

### Problem Set 5

This problem set uses the Blanchard Inflation Model and is due Friday, April 17.

1) To lower the inflation rate, you have to get the economy into the region where  $u_t > u_n$  (ie. you must run a recession). The sacrifice ratio is the pain to gain ratio involved in doing this: how much unemployment above the natural rate must the economy endure for each percentage point reduction in inflation.

What is the relationship between the sacrifice ratio and the slope of the Phillips Curve? Does a flat Phillips Curve correspond to a big or a small sacrifice ratio? Why?

2) On p. 192 of Edition 5, Blanchard describes an economy where policy makers want to lower inflation from 14% to 4%. He gives 3 scenarios for doing this. For each scenario, fill in the charts below (think of it as a Sudoku game) under the assumption that  $u_n = 5\%$  and  $\alpha = .75$  (be careful, Blanchard uses  $u_n = 6\%$  and  $\alpha = 1$ , so your answers will differ),  $\beta = .4$  and  $g_y = 3\%$ . We will follow Blanchard and assume that  $g_{NADt} = g_{mt}$  which is the Nominal Money Growth Rate in the table:

**a) Reduce inflation by 10% in one year** The most straightforward way to think about this is to imagine that some great genius told you how to set the exogenous variable  $g_{mt}$  so as to achieve your goal (as listed below):

Year	0	1	2	3
Unemployment	5%			
Output Growth Rate	3%			
Nominal Money Growth Rate	17%	-26.33%	+40.33%	+7%
Inflation	14%	4%	4%	4%
Expected Inflation	14%			

**b) Reduce inflation by 10% in 2 years** Let's say great geniuses are scarce. You can figure out what  $g_{mt}$  should be yourself once you know the "glide path" for the inflation reduction:

Year	0	1	2	3	4
Unemployment	5%				
Output Growth Rate	3%				
Nominal Money Growth Rate	17%				
Inflation	14%	9%	4%	4%	4%
Expected Inflation	14%				

c) **Reduce inflation by 10% in 5 years:** Alternatively, if you know the Output Growth Rate, you can still fill in the box:

Year	0	1	2	3	4	5	6	7
Unemployment	5%							
Output Growth Rate	3%	-3.67%	3%	3%	3%	3%	9.67%	3%
Nominal Money Growth Rate	17%							
Inflation	14%							
Expected Inflation	14%							

d) In which scenario does Output Growth and Nominal Money Growth fluctuate the most wildly? Why?

e) Is the sacrifice ratio any different in the three examples above?

3) Alternatively, imagine that the economy in the previous example undergoes a regime change where the central bank is taken over by inflation fighters who lower the growth rate of the nominal money supply to 7% and keep it there permanently. Calculate the path of the economy in terms of  $\pi$ ,  $u$ , and  $g_{yt}$  for 5 periods, and fill in the chart below.

I realize that this is a lot of tedium. If you are reasonably good at spreadsheets (or know someone who is), you can program a spreadsheet to solve Reduced Form equations (6) and (7) in the Inflation Model handout and then use equation (2) to give you the value for  $g_{yt}$ . In fact, if you do use a spreadsheet, carry out the analysis until the economy settles down approximately to its new medium run equilibrium. How many periods does this take? If you include your spreadsheet, you do not have to fill in the chart below:

Time	$g_{mt}$	$g_{yt}$	$u$	$\pi$
0	17%			
1	7%			
2	7%			
3	7%			
4	7%			
5	7%			

Finally, create a graph of the path of the economy in  $\pi, u$  space that corresponds to your answers in the chart above, but continues the movement of the economy in qualitative terms (not exact numbers) as it approaches medium run equilibrium.