000. The rate of utilization of Japanese capital (factories, equipment, etc.) was generally low in the 1990s, although it fluctuated with output. (See Figures 1-3).
- Government spending growth slowed sharply in 1996-1997, sped up after that, and then fell in 2000. (Figure 4).
- Consumption growth displays a sharp, downward spike in 1997-1998. (Figure 5).
- Investment growth was slow throughout the 1990s, except it was relatively strong in the two boom periods. (Figure 6). The number of new homes built ('housing starts') was also low, but fluctuated in the 1990s. (Figure 7).
- The unemployment rate grew substantially throughout the 1990s. (Figure 8).
- Net exports (the 'trade balance') fluctuate (Fig. 9) throughout the 1990s, as do both exports and imports (Fig. 10). The behavior of net exports reflects that imports have a bigger amplitude of fluctuation. Until 2000, net exports were countercylical: they were high when the economy was weak and low when it was strong. More recently, the data deviate from this pattern, as the trade balance continues to weaken despite the fact that the Japanese economy is now also relatively weak.
- The value of stocks was very high in late 1989, and then fell throughout the 1990s. Now they are about 1/3 their value a decade ago! (Figure 11). This represents a staggering loss of

⁷The Organization of Economic Cooperation and Development is a group countries composed primarily of developed economies like Japan, the US and Europe.

wealth. Stocks measure the value of productive assets like factories and equipment and their decline in value reflects a loss in confidence that these assets will be productive and generate earnings.

- The Bank of Japan has been pushing short term rates down consistently since the early 1990s, and now they are essentially zero. (Figure 12).⁸
- The value of the Yen appreciated overall during the 1990s. However, its value fluctuated and was relatively low when output was relatively low in the early 1990s, the late 1990s and now. (Figure 13).
- Inflation was rising in the late 1980s, but then fell thoughout the 1990s. There has been deflation in Japan since 1998. (Figure 14).
- 3. Why did things turn down in 1990?

In part, this was part of a longer-run trend evident in Figure 0, and in the Table.

Conventional Answer - Policy makers in late 1980s had two concerns:

• inflation was increasing (see Figure 14).

Our model indicates that if you cut back on the money supply then eventually prices start to drop.

• they worried that the sharp rise in the Japanese stock market (see Figure 11) was a bubble that is better *popped* sooner than later.

A brief explanation is required of what a bubble is and what it means to *pop* it!

Investment activities are be financed by borrowing from someone. Lenders always worry that borrowers will default. To discourage people from doing this, lenders look for *collateral*. Collateral is something the borrower loses in case he/she defaults. It can take at least two forms. First, it could be financial claims on productive capital, like equity, that the lender can seize in case of default. Collateral like this is written directly into loan contracts. Second, it could be the value of the firm doing the borrowing. The more valueable the firm is - as measured by its equity prices, say - the more a lender is willing to lend. The lender knows the borrower is aware that the lender can use legal means to destroy the profitability of a firm that defaults. The lender to a firm that is highly

⁸The 'discount rate' is not actually a market interest rate. It is the interest rate the BOJ charges to banks for loans. Short term market rates follow the discount rate closely.

profitable knows that the borrower will do all it can to avoid default. In this case, the firm itself is its own collateral. Collateral like this does not need to be written directly into loan contracts. Either way, high stock prices support high investment. When stock prices soar, central bankers fear that the rise in prices represent a 'bubble': a situation where people pay high prices not so much because they think the underlying real assets are worth it,

but because they think there will be some other person willing to take it off their hands for an even higher price later. The concern is that at some point, reality will dawn and people stop buying. Then, the stock price falls to an appropriate value. People refer to this as the bubble *popping*.

But, suppose that a lot of investment is financed by loans that are collateralized by equity. If the value of the equity falls, then investment must fall. In our model, this represents a fall in the exogenous component of investment, and it would have a negative impact on the economy (recall that a fall in I shifts the DD curve left and produces a reduction in output). Central bankers are notorious for being humorless, and they think that all bubbles inevitably pop. The only question is, when. They think that the longer a bubble is allowed to proceed, the more the price has to fall when it inevitably pops. And, the more the price falls, the more investment falls. So, central bankers like to move early on a bubble, to pop it.

How does a central banker think he/she can pop a bubble? They do open market operations by selling government debt. This reduces the price of government debt and raises the interest rate. The fall in the price of government debt produces a fall in the price of all assets, because they are all substitutable at least to some extent. The idea is that by nudging asset prices down, they can actually push the asset price down to its fundamental value, from its bubble value.

Central bankers have always thought this way. The Bank of Japan in the late 1980s was not an exception. The US Federal Reserve was very concerned by soaring stock prices in the 1920s, and tightened monetary policy in part to pop that bubble.⁹ Indeed they did pop it. The largest interest rate hike produced by the Fed occured in late 1929, and was followed by the first massive stock market crash that launched the Great Depression. The Fed in the 1980s was also concerned about the possibility that there was a bubble in the US stock market then.¹⁰ In contrast to what the

⁹For a discussion, see Friedman and Schwartz, A Monetary History of the United States. ¹⁰A memorable statement from this period was Alan Greenspan's statement that the

Fed did in the 1920s, the Fed in the 1980s did not take action to pop any stock market bubble.¹¹

The generally accepted idea is that because of a combination of concerns about popping stock market bubbles, or fighting inflation, the Bank of Japan adopted a tight monetary policy in the late 1980s. This resulted in a contraction for the reasons in the DD - AA model. The value of the yen appreciated (see Figure 13), interest rates rose (see Figure 12), output fell (see Figure 1). Also, the stock market crashed over a very short period of time. This may well account for the dramatic reduction in investment that occured (see Figure 6).

4. Why did things turn down again in late 1997?

Conventional answers -

- concerns about fiscal budget led to reduction in G and rise in T. Note the sharp fall in G in Figure 4.
- problems in banking sector (partly because of Asian crisis) led to bankruptcies and interruptions in lender-borrower relations, as though there were a fall in *I*.
- Asian crises contributed to weak aggregate demand (however, Figure 10 does not show a big fall in exports for this period.)
- 5. Why did things pick up again in 1999-2000? One explanation: high G growth was restored (see Figure 10). Then, output fell again as G growth dropped again.
- 6. Why is investment so low in Japan? The problem of bad bank loans.

The Economist magazine has emphasized that bad bank loans may be at the heart of the problems of the Japanese economy. (See article 1 on the course website.) A simple explanation of how bad bank loans may be at the heart of the low level of investment in Japan (see Figures 6 and 7) will be discussed in class.

high stock market reflected 'irrational exuberance'. Greenspan is the Chairman of the US Federal Reserve.

¹¹Perhaps the Fed was mindful of the experience of the 1920s, or of the BOJ in the late 1980s. Actually, critics of the Fed argued that the Fed in fact helped *fuel* the bubble. The Fed responded to the stock market reductions in 1987 and 1998 by buying government debt and thereby helping to drive the stock market up. By doing this, the critics argued, the Fed encouraged even normally sane market participants to be incautious about paying high prices for equity.



Fig. a: Nominal US exchange rate and current account













* Source: IMF International Financial Statistics.









FIGURE O

LONG-RUN DYNAMIC FORCES































