International finance
Problem set 3

1. People were basing their judgement on the relative PPP model. The Argentinian RER vis-à-vis Brasil had fallen (appreciated) substantially with respect to its past average. (Note the question said the real exchange rate was too high, but if E denotes the peso price of the brasilian currency, it was actually too low. It had appreciated too much).

$$RER = \frac{EP^*}{P} \tag{1}$$

were E is the peso/real nominal exchange rate and P and P^* are respectively the Argentinian and Brasilian price indeces.

Note that $E = E_{peso/\$}/E_{rea/\$} = 1/E_{\text{real}/\$}$. Given the fixed exchange rate with the dollar, the depreciation of the real versus the dollar (higher $E_{\text{real}/\$}$) which took place when Brazil devalued its currency implies an appreciation of the \$ and the peso. For given prices this implies an appreciation (a fall) in the Argentina/Brasil RER.

Possible solution:

- Depreciation: increase $E_{peso/\$}$ above 1peso/\$. This is what happened.
- Increase P^*. But why should Brazil inflate to sort out Argentinian problems.
- Fall in P. This is what the Argentinian government was hoping for. Prices did not fall quickly enough and the recession was strangling the Argentinian economy.

2. Balassa-Samuelson.

$$P_T A_T = P_N A_N \tag{2}$$

Given free labour mobility within countries the wage must be equalised across sectors. Hence, given perfect competition the marginal value product of labour must be equalised across sectors (go through Balassa-Samuelson and its assumption slowly). This implies

$$\frac{P_N}{P_T} = \frac{A_T}{A_N}, \tag{3}$$

higher productivity in one sector reduces that sector's relative price (explain intuition).

$$P = P_T^{1-\alpha} P_N^{\alpha} = P_T \left(\frac{P_N}{P_T} \right)^{\alpha} \tag{4}$$

which implies

$$P = P_T \left(\frac{A_T}{A_N} \right)^{\alpha} \tag{5}$$

Take logs

$$p = p_T + \alpha \left(a_T - a_N \right) \tag{6}$$

were lower cases denote logs. In general all variables apart from α can change over time. This can be written as

$$p\left(t\right) = p_T\left(t\right) + \alpha \left(a_T\left(t\right) - a_N\left(t\right) \right) \tag{7}$$

which holds for any t (if labour is instantaneously mobile).

Taking the difference between equation (7) evaluated at t and $t-1$ gives

$$\Delta p\left(t\right)=\Delta p_{T}\left(t\right)+\alpha\left(\Delta a_{T}\left(t\right)-\Delta a_{N}\left(t\right)\right), \tag{8}$$

were we have argued in class that absolute changes in logs are equivalent to percentage changes in levels. So, Δp is the rate of inflation in the home country. The above equation implies that it will be higher the higher the rate of inflation in the tradeable sector and the higher the difference in the rate of productivity growth between the tradable and nontradable sectors.

So for the rate of inflation not to be negative it has to be

$$\Delta p_{T}\left(t\right)+\alpha\left(\Delta a_{T}\left(t\right)-\Delta a_{N}\left(t\right)\right)\geq 0 \tag{9}$$

or

$$\Delta p_{T}\left(t\right)\geq -\alpha\left(\Delta a_{T}\left(t\right)-\Delta a_{N}\left(t\right)\right). \tag{10}$$

This is the lower bound on the rate of growth of the price of tradables necessary to ensure that there is no deflation in the country under exam. So, if in some country the rate of productivity growth is higher in the nontradable sector (the RHS of the above equation is positive), to avoid inflation it is necessary that the price of tradables increases by at least the value on the RHS. ECB should ensure that by printing enough money to sustain the necessary increase in the price of tradables. Emphasize that the nominal exchange rate cannot be adjusted as there is only one currency. So LOP for tradables implies all European countries must have the rate of price inflation in tradables which ensures no deflation in the country with the lowest differential $\Delta a_{T}\left(t\right)-\Delta a_{N}(t)<0$ if such a country exists.

3. Balassa-Samuelson implies

$$RER=\frac{EP_{T}^{*}\left(A_{T}^{*}/A_{N}^{*}\right)^{1-\alpha}}{P_{T}\left(A_{T}/A_{N}\right)^{\alpha}}=\left(\frac{A_{T}^{*}/A_{N}^{*}}{A_{T}/A_{N}}\right)^{\alpha} \tag{11}$$

or

$$\frac{EP^{*}}{P}=\left(\frac{A_{T}^{*}/A_{N}^{*}}{A_{T}/A_{N}}\right)^{\alpha} \tag{12}$$

Take logs

$$e+p^{*}-p=\alpha\left(a_{T}^{*}-a_{N}^{*}\left(t\right)-a_{T}\left(t\right)+a_{N}\right). \tag{13}$$

Taking time differences implies

$$\Delta e+\Delta p^{*}-\Delta p=\alpha\left(\Delta a_{T}^{*}-\Delta a_{N}^{*}\left(t\right)-\Delta a_{T}\left(t\right)+\Delta a_{N}\right), \tag{14}$$

were $\Delta e=0$ in the Euro zone because of common currency. So we can write

$$\Delta p^{*}-\Delta p=\alpha\left(\Delta a_{T}^{*}-\Delta a_{N}^{*}\left(t\right)-\Delta a_{T}\left(t\right)+\Delta a_{N}\right) \tag{15}$$

and plugging in numbers (suppose Ireland is the foreing country)

$$\Delta p^{*}-\Delta p=\alpha\left(0.08-0.02\right)=\alpha 0.06. \tag{16}$$

So the shares of nontradables in the consumption basket α determines how much of the differential in productivity growth translates into an inflation differential. Blanchard's procedure is equivalent to assuming $\alpha=0.179$. The number he uses comes from an estimated reduced-form equation, it does not necessarily equals the share of nontradables. It is often common to identify the service sector with the nontradable sector. In such a case one would obtain $\alpha\simeq 0.4-0.5$ which would imply an upper bound for the inflation differential of up to 0.03.