

**Brigham Young University Department of Economics**  
**Economics 459 - International Monetary Theory**  
**Dr. Phillips (section 1) Fall Semester 2008**

**Midterm Exam key**

A political coup has just occurred in the small imaginary country of Zalchistan. As chance would have it, this is the place where you served your LDS mission. And in an even more unbelievable quirk of fate, the new president is the branch president from the Zalchipour Central Branch where you served for six months in the capital city of Zalchipour. He is aware that you are studying international monetary theory and has agreed to pay you several hundred zotneys (the Zalchistan currency) in consulting fees to advise him on international economic issues. He has submitted 5 questions. Answer each one in the space provided.

1. "I need to understand some unfamiliar terms I ran across while reading a news magazine. Please write me some one-sentence definitions of the following:"

vehicle currency – **a currency used to facilitate trade of two other currencies that do not have a well-established exchange market; traders trade one of the currencies for the vehicle currency, and then trade the vehicle currency for the other.**

forward premium – **the percentage by which the current forward rate exceeds the current spot rate.**

forward exchange rate – **the price at which traders agree to exchange currencies at a specified date in the future, determined in advance of the actual exchange.**

absolute purchasing power parity – **the notion that the price of a baskets of commodities purchased in two different countries will cost the same when measured in the same currency units. (it doesn't matter which currency).**

covered interest rate parity – **the nominal interest rate in the home country is equal to the foreign nominal interest rate plus the forward premium.**

2. “Here are the figures from this morning’s edition of the Zalchipour Business Gazette with spot exchange rates and 30-day interest rate quotes:

Country	Currency	exchange rate	30-day interest rate (APR)
Zalchistan	zotney	-	4.0%
USA	dollar	150.0 zotneys/\$	1.5%
Beluga	bugle	22.5 bugles/zotney	12.5%
Europe	euro	175.0 zotneys/€	1.5%

“The presidential office has a special account earmarked for purchase of foreign delicacies for state dinners. My late predecessor invested the money in private bonds that will come due in one month and will pay 100,000,000 zotneys. At that point I would like to convert and would like to convert one-third of the funds into US dollars, one-third into euro, and one-third into Belugan bugles. How much of each currency will we have when we do this? Show your work in a clearly understandable fashion so that I can use it to educate my rather dimwitted finance minister, who has a Ph.D. in economics from the University of Utah.”

**First we need the forward rates so we can convert zotneys into foreign currencies in 30-days. We can use  $i-i^*=\phi$  to get the forward premium and then use  $[(f-s)/s]^{1/12} = \phi$  or  $12(\ln f - \ln s) = \phi$  to get the forward rate. We then convert 33,333,333 zotneys into the appropriate currency using these rates.**

US dollars: **f = 150.3128 zotneys/\$ which gives \$221,760**

Euro: **f = 175.3650 zotneys/€ or €190,080**

Belugan bugles: **f = .044131 zotneys/bugle or 755,331,360 bugles**

3. “The latest World Bank Development Report says per capita income here in Zalchistan was \$5000 in 2007. That seems way too low to me. The Penn World Tables give a value of 33.3 for Zalchistan in 2004. Here are some other useful data:

	US CPI	Zalchistan CPI	exchange rate (zotneys/dollar)
2004	112.0	145.6	98.6
2007	137.3	177.8	143.3

“Our Central Statistical Agency says real GDP per capita in 2007 was 715,000 zotneys. What was it in US dollars, if we adjust properly for deviations from purchasing power parity? Explain how you get this answer so I can pass it on to my chief economic advisor, Caput Cassus-Lacuna”

**It is very important to consistently use the same country as the home country. Since PPP measures from the Penn World Tables treat the US as the home country, let's do the same here.**

Recall from our homework that  $q = e \frac{P^*}{P} = e \frac{\tilde{P}^* P^* b}{\tilde{P} P_b} = e \frac{\tilde{P}^* q_b}{\tilde{P} e_b}$ . Also note that the CPIs in the base year are not 100, so we need to convert them so that 2004 is the base year.

$$\tilde{P}^* = \frac{177.8}{145.6} \times 100 = 122.12, \tilde{P} = \frac{137.3}{112.0} \times 100 = 122.59, \text{ so } q = \frac{1}{143.3} \frac{122.59 \times 333}{122.12 \times (\frac{1}{98.6})} = .2300$$

We then convert 715,000 zotneys to dollars and adjust for PPP deviations using:

$$P^* X^* = \frac{e P^*}{q} X^* = \frac{e}{q} (P^* X^*) = \frac{1}{.2300} 715000 = \$21,692$$

If use Zalchistan as the home country we have:

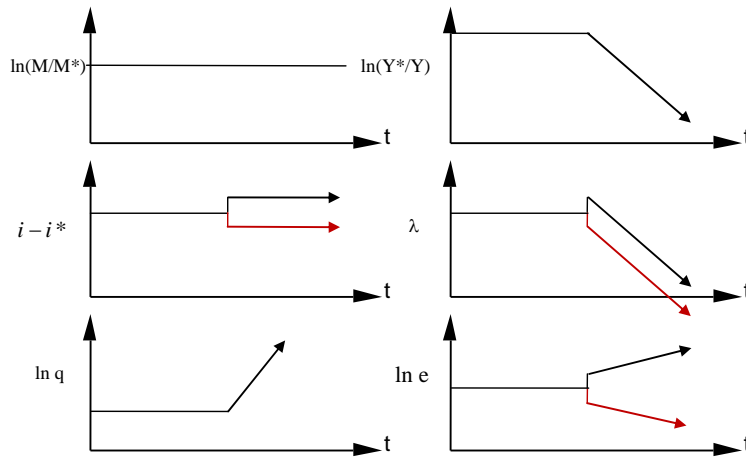
$$\tilde{P}^* = \frac{137.3}{112.0} \times 100 = 122.59, \tilde{P} = \frac{177.8}{145.6} \times 100 = 122.12 \text{ so } q = 143.3 \frac{122.12 \times (\frac{1}{333})}{122.59 \times 98.6} = 4.3475$$

$$P^* X^* = \frac{q P^*}{e} X^* = \frac{q}{e} (P^* X^*) = \frac{4.3475}{143.3} 715000 = \$21,692$$

4. “Our GDP level is substantially below that of the US, but recently we have been growing at roughly the same rate as the US. In addition, our money supply has been growing at the same rate as the US money supply. Due to the recent financial turmoil in the US we believe the US will go into a prolonged recession, but here in Zalchistan we don’t expect any drop in GDP growth at all. Zalchistani goods are quite different from those consumed in the US and not really very good substitutes. Can you give me a prediction for the path of the zotney per US dollar exchange rate? Be sure to explain your answer and provide reasoning from a well-accepted economic model. Diagrams or figures would help too.”

Use the equilibrium approach to exchange rates to answer this. Let Zalchistan be the home country. We have  $g_Y = g_{Y^*}$  and  $g_M = g_{M^*}$ , for the recent past. Now we expect that  $g_Y > g_{Y^*}$ .

Recall that model can be expressed as  $e = q \left\{ \frac{Y^*}{Y} \right\}^{\frac{M}{M^*}} \Lambda \left\{ \delta^e + g_M^e - g_Y^e - g_{M^*}^e + g_{Y^*}^e + \bar{\rho}, \frac{Y^*}{Y} \right\}$



There is ambiguity here because the direct effects from changes in  $(Y^*/Y)$  move things in the opposite direction that the changes in  $q$  move things. If Zalchistan goods are poor enough substitutes that the real exchange rate effects dominate, we will have a jump up in the nominal exchange rate (as the values of  $\delta^e$  rises more than  $g_{Y^*}^e$  falls) and it will continue to rise thereafter (as the upward slope in  $q$  is greater than the downward slope in  $\Lambda$ ). (illustrated with black lines). On the other hand, if the goods are substitutable enough the  $q$  effect will not dominate, and we will have an immediate drop in  $e$  followed by continual declines in its value. (illustrated in red)

5. “Suppose we could adopt a credible fixed exchange rate regime, like the one in Hong Kong, for example. Everyone knows that Zalchistani government bonds are much riskier than US government bonds. I would like to find out how much of a risk premium we need to offer to get international investors to buy our government bonds. I had the National Statistical Office analyze our past payments and compare them to the typical returns on international portfolios. It turns out that our bond payments are negatively correlated (correlation coefficient of  $-.467$ ) with international portfolio returns. Can you tell me what implications this has for the risk premium we must offer? I was a math & statistics major in college, so you can use mathematical formulas if you think it will help. Be sure to explain briefly where you got any formulas come from, though. For example, ‘This formula comes from a model of speculative bubbles’ is fine.”

**This means that Zalchistani bonds will sell for a higher price (equivalently offering a lower rate of return) than US government bonds. US government bonds are close to riskless. From our in-class model on the optimal portfolio for a one-period investor we came up with the following:**

**$E\{r_i\} - r_s = \gamma \text{Cov}\{r_i, r_p\}$ , where  $r_i$  is the return on investment strategy  $i$ ,  $r_s$  is the return on a sure/riskless investment (such as a US government bond), and  $r_p$  is the return on the overall market portfolio held.  $\gamma$  is the coefficient of relative risk aversion and is positive.**

**If investment  $i$  is a Zalchistani government bond and exchange rates are credibly fixed over time, the only source of risk for international investors comes from the riskiness of the bonds themselves. Since the return on these bonds is negatively correlated with the international market portfolio, the  $\text{Cov}\{r_i, r_p\}$  is also negative. This implies  $E\{r_i\} < r_s$ , meaning our bonds can offer a lower rate of return than US government bonds even though they are more risky.**

**Intuitively, this is because our bonds offer insurance to international investors. They pay off high when the international market portfolio pays off low.**