

Economics 302: Macroeconomic Analysis
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Problem Set #4

Due: Wednesday, December 8, 2004

1. Suppose that the government of a particular country decides to enact legislation that makes it more costly for firms to layoff workers, under the rationale that this will protect employment in a recession. In the labor market model that Blanchard develops in chapter 6 of his textbook, this would be represented as an increase in the variable z in the “wage setting” relationship.
 - (a) What affect does this policy have on the natural level of output? Explain intuitively.
 - (b) What effect does this shift in z have on the upward-sloping aggregate supply (AS) curve we derived in lecture (and is derived in Blanchard’s text)? Explain and illustrate graphically.
 - (c) Suppose that initially, the intersection of aggregate supply and aggregate demand was at a level of output that was below the natural rate. That is, the economy was in recession. What happens to the level of output as a result of this policy action? What has happened to the output gap (i.e. the difference between actual output and natural level of output)? Is your answer sensitive to the slope of the AD curve? Explain.
 - (d) Is this an effective anti-recession policy for the government to follow? Explain.

2. In chapter 9 of the textbook, Blanchard estimates an Okun’s Law relationship for the U.S. and three other countries. He concludes that there has been little change in the value of the Okun’s Law coefficient over time for the U.S., whereas other countries have seen significant increases in the slope of their Okun’s Law relationship. To test this claim for the U.S., collect quarterly data on unemployment and real GDP from 1959Q1 through 2004Q2.
 - (a) Blanchard’s preferred way of estimating an Okun’s Law relationship is between the change in the unemployment rate and the growth rate of real GDP¹ Compute these data for the 1960Q1 – 2004Q2 sample period, and print a scatterplot with a fitted regression line.
 - (b) Estimate the Okun’s Law relationship that corresponds with the line shown in part (a) above and print your results.
 - (c) Now estimate the above regression equation separately for the 1960Q1 – 1980Q4 and 1981Q1 – 2004Q2 periods and print the results. Compare your estimates with those in table 1 of Blanchard’s textbook (p. 185).

¹Make sure you compute annualized quarterly changes in real GDP growth, in order to get interpretable coefficients for your estimation.

- (d) Test formally the null hypothesis that there is no change in the Okun's Law coefficient for the U.S. between the two sub-sample periods of part (c). Do you reject the null hypothesis or not? Justify your answer.² Reconcile your results with the discussion in Blanchard's text.

3. Consider an economy with a Phillips curve given by

$$\pi = \pi^e - (u_t - 5\%),$$

where expected inflation is a weighted average of the monetary authority's target, $\bar{\pi}$, and the previous year's inflation rate:

$$\pi^e = \phi\bar{\pi} + (1 - \phi)\pi_{t-1}.$$

Suppose that prior to the regime change, the unemployment rate equaled the natural rate and inflation equaled 10%. Following a change in the monetary policy regime, the monetary authority wishes to undertake a disinflation to achieve an announced inflation target of 2%.

- (a) Suppose this policy announcement is perfectly credible: what would be the corresponding value of ϕ ? How many years would it take to achieve the target value of the monetary authority? What is the sacrifice ratio under this circumstance?
- (b) Now suppose that the monetary authority is known to be willing to tolerate at most a one percentage point gap per year between that year's unemployment rate and the natural rate, until the target is achieved. Does this information change your answer to part (a)? Explain.
- (c) In contrast with parts (a) and (b) above, suppose instead that "actions speak louder than words," so that the public believes last year's actual inflation rate tells what this year's inflation rate is most likely to be. Continue to assume that the monetary authority is unwilling to tolerate an unemployment gap in any year that exceeds 1%. What would be the corresponding value of ϕ ? How many years would it take to achieve the target value of the monetary authority? What is the sacrifice ratio under this circumstance?
- (d) Suppose that half the public finds the policy announcement credible, while half continues to base their expectations on the previous year's actual inflation rate. How many years would it take to achieve the target value of the monetary authority? What is the sacrifice ratio under this circumstance?
- (e) What implications does your analysis of parts (a) through (d) hold for the design of monetary institutions, if any? Explain.

²One form of a suitable test of this hypothesis is known as a "Chow test" — a type of F -test — which you may have seen in your Quantitative Methods (Econ 300) course.

4. In the U.S., interest payments — in nominal terms — on mortgages are tax deductible. For this problem, consider a homeowner in a 30% tax bracket with a \$100,000 mortgage.
- (a) Suppose the nominal interest rate on the mortgage is 5%, and the inflation rate is 0%. Compute the real interest rate on the mortgage before and after the tax deduction. (*Hint: The tax deduction acts like a subsidy, reducing the mortgage cost by 30 cents on the dollar.*)
 - (b) Suppose the nominal interest rate on the mortgage is 15%, and the inflation rate is 9%. Compute the real interest rate on the mortgage before and after the tax deduction.
 - (c) Contrast the before-tax and after-tax real interest rates above, and discuss the following claim: “In the U.S., inflation is good for homeowners.”