14.05 Intermediate Applied Macroeconomics
Problem Set 6 Solutions

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Due: December 1, 2005   Frantisek Ricka

1. The Great Depression

a) Briefly describe the course of the Great Depression in the US. In your answer, be
   sure to note when the Depression started, when it was at its deepest, and when it
   recovered.
   In the US, the Great Depression started in 1929. It was at its deepest in 1932, at
   which point industrial production was a little over half its pre-Depression level.
   Industrial production recovered to its pre-Depression peak by about 1936.

b) Using the Mundell-Fleming model with fixed exchange rates, briefly describe the
   position of the US, the UK and Germany within the gold standard in 1931. Draw
   graphs in the (ε, Y) space to illustrate your answer. [Hint: you should work with
   rational expectations, making use of the uncovered interest parity condition].
   In Germany, the recession shifts the IS to the left in the (ε, Y) space, creating
   expectations of a devaluation of the mark. From the UIP condition $(i=i^*+E(\acute{\varepsilon}/\varepsilon))$,
   we see that expected devaluation raises the interest rate. The interest rate would
   need to be very large for Germany to attract capital from other countries. To try to
   solve this situation, Germany suspended the free flow of gold in July 1931. It
   regained control of the monetary policy, but it decided not to expand money
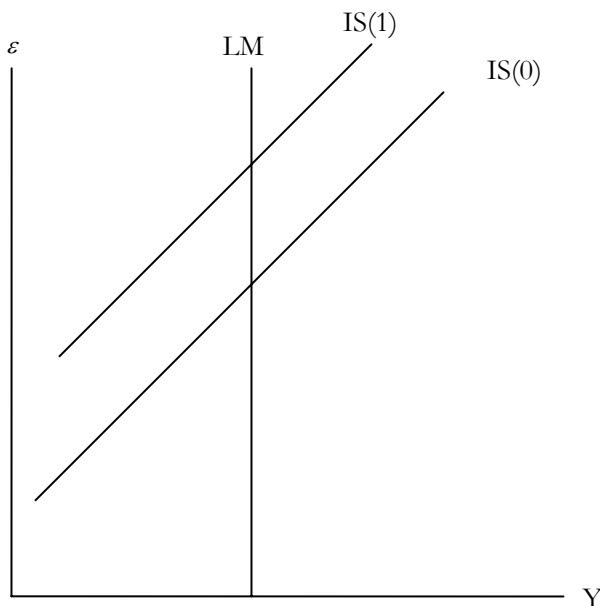   supply. Therefore, it was unable to fight the recession and increase output.

Figure 1

In the UK there were also expectations of a devaluation The Bank of England devalued in September 1931, allowing the exchange rate to rise, but it didn't expand money supply immediately. So, the situation is similar to figure 1.
The US responded by contracting money supply, which led to an increase in the interest rate of two percentage points. It was able to satisfy the UIP condition and to keep a fixed exchange rate. However, this contractionary monetary policy made the recession even worse. The US situation can be described by figure 2.
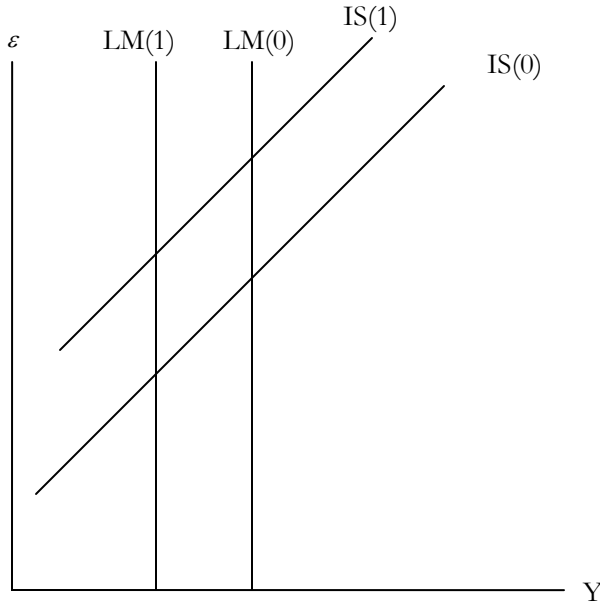

Figure 2

c) When the UK devalued, explain what policies would work to inflate the economy. Draw a graph in the (ε,Y) space to illustrate your answer.
If the UK adopted an expansionary monetary policy, it would be able to fight the recession. Moreover, the monetary expansion would offset the negative effect of the devaluation on the other countries. A devaluation is often seen as a "beggar-thy-neighbor" policy, because it increases net exports in the country that devalues at the expense of reducing net exports for its trade partners. If the country that devalues also increases money supply and it is big enough to influence the world interest rate (i*), the interest rate will fall, offsetting the negative effect of the devaluation on the rest of the world.
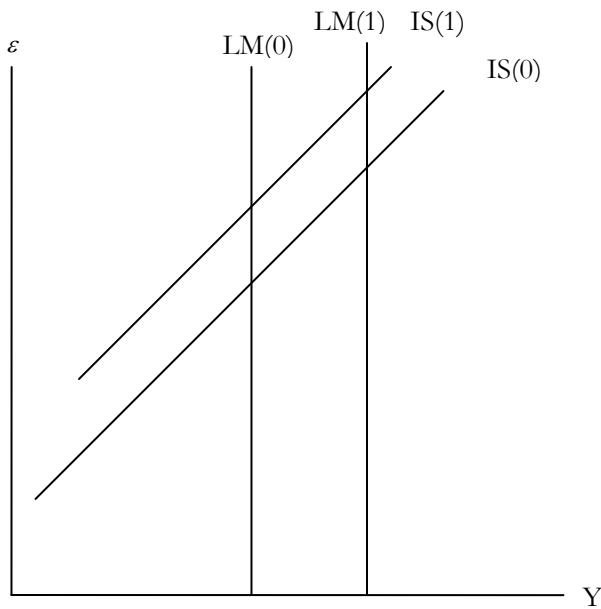
2

LM(1)   IS(1)

ε   LM(0)

IS(0)

Y

Figure 3

d) Highlight the main reason why, in Temin's view, the eventual recovery was quite rapid in the US relative to other nations. What were the macroeconomic policies that lead to the recovery?

According to Temin, the recovery that started in 1933 in the US was relatively rapid because of the change in policy regime that was associated with the start of Franklin Roosevelt's presidency. This contrasted with a more continuous approach to policy in, for example, the UK and France. (By comparison, Germany also changed its government and policy regime in 1933, and also recovered quickly). In the US, the government that supported orthodox policies including defending the gold standard was defeated and replaced by a government committed to economic expansion. In the early 1933 the dollar devalued and monetary policy expanded. Also, a whole range of New Deal policies were introduced, including reform of the banking system, deposit insurance, and government involvement in wage and price setting. These policies explain the economic recovery in 1933.

2. Great Depression and Today

Rodrigo de Rato, the head of the IMF, said, "Governments have two choices: one is to address the issue [of global imbalances] with a change in policies; the other is to let market forces resolve the problem for them, which could be much more costly and risky. The United States needs to speed up reduction of its public deficit, and we hope that this will be reflected in the administration's policies as soon as possible."

a) What are the global imbalances that de Rato is speaking of?

The global imbalances are a large capital inflow and negative net exports. By the balance of payments condition:

$$CF(i - i^*) + NX(\frac{\varepsilon P^*}{P}) = 0$$

The US has CF > 0 and NX < 0.

b) How could "market forces resolve the problem"? *Hint: capital imports have enabled the US to "live beyond its means" (in Eichengreen's words). If foreign countries do not wish to hold dollars, then US consumption must fall. Use a diagram in (ε, Y) space to show the connection between C and ε. Further hint: if foreigners expect ε to rise, what will happen to the US interest rate and investment? How will this affect ε?*

If foreign countries do not wish to hold dollars, net exports must rise for the balance of payments condition to hold. So, there must be a depreciation of the dollar. Consumption must fall for the exchange rate to depreciate, as in figure 4. If foreigners expect ε to rise more, the interest rate will need to rise. We can see it from the uncovered interest rate parity condition:

$$i = i^* + E(\frac{\dot{\varepsilon}}{\varepsilon})$$

Because the interest rate rises, investment falls and the IS shifts to the left even further in the (ε, Y) space, leading to an even larger depreciation.
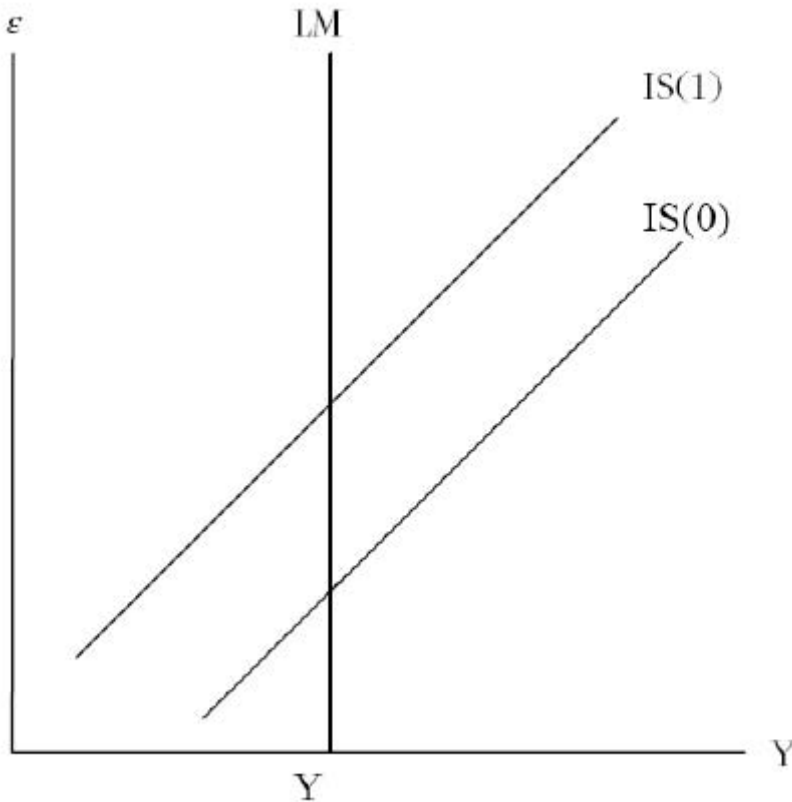

Figure 4

c) Explain why current exchange-rate regimes make this problem less acute than the global imbalances that resulted from the First World War.
During the First World War there was a fixed exchange rate regime. This regime is sustainable only while the Central Banks have enough reserves to keep the exchange rate fixed. If there are expectations of a depreciation, the interest rate must go up, leading to a currency crisis. Today there is a flexible exchange rate. If the dollar depreciates slowly, there will be no currency crisis.

d) Describe how market forces resolved problems of global imbalances in the 1930s. Do these events fit de Rato's description as "costly and risky"?
In the 1930s the US increased the interest rate in response to the expectations of devaluation. This contractionary monetary policy was costly as it led to the Great Depression. In Germany, there were capital controls but no expansion in money supply. The cost in Germany was the rise of a totalitarian regime.

e) What would the United States government have to do to resolve its part in the global imbalances? Be specific.
The US would have to reduce the public deficit in order to decrease its capital inflows. As we saw in part (b), this can be accomplished by increasing net exports. For that, consumption, investment and/or government spending have to decrease to have a depreciation of the dollar. Moreover, there is the problem of how to finance the social security reform. If the government creates individual accounts and, at the same time, keeps the benefits constant and does not raise new taxes, the reform can only be financed through borrowing, which would increase net capital inflows even further.

3. Analysis of Labor Market Fluctuation with Friction

a) Consider a world in which unions prevail, so that wages are set before market conditions are known. In other words, nominal wages are fixed. Demonstrate in a graph drawn in $(w/p, L)$ space how this market could sustain involuntary unemployment. In this model, when there are fluctuations in the market for goods, does the labor market stay on the labor supply curve or the labor demand curve? Why?
Because nominal wages are fixed, the real wage is determined by fluctuations in the price level. If the price level is below the level that would equilibrate labor supply and labor demand, we can get involuntary unemployment (i.e. there are not enough jobs available for the number of people who would like to work at the going wage). The situation is depicted in Figure 1.
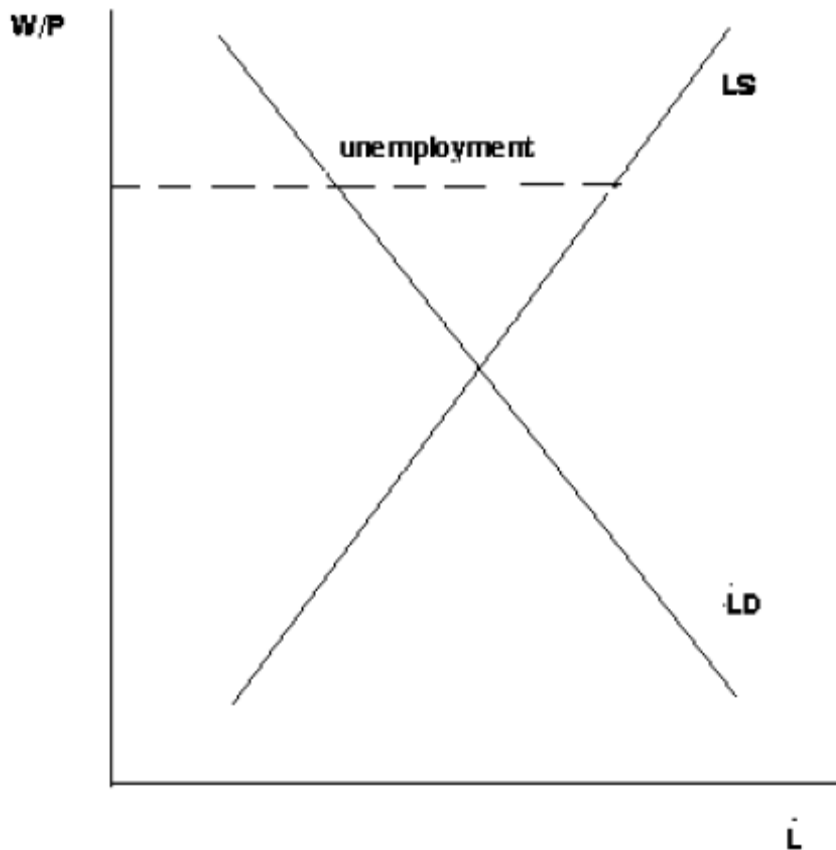
Figure 1:

b) Now consider a world where unions play an insignificant role in the wage setting process. Suppose, in fact, that wages are perfectly flexible. Assume imperfect competition in the product market, so that $P = \bar{P}$ up to some y^{max}, at which point the producer will refuse to produce the product at $\bar{P}$. First, discuss what determines y^{max}. How does the producer decide its value? Then show how this labor market looks in (w/p, L) space. In this model, do we stay on the labor supply curve or the labor demand curve? Explain.

In this model of imperfect competition, producers set price above marginal cost. As the nominal wage changes, their cost may increase, but as long as their costs remain below the price that they are charging (which is fixed in this model), they will continue to meet demand at the prevailing price. If wages increase such that price is below marginal cost, however, they will refuse to produce their goods. So they will produce until the point that $P = MC$; or Y^{max}. See Figure 2. In this

6

model, we are always in equilibrium in the labor market. Wages can adjust to account for market conditions. A fall in aggregate demand, for example, will lead to a decrease in the wage because firms are demanding less labor. But at this lower wage, fewer workers want to work. So we are still at equilibrium, both on the labor supply curve and the effective labor demand curve.
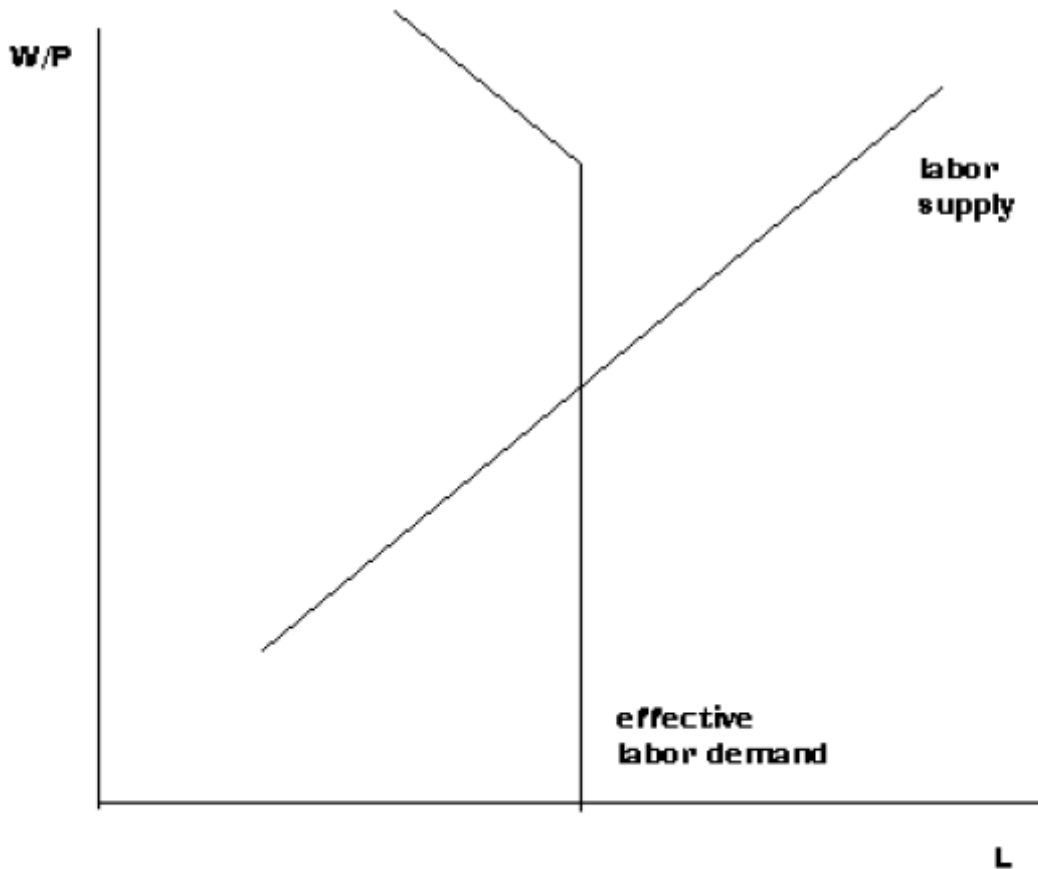

Figure 2:

c) Which model best explains the rise in unemployment in the contraction that became the Great Depression? Based on this model, show the effect of a decrease in aggregate demand on the real wage, the amount of labor employed, and unemployment in each case. Use a graph/graphs and explain. How closely do the predictions of this model match what happened historically?

We know that prices were falling during the period in question, so we may choose model (a) to allow for this. Here, a decrease in aggregate demand would cause prices to fall, and therefore the real wage to rise. We would get involuntary unemployment at the going wage, as discussed in part (a). This model predicts a

rise in the real wage, a fall in the amount of labor employed, and a rise in unemployment. Historically, we did see prices fall, we did see unemployment rise, and we did see a fall in the amount of labor employed. But we also saw nominal wages falling at this time, which this model does not capture. The situation is presented in Figure 3.
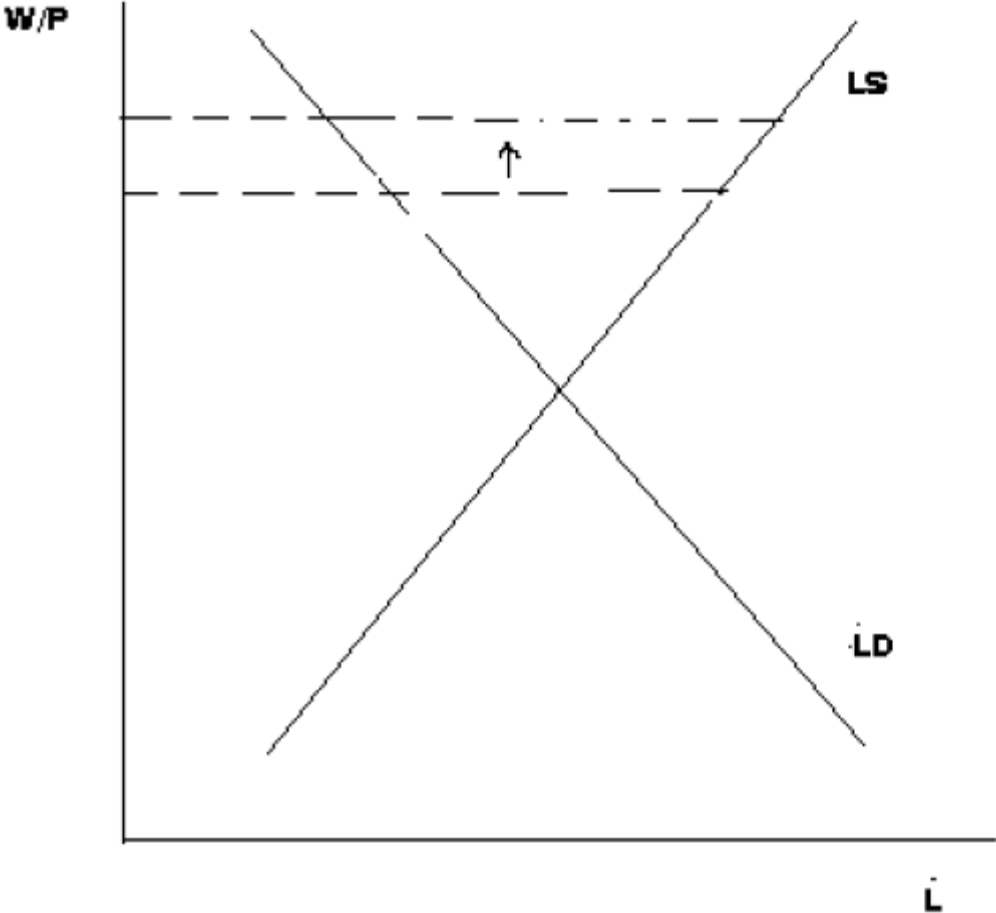

Figure 3: