Macroeconomic Theory
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Suggested Answers to Midterm Examination # 1

1.	$W/P = d0 - d1*L + d2*K + d3*RM$	(1)	**Endogenous**	**Exogenous**
	$L^s = so + s1*(W/P) + s2*EITC$	(2)	W, P, L, L^s, Y	K, RM, EITC
	$L = Ls$	(3)	AD, C, I, T	M, k, G
	$Y = 100*L^{.7}K^{.3}$	(4)		
	$AD = k*M/P$	(5)		
	$AD = C + I + G$	(6)		
	$C = .8* (Y-T)$	(7)		
	$T = .25*Y$	(8)		
	$Y = AD$	(9)		

a. Solve equations (1) – (3) jointly to determine L.
Plugging (1) into (2) yields and replacing the left hand side with (3) yields
$L = so + s1*(do - d1*L + d2*K + d3*RM) + s2*EITC$ which can be solved to yield

$$L^* = \frac{so + s1*do + s1*d2*K + s1*d3*RM + s2*EITC}{1 + s1*d1}$$ - the equilibrium level of employment

b. Plug the result (L*) into equation (4) to yield the reduced form equation for output

$$Y^* = 100*\left[\frac{so + s1*do + s1*d2*K + s1*d3*RM + s2*EITC}{1 + s1*d1}\right]^{.7}K^{.3}$$

c. Same answer as b.
d. An increase in the EITC shifts out the labor supply curve to the right which (based on L* and Y*) yields an increase in employment and output. If we plug the new L* into (1), we see that real wages fall. To determine the effect on the price level, set (5)=(9) to yield $Y = k*M/P$. Since Y* rose, the right hand side must rise; therefore, P must fall.
e. A rise in governmental expenditures only affects equation (6) and (9). Since Y is unchanged, AD must be unchanged; thus, the increase in G must be countered by a fall in either C or I. By (7), C does not change since Y and T do not change; thus, I must fall.

2.a. Using year 1 prices, household income for year 1 = \$1,950 and for year 2 =\$2,460; thus, the increase in household income would be given by

$$\frac{2460-1950}{1950}*100 = 26.2\%$$

b. Using year 2 prices, household income for year 1 =\$3,250 and for year 2 = \$3,700; thus, the increase in household income would be given by

$$\frac{3700-3250}{3250}*100 = 13.8\%$$

c. The chain weight index = $\text{sqrt}[(1.262)*(1.138)] - 1 = 19.8\%$

3. a. First, put everything in x/RMB terms. Thus Euro and $ exchange rates must be inverted. The trade weight average for China comes from multiplying the ratio of the exchange rate in 2012 to that in 2005 by its trade share; thus,

TWER = .4*(.121/.094) + .3*(12.8/12.9) + .3*(.159/.121) = 1.207 so the TWER rose by 20.7% from 100 in 2005 to 120.7 in 2012.

b. REX = e * P(China)/P(US) where e is in $/RMB

In growth rate terms REX growth = e growth + P(China)growth – P(US)growth
Put e growth in index terms with 2005 = 100; so 2012 = (.159/.121)*100 = 131.4
Thus,

$$\text{REX growth} = \frac{131.4-100}{100} + \frac{130-100}{100} - \frac{230-195}{195} = .314 + .300 - .179 = .435 \text{ or } 43.5\%$$

c. REX represents how much of another country's goods one gets per unit of that country's goods. In the example above, China's terms of trade have improved by 43.5%.

4. One can treat the tariff proposal as if it were the imposition of a quota. In the graph below, NX would initially shift to the right, and, as a result, S – I would rise. The real exchange rate, however, would not remain the same. It would begin to rise as U.S. demand for Chinese imports fell, which pushes demand for RMB down and REX up. Furthermore, domestic US prices would rise relative to Chinese domestic prices to further push REX up. As a result, exports would fall, and imports would rise until the resultant REX yielded the original level of net exports and S – I. Of course, these results would not hold if China also took such restrictive action.

The only difference between a small and large open economy relates to changes in domestic interest rates. In a large open economy, real interest rates might absorb some of the shock from the tariff. As NX increases, S becomes greater than I, which might drive down interest rates and increase I which would somewhat replace exports as REX rises. No such effects would take place in a small open economy since real interest rates are assumed to be set in world capital markets.