

Problem Set #4: Monetary & Fiscal Policy

Revised: December 10, 2013

You may do this assignment in a group. Whatever you hand in should be the work of your group and include the names of all of the contributors.

1. *The Taylor rule in the Euro Area (50 points).* You're a trader on Deutsche Bank's fixed income desk and have just been transferred from New York to London. You realize, among other things, that you must come to terms quickly with differences between American and European monetary policy. You wonder, given the chaos right now in the Euro Area, whether the Taylor rule is a reasonable guide. You review your Global Economy class notes and do the following:
 - (a) Using data from FRED (see data guide below), you plot inflation and GDP growth for the Euro Area. (10 points)
 - (b) You also plot the Euro Area interbank rate (a representative short-term interest rate) and the Taylor rule for the same rate for the period 1999-present. Since it's not clear what "potential output" is right now, you use the growth rate version of the rule:

$$i_t = r^* + \pi_t + 0.5(\pi_t - \pi^*) + 0.5(g_t - g^*),$$

where g_t is the growth rate of real GDP. As usual, you use year-on-year inflation and growth rates and set $r^* = \pi^* = 2$. You also set $g^* = 2$, but wonder whether another value would be appropriate. (10 points)

- (c) How does the policy rate compare to the Taylor rule in 2009? Do you think the ECB's policy was appropriate? (10 points)
- (d) How does the policy rate compare to the rule now? What justification does President Mario Draghi give in his most recent [press conference](#)? Do you think the policy is appropriate? (20 points)

Data guide. To implement the Taylor rule, you'll need quarterly data for

- Real GDP (FRED code NAEXKP01EZQ661S): use year-on-year growth rate.
- Consumer prices (FRED code CP0000EZ17M086NEST): use year-on-year growth rate.
- Euro area interbank rate (FRED code IR3TIB01EZQ156N): use as is.

You can download all of them from FRED. It's not required, but you can also generate the graph(s) directly in FRED.

Solution:

- (a) The graph is at

<http://research.stlouisfed.org/fred2/graph/?g=pHg>.

Right now, inflation (year-on-year) is about 0.8% and GDP growth is about -0.2%. Relative to 2011 and 2012, inflation is significantly lower and growth a bit higher.

- (b) The interest rate and the Taylor rule are pictured together at

<http://research.stlouisfed.org/fred2/graph/?g=pQ4>.

In the figure, the blue line is the interbank rate and the red line is the Taylor rule. The link includes a description of how it was computed. Note that the two lines are (roughly) similar between 2000 and 2008; in this respect, the Taylor rule has been a reasonable guide to ECB interest rate policy. The two lines are even closer over this period if the target growth rate is 3%.

- (c) In 2009, the Taylor rule points to a negative interest rate, which of course isn't feasible. The ECB reduced the interbank rate to 1.75%, which was a less aggressive response than we saw from the Fed.

Would another value be appropriate? One possibility: You could suggest they should have reduced the rate further, as the Fed did. Or you could argue that the Taylor rule isn't really appropriate for the ECB, with its mandated emphasis on inflation.

- (d) Right now, the Taylor rule is about 1% above the actual interest rate. In this respect, the ECB is being more expansionary than the rule suggests.

Draghi said in his press conference:

Underlying price pressures in the euro area are expected to remain subdued ... [and other factors suggest] we may experience a prolonged period of low inflation. ... Our monetary policy stance will remain accommodative for as long as necessary, and will thereby continue to assist the gradual economic recovery.

In short: a low interest rate is justified by the inflation numbers and, furthermore, this will contribute to growth. Unlike similar statements from the Fed, the emphasis is clearly on inflation. See [here](#).

2. *Fiscal policy in India (50 points)*. After a century or more of poor macroeconomic performance, India began growing rapidly in the 1980s and briefly approached

Chinese rates of growth. It remains a poor country, but much less so than thirty years ago. Last year, however, growth dropped dramatically, and analysts fear there could be worse to come. Among their concerns:

- The ruling Congress party has done little to continue the liberalization that led to high growth over the last thirty years.
- Some of the most restrictive labor market regulations anywhere in the world have limited the participation of the large population of unskilled workers, as firms invest in automation and hire skilled workers instead. Think: call centers and software, not manufacturing.
- Infrastructure remains poor across the board.
- The rupee dropped 20% in August, as investors reacted to the prospect of higher interest rates in the developed world and the government's misguided attempt to impose capital controls.
- Major redistribution programs, designed to help the poor and garner votes, have exacerbated a continuing problem with government debt and deficits. The Economist Intelligence Unit puts it this way in their Country Risk Service: "India's sovereign risk rating is constrained by poor fiscal management and high levels of public debt."

Your mission is to focus on the last item: to assess the fiscal policy risks to the economy. Having some experience with such situations, you collect some data:

	2011	2012	2013	2014
Real GDP growth (percent)	7.75	3.99	5.68	6.23
Inflation (percent)	9.30	8.10	7.85	7.35
Interest rate on debt (percent)	6.39	6.61	6.86	7.25
Govt expenditures (percent of GDP)	27.19	27.50	27.78	28.01
Government deficit (percent of GDP)	8.44	8.31	8.31	8.45
Government primary deficit (percent of GDP)	4.20	3.90	3.77	3.68
Government debt (percent of GDP)	66.36			

Entries for 2013 and 2014 are forecasts.

With this information in hand, you start to sketch out your report:

- What is the difference between the government's deficit and primary deficit? Why is the latter smaller? (10 points)
- Compute India's debt-to-GDP ratio for the period in the table. Over the period 2011-2014, what factors account for the change in the ratio? (20 points)
- How would your estimate change of the debt-to-GDP ratio at year-end 2014 if (i) the interest rate paid on debt rose by 2% or (ii) the growth rate fell by 2%? (10 points)

- (d) After skimming the EIU's Country Risk Report — and using your own good judgement — how would you rate the risk from government debt and deficits to the Indian economy? What specific concerns would you point to? (10 points)

Accessing the EIU's Country Risk Reports. Go to NYU's [Virtual Business Library](#), then click on Country Information, EIU Country Risk Service (login as requested if off-campus), Country Risk Service (again), and (in this case) India. Choose the latest report and give it a quick read.

Solution:

- (a) The difference between the primary and total budget balances reflects interest payments on the debt. In 2012, the government deficit was 8.31 percent of GDP and the primary deficit was 3.90 percent. The difference of 4.41 percent is interest payments on the debt.
- (b) This is a call to apply our debt dynamics tool. The equation is

$$\Delta(B_t/Y_t) = (i_t - \pi_t)(B_{t-1}/Y_{t-1}) - g_t(B_{t-1}/Y_{t-1}) + (D_t/Y_t).$$

We'll label these terms (A), (B), and (C), as we did in class.

The results of these calculations are listed below. See also the spreadsheet (save this pdf file, open it, and click on the pushpin): 

	2011	2012	2013	2014	2012-14
Real GDP growth	7.75	3.99	5.68	6.23	
Inflation	9.30	8.10	7.85	7.35	
Interest rate on debt	6.39	6.61	6.86	7.25	
Govt expenditures	27.19	27.50	27.78	28.01	
Government deficit	8.44	8.31	8.31	8.45	
Primary deficit	4.20	3.90	3.77	3.68	
Ratio of debt to GDP	66.36				
(A) real interest		-0.98	-0.66	-0.07	-1.71
(B) growth		-2.64	-3.78	-4.11	-10.54
(C) primary deficit		3.90	3.77	3.68	11.35
Total (A) + (B) + (C)		0.27	-0.67	-0.50	-0.90
Ratio of debt to GDP		66.63	65.96	65.46	

Overall, we see that debt falls from 66.36 to 65.46, a change of -0.90. We see in the far right column that this modest amount reflects two offsetting effects: a decline of 10.54 from economic growth, and a rise of

11.25 from primary deficits. We also see a fortuitous contribution from negative real interest rates.

[A few brave souls noted that our debt dynamics equation is an approximation. It's not necessary to go beyond that, but if you did, you get a point or two for bravery.]

- (c) You may notice that the effect of these changes is the same: both add $0.02 * B_{t-1} / Y_t - 1$ to the change in B/Y . Over the three years, this adds almost 4% to the change, with the effect that the ratio of debt to GDP rises by 3.08%, rather than falls by 0.90%. The point is that modest changes in conditions can change the debt situation in a noticeable way. Details on the calculations in the spreadsheet.
- (d) The EIU Country Risk Report includes these notable comments:
- Growth. The government has undertaken a series of reforms to revive the torpid economy. However, real GDP growth slowed sharply in the first quarter of the fiscal year.
 - Interest. In October the Reserve Bank of India (the central bank) again raised its main policy interest rate, the repurchase rate, which now stands at 7.75%, in a bid to moderate inflation. We forecast that the RBI's policy measures will help to moderate inflationary expectations, although headline consumer price rises will remain high in 2013.
 - Political. The government's budgetary strategy has been repeatedly blown off course by a series of unfavourable developments since 2008. In its budget for 2013/14, the UPA has set itself the target of cutting the fiscal shortfall to the equivalent of 4.8% of GDP. However, the sharp depreciation of the rupee in June-August 2013 is likely to scupper the government's plans to lower its subsidy bill, which accounts for around 16% of public expenditure. With elections looming, there is also a growing risk that the government will boost spending in the run-up to the polls, in a bid to secure voter approval.
 - Two things we haven't discussed:
 - (i) Banking. Following a downgrade to India's rating for banking sector risk in October, in view of continued stress on the sector, The Economist Intelligence Unit does not envisage a further downgrade.
 - (ii) Foreign debt. Although the level of domestic public debt is high, external debt as a proportion of GDP remains low, and so it is unlikely that India will experience an external debt crisis in 2014-15.