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C06, Fall 1999
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Note: Only Figure 1 (they are the first three figures, not labelled) and Figure 8 are attached directly to this document. The remaining figures have to be downloaded separately.

Lecture #12: The $J-$Curve, Financial and Goods Market Shocks.

1. J-Curve. Here are two examples that give different implications for the time it takes for $J-$curve effects to work.

   (a) US in the 1980s. Figure 6 from Lecture 11 shows the US exchange rate and current account data for the 1980s. (The inverted 'V' curve is $1/E$, and the curve that begins around the zero line is the current account divided by GDP). 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 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.

   (b) The Asian 'crisis' countries and Mexico (see the figures from Lecture 2). For concreteness, we focused on the Malaysian case in class. Note how the exchange rate depreciated sharply in late 1997 (see the attached figures). Then, the current account *immediately* swung towards surplus. These data indicate that there was essentially *no* J-curve: 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. Another reason for the absence of the $J-$curve is that a cutback in imports may have been reinforced by the factors that contributed to the recession that occurred in Malaysia in 1998 (according to the attached figure on industrial production, if Malaysia had continued on its

pre-crisis trend, industrial production would have been nearly 180 in 1998 whereas it actually was around 140, for a 20% drop!).

Why was there such a sharp recession? One reason was that many businesses 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. Stabilization Policy. 'Stabilization Policy' refers to the policy of the government, in manipulating M, G, T to stabilize the economy's response to shocks. Roughly, shocks divide into two types: financial market shocks, which shift the AA curve and aggregate demand shocks which shift the DD curve. I will only consider shocks that are expected to be temporary.

   First, let's review how these shocks affect the economy in the absence of any government response. As a way of bringing this analysis to life, we use this information to make an educated guess about the source of shocks driving the US business cycle. In Lecture 13, we consider what the government can do to stabilize the economy's response to a shock. There, we'll also evaluate the pros and cons of using fiscal and monetary policy to stabilize financial market and aggregate demand shocks.

   (a) *An Aggregate Demand Shock*

An aggregate demand shock could be a shift down in the $C(Y-T)$ curve, or the $CA(q, Y-T)$ curve, or a shift down in I, G. A shock to planned household consumption can occur for many reasons. For example, a prominent economist, Olivier Blanchard, argued that there was a negative shock to $C(Y-T)$ in 1990. Blanchard noticed that in that year, consumption fell by a large amount, more than could be explained by any movements in Y or T. The fall in consumption mainly was due to a cutback in household purchases of durable goods, like automobiles, VCR's, televisions, etc. Blanchard reasoned that the crisis in the middle east, then underway, may have sparked a fear in the minds of households that another recession like the 1974-1975 recession might occur. The latter recession is often attributed to a conflict in the middle east in 1973 (the Yom Kippur War) which led to a sharp rise in oil prices.[1] When households fear a recession may occur, it is reasonable for them to put off expenditures on durables.

A shock to I could occur for similar reasons, a fear that the economy may not be strong in the future. Another possibility, thought to have been important in the Asian crisis countries, is that something happens which reduces the net asset position of firms, and forces them to cut back on I. Interestingly, shocks to I or $C(Y-T)$ can be self-fulfilling according to our model. According to the model, a reduction in I and/or $C(Y-T)$ arising from the fear of an upcoming recession will produce an actual recession!

Figure 2 displays the effects of a negative aggregate demand shock in the $DD-AA$ model. Output is initially at Y_1 and then falls from point 1 to point 2, where output is Y_2 (you should be sure you understand what the significance of the point, Yt, is in the figure). At the same time, the exchange rate depreciates from E_1 to E_2. Figure 3 displays the time path of the various variables.

(b) *Financial Market Shock.*

One type of financial market shock could induce a shift up in the money demand curve. Why might this happen? Usually, the only thing that can shift up that curve is an increase in Y (a change in R induces a move along the curve, since R is on one of the axes). There are other reasons the money demand curve might shift up. For example, people in financial markets may suddenly become fearful that there will be a stock market crash. Such a fear could break out, for example, if a prominent personality starts to

[1] Actually, the causes of the 1974 recession are still debated today. Some argue that the recession reflected a sharp monetary tightening initiated by the Fed to fight inflation. Consistent with this latter interpretation, short term interest rates soared to heights unseen in the post-WWII period in 1973 and 1974.

speculate in public that the stock market is overvalued, or that the high price of stock reflects 'irrational exuberance'. This could encourage people in the thought that the stock market is high for no good reason, and that therefore it's about to fall in value. Such a concern would lead individuals to convert some of their stock market holdings into cash. The idea is that, if the stock market indeed does crash, then the person can use the cash later to buy back the stock at very low prices. Thus, suppose you have \$100 worth of stock. You become convinced that the stock market will fall 10 percent tomorrow. That means that your stock tomorrow will be worth \$90. Under these conditions it makes sense to sell today, and convert the \$100 into cash. Then, tomorrow buy back your stock for \$90. This strategy has netted you \$10! Add a few zeros after these numbers, and it is easy to see why a concern that the stock market is about to fall can induce a desire to shift wealth into cash.

What does this mean from the point of view of our model? It means that for every Y, P and R, households now want to hold more M. That is, that the money demand curve shifts to the right. Interestingly, this is another example where expectations can be self-fulfilling. The concern that the stock market will crash leads everyone to sell. That brings the stock market down. In addition, we'll see in a minute that the shift up in the demand curve gives rise to a recession. That also puts a damper on stock prices, as firms are forced to cut back on dividend payments. So, the fear of a stock market crash can actually be self-fulfilling.

Let's see how to work out the effects of an increase in money demand in our model. First, consider the impact on the AA curve of the increase in money demand from $L(R, Y)$ to a higher curve, $Lp(R, Y)$. Figure 4 shows what happens to the exchange rate, E, after the increase in money demand, if we hold Y, P, M, E^e fixed. The effect is to raise the nominal rate of interest and appreciate the currency. The interest rate is higher, because that's the only way to reconcile the higher level of money demand with the unchanged stock of money that is in the financial markets (remember, we hold M, P fixed). The exchange rate is lower because that's the only way to reconcile two requirements of international financial markets: (i) eventually, the exchange rate has to be back where we started because the shock is temporary and (ii) the exchange rate has to get there by depreciating, since otherwise the return on US dollar assets would exceed the US dollar return on foreign assets.

Because, for every Y, a lower E is now required to clear the financial markets (i.e., satisfy UIP and the money demand equals money supply equation), it follows that the AA curve shifts *down*

with the increase in money demand.

It is not hard to guess what will happen to the general equilibrium of the economy with the increase in money demand. The appreciated exchange rate will hurt the current account, and thereby will start the economy on the path towards recession. That is, the fall in E, given that P^* and P are fixed, implies a fall in the real exchange rate, $q = EP^*/P$. With the fall in the price of foreign goods relative to foreign goods, CA falls, reducing aggregate demand. This fall in aggregate demand gives rise initially to unintended inventory accumulation (see Figure 5). Firms respond to this by gradually reducing output and employment. As output begins to fall, this has a feedback effect on the financial markets. The fall in output shifts the money demand curve back to the left, bringing the interest rate back down and driving E back up somewhat. It's hard to see graphically how all this works out in the end using the diagrams in Figures 4 and 5. This is when the AA and DD curves are handy. These are displayed in Figure 6. Note the shift down in the AA curve. The values of the exchange rate, E_1 and E_2, and the value of output, Y_1, in Figure 6 coincide with the corresponding variables in Figure 4.

The economy begins at point 1 in Figure 6. With the rise in money demand, the AA curve shifts down. Then, the exchange rate falls from E_1 to E_2, as in Figure 4. At this point (point 2) the financial markets are in equilibrium. However, as noted above, the goods market is not in equilibrium at point 2. The unintended inventory accumulation that occurs there leads firms to reduce output, so the economy has a tendency to move in a westerly direction from point 2. However, as soon as output drops even a little, the financial markets are out of equilibrium (we're above the AA curve). This has the effect of raising E above its low level of E_2. The economy moves in this way, with E rising and Y falling, until point 3 is reached and we're in an equilibrium. The notion is that eventually, the money demand shock reverses itself (remember, it was assumed to be temporary), and the economy ends up going back to point 1. It is easy to confirm that a temporary positive shock to money demand has essentially the same effect as a temporary negative shock to the money supply. You should confirm this for yourself.

A (crude!) depiction of the main variables over time after a temporary increase in money demand appears in Figure 7.

(c) Business Cycles. The previous discussion showed that a bad shock to asset markets (an increase in money demand or a decrease in the money supply) has a very different impact on financial mar-

ket variables than a bad shock to aggregate demand. The former makes the interest rate rise and the exchange rate appreciate, while that latter has the opposite impact on financial variables. This provides potentially important clues about the source of shocks to the business cycle. The idea is that if interest rates are high at the start of a recession, then the culprit was an asset market shock. If interest rates are low, then the likely culprit is a goods market shock. Figure 8, attached, exhibits the short term US rate of interest for the period, 1954 to 1998.[2] Note the vertical bars. In each case, the first bar marks the beginning of a recession (as determined by the National Bureau of Economic Research) and the second vertical bar marks the end. There are six recession periods in the Figure: 1960, 1970, 1973-74, 1979, 1981-82, 1990. Note that in each case, except the 1990 recession, the beginning is marked by a sharp rise in the interest rate. As the recession gets underway, the interest rate typically comes down. This is precisely what our model predicts: initially after a positive money demand shock or a negative money supply shock, the interest rate spikes up, and then it comes down as money demand shifts left while the economy slips into recession.[3]

The 1990 recession looks different from the others. In that case, the interest rate had spiked earlier, in 1988, and had been coming down for over a year, before the recession started. Since the beginning of that recession is marked by a falling rate of interest, it looks like it might have been triggered by a bad aggregate demand shock, along the lines discussed by Blanchard, and reviewed above.[4]

[2]The interest rate in Figure 8 is the Federal Funds Rate. This is the interest rate that banks pay for Federal Funds: deposits that banks hold at the Federal Reserve. When banks send payments to each other (for example, to redeem checks written by depositors), the payments are typically made in the form of Federal Funds. In effect, banks pay each other by writing checks on their deposits with the Fed.

[3]The behavior of the exchange rate in these periods does *not* conform to what the model would predict based on a financial market shock. One interpretation is that this reflects some of the empirical problems of UIP, which were discussed in an earlier lecture.

[4]There are people who argue that the 1990 recession was not an exception, and that it too was due to a financial market shock. They argue that the financial market shock occured in 1988 and that the '1990 recession' actually started back in 1988. Their position is that the National Bureau of Economic Research got the timing of the start of that recession wrong.

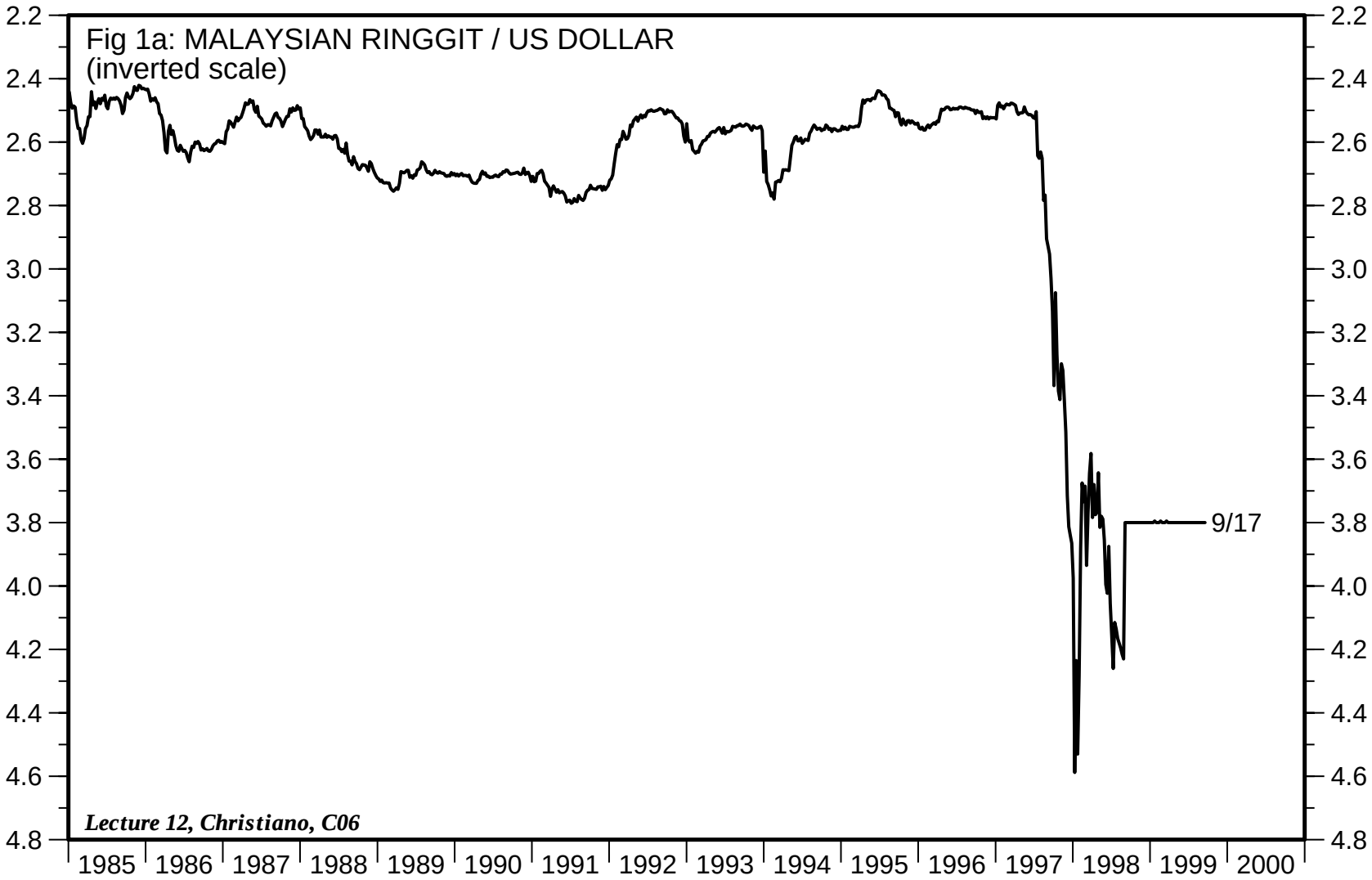
Fig 1a: MALAYSIAN RINGGIT / US DOLLAR
(inverted scale)
2.2
2.4
2.6
2.8
3.0
3.2
3.4
3.6
3.8
4.0
4.2
4.4
4.6
4.8
9/17
Lecture 12, Christiano, C06
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
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1996
1997
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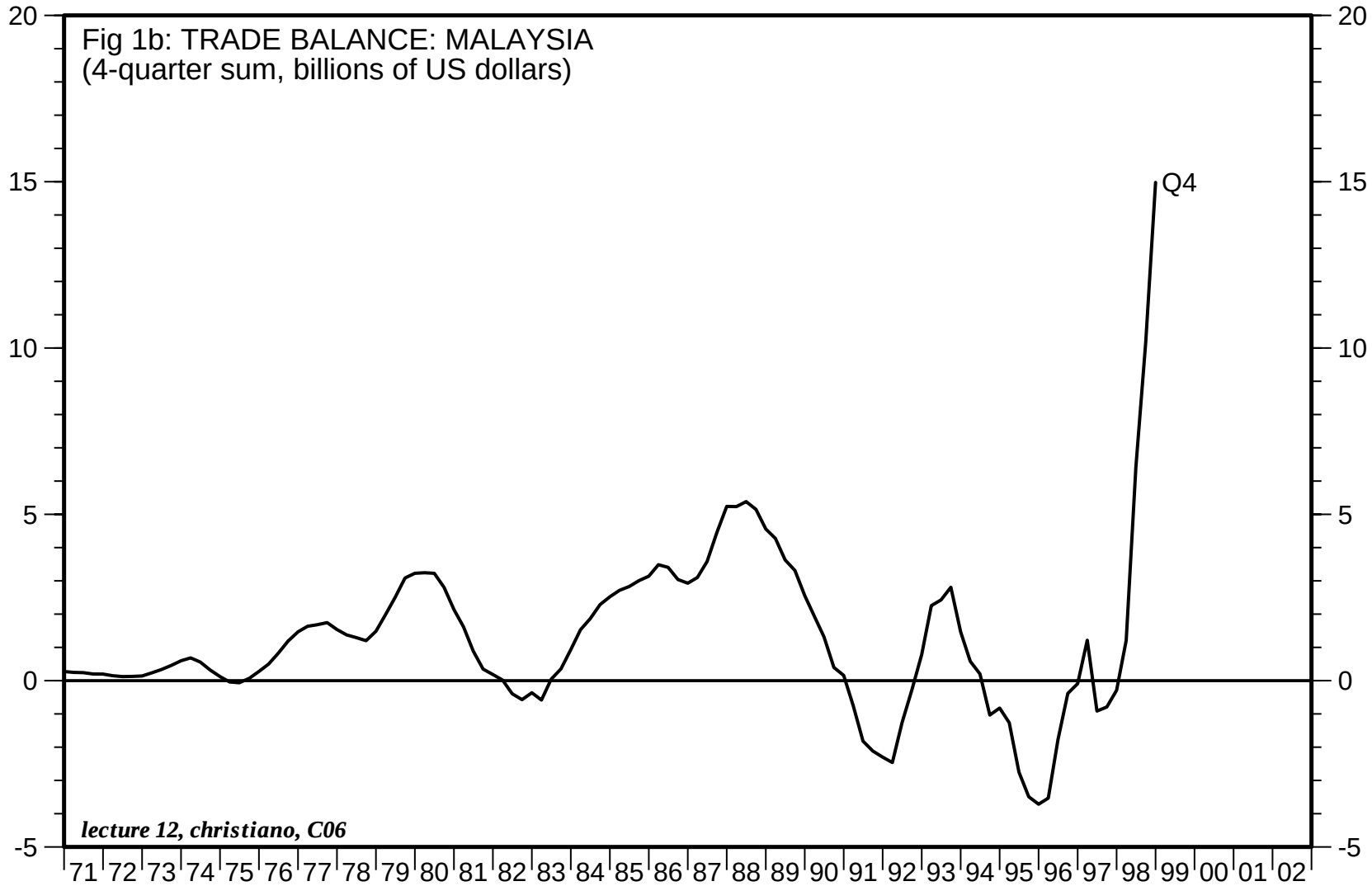
1999
2000



* Source: IMF International Financial Statistics.

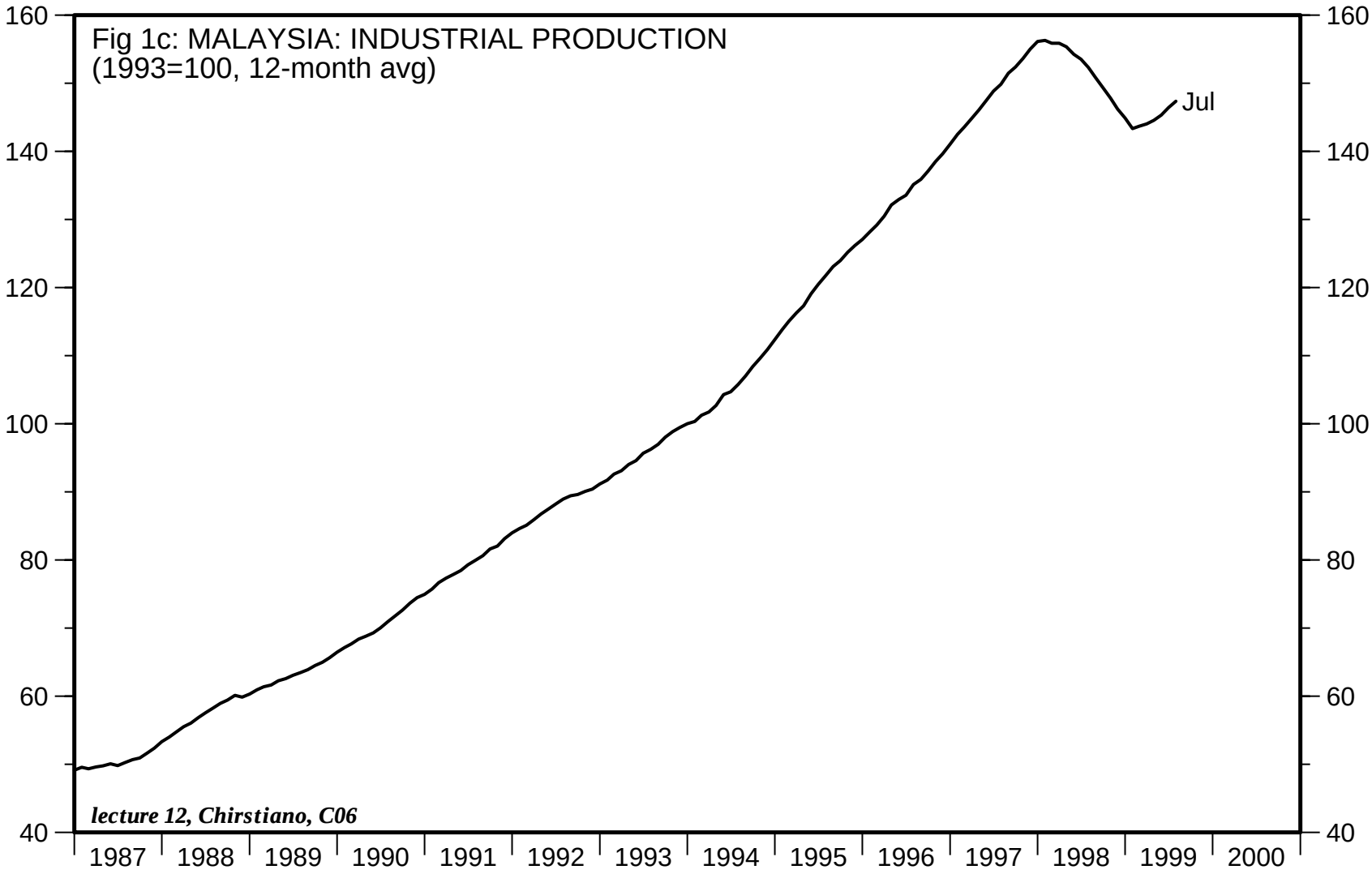


Fig 1c: MALAYSIA: INDUSTRIAL PRODUCTION
(1993=100, 12-month avg)
Jul
lecture 12, Chirstiano, C06
160
140
120
100
80
60
40
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000

Fig 8: Short Term US Interest Rate and Recessions

First vertical bar: start of recession, second: end of recession