NYU STERN

The Global Economy
Professor David Backus

Final Examination

Revised: May 6, 2010

You have 120 minutes to complete this exam. Please answer each question in the space provided. You may consult one page of notes and a calculator, but devices capable of wireless transmission are prohibited.

I understand that the honor code applies: I will not lie, cheat, or steal to gain an academic advantage, or tolerate those who do.

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(Name and Signature)

1. *US monetary policy (30 points).* The Federal Reserve's Federal Open Market Committee (FOMC) met April 27-28, 2010, and released this statement:

   > Information received since the FOMC met in March suggests that economic activity has continued to strengthen and that the labor market is beginning to improve. Growth in household spending has picked up recently. ... Business spending on equipment and software has risen significantly. ... Housing starts have edged up but remain at a depressed level. ... With substantial resource slack ... and longer-term inflation expectations stable, inflation is likely to be subdued for some time. ...
   >
   > The Committee will maintain the target range for the federal funds rate at 0 to 1/4 percent. ...
   >
   > Voting against the policy action was [Kansas City Fed President] Thomas M. Hoenig, who believed that ... [an] exceptionally low level of the federal funds rate ... was no longer warranted.

   Later the same week, the Bureau of Economic Analysis announced that in the first quarter real GDP growth was estimated to be 3.2% and inflation (in the GDP price index) 0.9%. Both are expressed at annual rates.

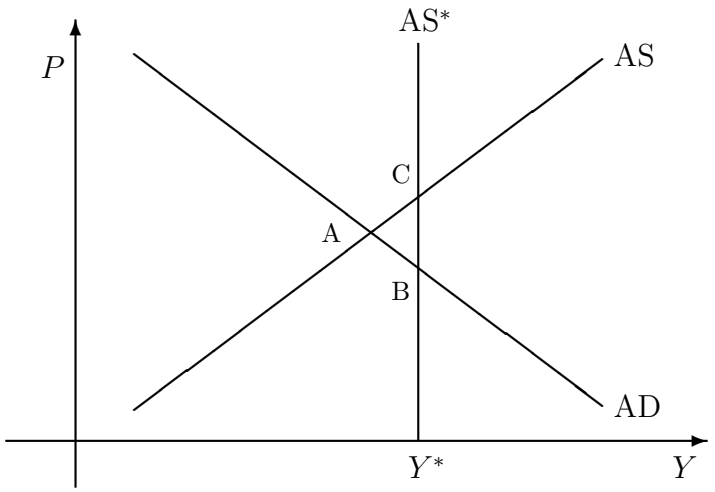
   (a) Consider this information in the context of the aggregate supply and demand framework. Based on the FOMC statement, where is the short-run equilibrium of the economy relative to the Fed's inflation target and the long-run equilibrium level of output? Illustrate your answer with the appropriate diagram. (10 points)

   (b) Given your answer to (a), what should the Fed's response be? How should it change the money supply? The fed funds rate? (10 points)

(c) What would the Taylor Rule suggest for current monetary policy? Is it consistent with your answer to (b)? Given your answer(s), do you agree with Hoenig? Why or why not? (10 points)

Solution:

(a) The phrase "substantial resource slack" suggests that output is below its long-run equilibrium. The phrase "inflation is likely to be subdued for some time" suggests that inflation is below target (2% say). That suggests a picture something like this, with A as the short-run equilibrium and C as the target.



(We don't know that C is at the intersection of AS and AS*, just that it's above and to the right of A.)

Grading: 10 points for something like this.

(b) The goals of policy are (i) stable prices (ie, 2% inflation) and (ii) long-run equilibrium level of output. From (a), we know that both are below their target levels. We can move both in the right direction by shifting the AD curve up and to the right. An increase in the money supply has this effect. Typically we would describe this as a drop in the short-term "fed funds" rate.

Grading: 5 points for the goals, 5 for showing how the Fed would accomplish them.

(c) Now we shift gears and think in terms of the Taylor Rule. The rule gives us a fed funds rate of

$$\begin{aligned} i &= r + \pi + 0.5(\pi - \pi^*) + 0.5(g - g^*) \\ &= 2 + 0.9 + 0.5(0.9 - 2) + 0.5(3.2 - 3) \quad = \quad 2.45. \end{aligned}$$

There are lots of choices here, but they should give you an interest rate above the current recommendation of "0 to 1/4 percent."

Here are some possible interpretations:

- The current rate is too low. Hoenig hints at this in his statement. (In fact, he was making a more subtle point about whether the Fed should commit to a long period of very low interest rates, but I edited that out to keep things simple.)
- There's a difference between excess capacity ($y - y^*$) and the growth rate version we've used. This is a subtle issue, not something I'd expect you to worry about, but might show up in public discussion. The difficulty with the capacity version is coming up with a number for y^*. If you do this, you might argue that although growth is now up to its postwar average, output remains well below its long-run equilibrium. That's in fact what the statement says, so this is a plausible interpretation of the policy decision.

Grading: 5 points for correct calculation of interest rate implied by Taylor Rule, 5 points for a sensible discussion of what this means to the Fed right now.

2. *Near-term prospects for Turkey (40 points).*

	2004	2005	2006	2007	2008	2009	2010
Real GDP growth	9.6	8.4	6.9	4.7	0.7	–4.7	4.0
Inflation	8.6	8.2	9.6	8.8	10.4	6.3	10.0
TFP growth	6.1	4.7	4.3	5.7	–2.4	–5.7	2.2
Investment rate	20.2	21.0	22.3	21.4	19.9	16.8	15.9
Saving rate	19.4	20.0	22.0	21.1	21.8	14.8	16.0
Current account	–3.7	–4.6	–6.0	–5.8	–5.6	–2.3	–4.0
Budget balance	–5.4	–1.3	–0.6	–1.6	–1.8	–5.5	–5.3
Primary balance	4.7	5.8	5.5	4.2	3.5	0.1	–0.1
Public debt	56.6	51.1	45.5	39.6	40.0	46.3	
Net foreign assets	–41	–35	–39	–39	–38	–44	–40
Interest rate: short	21.4	14.7	15.6	17.2	16.0	9.2	10.0
Real exchange rate	131	146	145	159	162	150	165
Reserves	37	52	63	77	74	75	

Economic indicators for Turkey. (i) Investment, saving, current account, budget balances, public debt, and net foreign assets are expressed as percentages of GDP (ratio to GDP multiplied by 100). (ii) Government budget numbers (budget

balance, primary balance): negative numbers indicate deficits, positive numbers indicate surpluses. (iii) The real exchange rate is a weighted average across trading partners, with weights tied to the amount of trade; high numbers indicate that prices of local goods are high relative to prices in other countries. (iv) Foreign exchange reserves are expressed in billions of USD. (v) 2010 numbers are estimates. All numbers courtesy of the Economist Intelligence Unit.

You have been asked to write a short report summarizing economic prospects in Turkey over the next 2-3 years. Is Turkey more likely to grow like China or collapse like Greece? Its level of development is between the two, with GDP per capita double China but less than half of Greece.

Having some experience with such situations, you study the Economist Intelligence Unit's various reports and summarize the relevant sections:

- Modern Turkish politics has evolved from the secular single-party republic established by Mustafa Kemal (Ataturk) in 1923 into a multiparty democracy.
- The ruling Justice Party (AKP) gained power in 2002 and is likely to retain power until elections in 2011. The AKP's "pro-Islamist roots" are an ongoing source of tension with the "secularist elite" and a source of political uncertainty.
- Turkey has a free-trade agreement ("customs union") with the EU and is exploring closer ties, including membership.
- Large government deficits in the 1990s led to inflation rates between 50 and 100 percent. An accord with the IMF, in which loans were tied to fiscal stringency, was in effect from 1999 to 2008. The government has "promised to reverse the deterioration [in the budget during the global financial crisis]."
- Turkey has a flexible exchange rate.
- Turkey has "full capital account convertibility:" unlike China, there are few restrictions on international capital flows. At present, about two-thirds of foreign liabilities are private and one-third public.
- The banking system is "stable."
- After a strong second half of 2009 and first quarter of 2010, the IMF raised its forecast of GDP growth for 2010 from 3.7 to 5.2%.

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

(a) Describe Turkey's recent fiscal situation. What is your estimate of the debt-to-GDP ratio at year-end 2010? What factors might change your estimate? (15 points)

(b) Do you see any "red flags" that make you concerned about the near-term future of the Turkish economy? Explain why or why not using whatever list of issues you think is appropriate. (15 points)

(c) How do you see Turkey's near-term prospects? Is Chinese success or Greek tragedy more likely? Why? (10 points)

Solution:

(a) From 2005 to 2008, overall deficits have been modest and the primary deficit was a surplus. The overall deficit increased from 1.8 to 5.5 in 2009, as the global crisis hit, and stayed there through 2010. The primary deficit has been close to zero both years. One question, then, is how the government budget — and the economy more generally – will recover.

We can compute year-end 2010 debt from

$$B_t/Y_t \;=\; [(1+i)/(1+g)]B_{t-1}/Y_{t-1} + D_t/Y_t.$$

The last term comes from the table: $D/Y = 0.1$ (%). Now we need the interest rate and growth. For the interest rate, we could use the short rate (the long rate isn't available) or compute interest indirectly from the interest burden. A ballpark number here is about 11%. [I divided 5.3 by 46.3 and then divided the whole thing by $(1+g) = 1.016$ for 2009. You'll have to do some algebra to see why this makes sense.] There's not much difference between them, so I'll go with the short rate: 10%. For the growth rate, we want the sum of the inflation rate and the real growth rate: 10 + 4 = 14%. Given the updated forecast from the IMF, we could go with a slightly higher number for real growth. With these numbers, the debt-to-GDP ratio would become

$$B_t/Y_t \;=\; [1.10/1.14](46.3) + 0.1 \;=\; 44.8.$$

That is, it's falling, because growth is greater than the interest rate.

What might change this calculation? On the down side, a rise in the interest rate such as we've seen in Greece. No sign of that yet, and it's unlikely On the up side, an increase in growth; this would show up directly in g and also decrease the primary deficit (tax revenues rise when the economy grows). A collapse of the economy would have the opposite effect. Finally, a sharp rise in government spending (remember, an election is due by 2011) would increase the primary deficit.

Grading: 5 points for the discussion, 8 for the calculation, 2 for a discussion of additional factors.

(b) Our checklist:

- Government debt and deficits. We just saw the numbers. Although there's a history of deficits, the recent past has shown more discipline. Our best guess is that the debt-to-GDP ratio will fall this

year. If the economy continues to grow, fiscal policy should be low risk.

- Exchange rate and reserves. The numbers show a modest increase in the relative price of Turkish goods, with the exception of a drop in 2009 (we saw that in all emerging economies during the crisis). But there's a flexible exchange rate system (historically lower risk than fixed) and reserves show no sign of dropping. Overall, not a particular source of concern.
- Current account and net foreign assets. There have been significant capital flows into Turkey, but is that a source of concern? It depends, to coin a phrase. The net foreign asset position is larger than many countries (larger than the US, for example), but most of it reflects private investments in Turkish firms and banks. Overall, I'd rate is between modest and no concern.
- Banking system. The EIU says it's stable, we'll take their word for it.
- Politics and institutions. This is the big unknown. It's a critical time in Turkish history, not clear how it will play out. Will the secular elite lose control? Will the AKP be pragmatic? There's a lot at stake, or seems to be.

Grading: 5 points for the list, 2 points for the discussion of each item.

(c) On the whole, Turkey looks like a good bet to me. The only red flag is the political situation. Time will tell how that works out.

Grading: 10 points for any sensible discussion.

3. *Miscellany (30 points).*

(a) *Indicators.* In the US right now, the stock market is up 6% since the start of the year and unemployment remains near its peak. What does this information tell you about the likelihood of faster economic growth in the next 6-12 months? (10 points)

(b) *Mercedes.* If US economic growth is expected to increase by 2% in 2011, what would you expect for US sales of Mercedes? Why? (10 points)

(c) *Renminbi valuation.* What would you point to if you wanted to make the case that the renminbi (the Chinese currency) is undervalued? Do you agree that it's undervalued? (10 points)

Solution:

(a) Stock market is a leading indicator, unemployment lagging. So this suggest faster growth in the near future.

Grading: 10 points for noting the lead/lag difference between the two indicators.

(b) We know two things that are relevant: (i) durable goods are more volatile than GDP as a whole, so a 2% rise in GDP would be associated with a rise of 2-3 times that in durable goods expenditures; (ii) Spending volatility is higher for the rich, which again points to greater cyclicality. This would depend to some extent on which car we had in mind. Bottom line: we should see a significantly larger increase in Mercedes sales. Grading: 6 points for mentioning cyclicality of durable goods, 4 for going beyond that.

(c) Some points you might make: (i) it seems to be undervalued in a PPP sense, (ii) the central bank is buying dollars like mad. I discount (i) because we know departures from PPP are common all over.

Grading: 10 points for noting (i,ii) or comparable arguments.