

Final Examination

Revised: May 6, 2009

You have 100 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.

(Name, section, and signature)

1. *Stimulus in China (30 points)*. China has responded to the current global crisis by implementing a massive program of government spending on infrastructure. Your mission is to outline the argument for or against such a program using the aggregate supply and demand (AS/AD) framework.
 - (a) Over the last year, output growth and inflation have both fallen in China. Would you say this comes from a shift in supply or demand? Illustrate your answer with the appropriate diagram. (10 points)
 - (b) Describe the impact of a large increase in government spending on infrastructure projects. What is the likely impact on output? Inflation? (10 points)
 - (c) What are the traditional goals of macroeconomic policy, expressed in terms of aggregate supply and demand? Does the Chinese spending program move them closer to these goals? (10 points)

Answer.

- (a) Shifts in demand move output and prices in the same direction, shifts in supply move them in opposite directions. (By longstanding tradition, we interpret output as output growth and prices and inflation.) Since they both fell, we would interpret this as a shift left in demand.
Grading: 5 points for graph, 5 more for showing that a demand shock reduces output growth and inflation.

- (b) This is a purchase of goods, therefore affects demand. A shift right in demand increases output growth and inflation.

Grading: 5 points for noting this is a shift right in demand, 5 more for the impact on output and inflation.

- (c) The goals are (i) output equal to the long-run aggregate supply curve AS^* and (ii) stable prices. The answer depends where you start: are we to the left of AS^* prior to the stimulus? If so, then the stimulus program moves output in the right direction. Ditto with inflation: if we start with stable prices, the stimulus

Grading: 5 points for noting the goals, 5 more for noting the appropriate policy and the importance of the starting point.

	2002	2003	2004	2005	2006	2007	2008	2009
GDP growth	4.3	3.0	3.8	2.8	2.8	4.0	2.1	-1.6
Inflation	3.0	2.8	2.3	2.7	3.5	2.3	4.4	1.2
Interest rate: short	4.6	4.8	5.3	5.5	5.8	6.4	6.7	2.8
Interest rate: long	5.8	5.4	5.6	5.3	5.6	6.0	5.8	3.3
Investment rate	24.1	25.2	25.5	26.5	26.8	27.8	28.7	
Saving rate	20.1	20.4	20.0	21.3	21.2	21.9	24.3	
Current account	-3.8	-5.5	-6.1	-5.8	-5.5	-6.4	-4.2	-3.5
Govt budget: total	1.3	1.8	1.1	1.5	1.5	1.6	1.8	-3.3
Govt budget: primary	2.9	3.2	2.4	2.7	2.6	2.6	2.7	-2.6
Govt debt	20.1	18.5	17.5	17.0	16.4	15.4	13.9	
Exchange rate	1.84	1.54	1.36	1.31	1.33	1.20	1.19	
Real exchange rate	100	113	121	125	125	133	132	
FX reserves (USD)	21	32	36	42	53	25	31	
FX reserves (months)	2.9	3.7	3.3	3.4	4.0	1.6	1.7	
Net foreign assets	-68	-68	-65	-71	-77	-89	-103	

Table 1: Economic indicators for Australia. Notes: (i) Investment, saving, current account, government budget, government debt, and net foreign assets are expressed as percentages of GDP (ratios multiplied by 100). (ii) The exchange rate is the Aussie dollar (AUD) price of one US dollar; high numbers indicate that foreign currency is expensive. The real exchange rate is a weighted average across trading partners. The convention is the inverse of the exchange rate: high numbers indicate that local goods are expensive relative to foreign goods. (iii) Foreign exchange reserves are expressed, first, in billions of USD, second, as a ratio to monthly imports. Thus the number 2.9 means that reserves are 2.9 times one month's imports. (iv) 2009 numbers are estimates.

2. *Deficits down under (40 points).* As a European investor in short-term Australian securities, you have made a fair amount of money over the last decade

betting that Australia's high interest rates would not be offset by declines in the value of its currency. You wonder, however, whether it's time to take your money and run.

Having some experience with such situations, you check the Economist Intelligence Unit's Country Data, summarized in Table 1, and Country Risk Service, which reports:

- The exchange rate is flexible, and could move either way against the euro.
- Australia's large net foreign liability position reflects a combination of direct investment in Australian businesses, notably mining, and the carry trade, in which investors purchase AUD-denominated assets in order to benefit from relatively high local interest rates.
- The banking system faces higher financing costs due to global credit conditions, but is stable. Government guarantee of deposits has reduced the risk of failures.

With this information in hand, you go through your checklist:

- (a) Fiscal policy 1. Why are the total and primary government balances different? What would you estimate for the debt-to-GDP ratio at the end of 2009? (10 points)
- (b) Fiscal policy 2. Are Australia's government debt and deficit large enough to concern you? Why or why not? (10 points)
- (c) What other factors would you consider in assessing the risks to Australia's economy? Which ones do you regard as troubling? Why? (20 points)

Answer.

- (a) The difference is interest on government debt. The government budget looks like (you'll have to look up the notation)

$$G_t + V_t - T_t = B_t - (1 + i)B_{t-1}.$$

The expression on the left is the primary deficit. On the right, interest in the debt is part of the second term: iB_{t-1} . The numbers tell us this is expected to be 0.7% of GDP (the difference between the primary and total deficits). Since debt at the end of the last year was 13.9% of GDP, the interest rate was about 5%.

The debt-to-GDP ratio evolves like this:

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

The numbers we're given suggest: $i = 3.3$ and $g = -1.6 + 1.2 = -0.4$. There's some question about the exact numbers; it's critical, though, that

you understand that g is *nominal* GDP growth. If $B_{t-1}/Y_{t-1} = 13.9\%$, that gives us $B_t/Y_t = 17\%$ at the end of this year.

Grading: 5 points for noting the difference between the two budget numbers (interest), 5 for the calculation of the new debt-to-GDP ratio.

- (b) You have some flexibility here, but two points seem essential: the debt to GDP ratio is very low and Australia is a developed country with good institutions. Both suggest that there is no cause for concern.

Grading: 20 points for a lucid answer something like this.

3. *Miscellany (30 points).*

- (a) If the inflation rate rises, how would a central bank following a Taylor rule respond? Why? (10 points)
- (b) If Hungary's central bank sells euros to citizens who want them, what is the impact on Hungary's money supply? How might it offset this impact? (10 points)
- (c) If the unemployment rate rises, is that bad news for future economic growth? Why or why not? (10 points)

Answers.

- (a) The Taylor rule indicates that a central bank would raise the short-term interest rate

Grading: 8 points for noting the interest rate rises, 1 for noting it rises more than one for one, and 1 for noting that the rationale is to keep inflation down (higher interest rate corresponds to reduced money supply).

- (b) We're talking about a central bank selling euros, collecting local currency in return. The latter reduces the amount of currency in private circulation: reduces the money supply, in other words. To reverse that, it could purchase government securities (the usual way to increase the money supply). In this context, the transaction would be called sterilization.

The two transactions might look like this on the central bank's balance sheet. At the start:

Assets		Liabilities	
FX Reserves	100	Monetary Base	200
Bonds	100		

After selling euros:

Assets		Liabilities	
FX Reserves	75	Monetary Base	175
Bonds	100		

After purchasing securities:

Assets		Liabilities	
FX Reserves	75	Monetary Base	200
Bonds	125		

Grading: 10 points for similar description of how the balance sheet changes. It's not necessary to show the balance sheets explicitly as long as the logic is clear.

- (c) I would say no: the unemployment rate is a lagging indicator, so it's telling about bad news that's already happened. In that sense, the unemployment rate is bad news about the past, not the future.

Grading: 10 points for understanding that the unemployment rate is a lagging indicator. 5 or 6 for anything sensible even if this point is missed.