

Brigham Young University Department of Economics
Economics 459 - International Monetary Theory
Dr. Phillips (section 1) Spring Term 2006

Midterm Exam key
March 31 - June 1, 2007

This exam is closed book and closed notes, though you may use a calculator. Read all questions carefully before answering. Write your answers legibly in the space provided. Keep your answers concise and correct. Points will be deducted for answers which are irrelevant to the question. Each question is worth 20 points.

Due to the outstanding education you received at BYU, you have been hired by the Ministry of Economic Affairs in the small faroff country of Beluga. The Deputy Vice-Minister for International Money and Finance, Mr. Waimi Aiask, a Ph. D. graduate of the University of Utah's economics department, knows virtually nothing about economics and has given you the responsibility of advising him. He has submitted 5 questions. Answer each one in the space provided, and remember that death is still an acceptable punishment in Beluga. The currency in Beluga is the bugle.

1. "The president is in favor of putting the bugle on the gold standard. I have been thinking that we can do so very easily by simply returning Beluga to the Bretton Woods system. When I mentioned this at lunch yesterday, the Deputy Vice-Minister for Domestic Taxation laughed at me. Can you explain what, if anything, I might have said wrong?"

The Bretton Woods System was an international cooperative system. You can't just decide to go on the system unilaterally. Under the Bretton Woods System, the US pegged the value of the US dollar to gold with a par value of \$35 per ounce of gold. Then various countries declared the value of their currencies in terms of US dollars.

While Beluga could easily peg the value of the bugle to the dollar through a fixed exchange rate policy, this is not the same as the Bretton Woods System, since the US does not fix the dollar to gold anymore.

2. “At that same luncheon, the Deputy Vice-Minister for Economic Statistics and Data told me I needed to put in more hours at work if I am to impress the Minister and get a promotion next month. When I asked how long I should stay at work, he suggested I go home and sleep, ‘when the international foreign exchange markets close.’ Quite a few of the other Deputy Vice-Ministers thought what he said was funny, so I laughed too. But I don’t get it. What’s the matter with going home after the markets have closed? It sounds reasonable to me. Explain to me the hours these markets are open.”

The international financial markets are open usually from 9 a.m. to 4 p.m. local time, though there are some variations. However, these markets are located in many different time zones. The first market to open is the one in Sydney, Australia. Then Asian markets in Tokyo, Hong Kong & Singapore follow a few hours after this. By the time these markets close, European markets have opened. The largest of these is in London, though Frankfurt and Zurich are also important. The US market in New York opens around noon in London. By the time New York closes, it is almost time for Sydney to open again. San Francisco is the biggest market that stays open during the gap of the New York close and Sydney open.

Hence, the markets are open 24 hours per day, except for a brief period between Friday’s close in San Francisco and Sydney’s open on Monday morning. If you work these hours you will die of exhaustion. Perhaps the Deputy Vice-Minister for Economic Statistics and Data does not like you?

3. “Here are the figures from this morning’s edition of the Belugan Economic Journal with exchange and 30-day interest rate quotes:

| Country | Currency | bugle equivalent | 30-day interest rate (APR) |
|---------|----------|---|----------------------------|
| USA | dollar | 144.0 | 1.5% |
| Beluga | bugle | 140.3 this must be 1! | 4.0% |

“My boss the Vice-Minister has a private savings account with a balance of 40,000,000 bugles. He has to wait for a month before he can cash out the account and would like to convert them to Euro when he does cash out. The Wall Street Journal reports that Euros are selling for \$1.30/€today and that the 30-day interest rate on Euro is 1.8%. How many Euro can the Vice-Minister expect to receive when he cashes out in 30 days? Explain how you got your answers carefully so I can pass on this advice to the Vice-Minister and make it look like I know what I’m talking about.”

First we need to deduce the 30-forward exchange rate of bugles for Euro. This can be imputed using covered interest rate parity. Treating Beluga as the home country this gives...

$$1 + i = (1 + i^*)\left(\frac{f}{s}\right)^{12} \text{ or } 1.040 = (1.018)\left(\frac{f}{s}\right)^{12}.$$

To get the spot rate we can invoke triangular arbitrage,

$$s = (144.0b/\$)(1.30\$/Euro) = 187.2b/Euro$$

$$\text{So that } 1.040 = (1.018)\left(\frac{f}{187.2}\right) \text{ which gives } f = 187.2\left(\frac{1.04}{1.018}\right)^{1/12} = 187.5338$$

So in 30-days 40 million bugles will be worth 40,000,000/187.5338= 213,294.80 Euro

4. “I have been asked to give a presentation to the faculty and students at Capitol University next week. I would like to speak on international portfolio theory, but I think I need to show some math and equations and stuff to properly impress them. I don’t want to worry about the international aspects of investment; a model with generic investment opportunities is fine. Can you set up and explain that model where investors maximize over one period? Set up the model, explain all the variables and then show that Lagrangian thing and the first-order conditions. That should be enough.”

Letting C be consumption next period or wealth (since the investor consumes all his wealth), let the investor divide his initial wealth, B_0 , across I assets indexed by i , with the % of B_0 allocated to any given asset denoted, w_i . The investor maximizes the expected utility of consumption minus a weight on the variance of utility. The weight is proportional to the investor’s level of risk aversion, γ . Returns on individual assets are random variables denoted, r_i with expected values of μ_i and variances of σ_i^2 . The covariances between these various assets are denoted σ_{ij} .

The problem can be expressed mathematically as:

$$\text{Max}_{\{w_i\}} E\{\ln C\} - \frac{\gamma}{2} V\{\ln C\}, \text{ subject to the weights all adding to one.}$$

Noting $\ln C = \ln B_0 + \sum_i w_i r_i$

gives $E\{\ln C\} = \ln B_0 + \sum_i w_i \mu_i$ and $V\{\ln C\} = \sum_i w_i^2 \sigma_i^2 + 2 \sum_i \sum_{j < i} w_i w_j \sigma_{ij}$

Which allows us to rewrite the problem using the following Lagrangian:

$$L = \ln B_0 + \sum_i w_i \mu_i - \frac{\gamma}{2} \left[\sum_i w_i^2 \sigma_i^2 + 2 \sum_i \sum_{j < i} w_i w_j \sigma_{ij} \right] + \lambda \left[1 - \sum_i w_i \right]$$

The first-order condition on a generic asset weight, w_i is:

$$\frac{\partial L}{\partial w_i} = \mu_i - \frac{\gamma}{2} [2w_i \sigma_i^2 + 2w_j \sigma_{ij}] - \lambda = 0$$

The first-order condition on the Lagrange multiplier, λ , returns the constraint:

$$1 - \sum_i w_i = 0$$

5. “Zalchistan, our hated neighbor, is experiencing a speculative attack on their currency. I like it when bad things happen to them, but I hear these things are contagious! The Bank of Beluga says we are safe since the bugle is floating. What does ‘floating’ mean? And how does that protect us from a speculative attack?”

“Floating” means the currency has no fixed value against any other currency. The central bank (in this case the Bank of Beluga) does not agree to buy and/or sell the domestic currency for any foreign currency at a fixed value. Rather the relative values of all currencies are determined by supply and demand with little or no intervention in the market by the central bank.

Because speculative attacks are caused by speculators beliefs that the central bank will be forced to abandon the current fixed value of the currency they cannot really spread to floating currencies. Speculators should not expect the bank to suddenly change the value of the bugle in terms of dollars or some other hard currency. Speculators may expect the value to fall, but it will do so immediately, through market forces, and not with some delay. Hence, speculators have no window of opportunity to withdraw and exchange “hot” money, as they do with a fixed exchange rate. There can be no self-fulfilling expectations where the bank abandons the peg because speculators withdraw and exchange bugles for hard currency, which is the essence of a speculative attack.