EC4333 Lecture 10 Handout

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The Stiglitz-Greenwald Model

For all the details, look at Stiglitz, J.E., and Greenwald, B. Helping Infant Economies Grow: Foundations of Trade Policies for Developing Countries, *American Economic Review*, Papers and Proceedings, May 2006, in the coursepack.

Assume two countries, developed D and less developed, L. These countries face the same production technologies, with only labour as the input for both produced goods, agriculture, A and industry, I. Call $C_I^D(C_A^D)$ the cost of labour per unit of agricultural or industrial output in the developed country, and vice versa in the less developed country. Assume

$$C_I^D < C_I^L \quad \text{and} \quad C_A^D < C_A^L, \qquad \text{but} \tag{1}$$

$$\frac{C_A^D}{C_I^D} < \frac{C_A^L}{C_I^L}. \tag{2}$$

In equilibrium, the less developed nation will specialise in agricultural output while the rich country will produce both goods. Prices will be determined by a trade off between the cost of producing the industrial and the agricultural good, so

$$P_I^D = \frac{C_I^D}{C_A^D} \tag{3}$$

and wages in both countries will be given by

$$W^D = \frac{1}{C_A^D} \tag{4}$$

and

$$W^L = \frac{1}{C_A^L} \tag{5}$$

Allowing free trade between these countries means that L will devote all their energies to specialising in agriculture. Consumption in L will therefore be determined by P_I^D. All gains to trade flow to L in this example.

Now adding a measure of technological progress by differentiating with respect to time yields:

$$\frac{-1}{C_I} \times \frac{\partial C_I}{\partial t} = \frac{-1}{C_A} \times \frac{\partial C_A}{\partial t}. \tag{6}$$

So:

$$-\frac{\partial}{\partial t}\left(\frac{C_I}{C_A}\right) = \frac{-C_I}{C_A}\left(\frac{1}{C_I} \times \frac{\partial C_I}{\partial t} - \frac{1}{C_A} \times \frac{\partial C_A}{\partial t}\right) \tag{7}$$

Equation 7 says that increases in technological progress will spillover from the industrial sector to the agricultural one. Now let

$$g = \frac{-1}{C_I} \times \frac{C_I}{\partial t} = \frac{-1}{C_A} \times \frac{\partial C_A}{\partial t} = f\left(\frac{Q_I}{Q_I + Q_A}\right). \tag{8}$$

Here Q_A is the measure of output in the agriculture, Q_I is output in the industry. When $Q_I^L = 0$, industry stagnates in the less developed country.

Trade Policy

Now ban industrial exports from D. What will happen? First, there will be hardship, but at some point L will have to start producing its own industrial output to survive, thus $P_I^L = \frac{C_I^L}{C_A^L}$. If we wait long enough, eventually the benefits of this improvement will outweigh the short run costs. The country will become self sufficient because at some point

$$g^L = f\left(\frac{Q_I^L}{Q_I^L + Q_A^L}\right) > 0. \tag{9}$$

What's the point of the paper? Trade barriers might enhance rather than reduce welfare. What, in your opinion, is the major weakness of an argument like this?