Macroeconomics, Module 10: Business Cycle Effects

*Homework Assignment*: Civil Strife

(The attached PDF file has better formatting.)

Country W derives all its income from extracting and refining oil. In 20X4, it has 20 million workers and $40 billion of capital (oil rigs, refineries, and so forth). The ratio of capital to labor is at the optimal (steady state) ratio.

In 20X5, a Maoist insurrection destroys half the machinery but does not affect the labor force. Many workers skilled at advanced technology now do manual work or are idle.

In 20X6, the insurrection is eliminated. The country's economy is closed, so the real interest rate depends on conditions in this country alone, not on the global economy. Rebuilding the oil rigs and refineries is done by domestic firms, not by international firms.

This homework assignment asks about the effects of the civil strife and the decrease in capital. Compare this homework assignment to the homework in the previous module.

- An epidemic that reduces the labor force hurts workers who die but helps workers who remain alive.
- Civil strife that destroys capital hurts firms whose capital is destroyed but helps firms whose capital is not destroyed.

Similarly, a harvest failure hurts farmers whose crops are destroyed but helps farmers whose crops are not destroyed. This homework assignment asks about the effects on the capital remaining after the civil strife. It begins by examining the marginal product of labor.

A. What is the effect on the marginal product of labor?
B. What is the effect on the real wage rate?
C. What is the effect on the employment rate?
D. What is the effect on the hours worked per worker?
E. What is the effect on the real rental price?
F. What is the effect on the real interest rate?
G. What is the effect on the investment rate?

For Part A: The civil strife decreases the ratio of capital to workers 50%, so it doubles the ratio of workers to capital. Use the concept of capital deepening: as the capital per worker decreases, what happens to the marginal product of labor? Many skilled workers no longer have the capital they need. The marginal product of labor is the value of the last worker with the same skills, which may now be low.

*Illustration:* In countries with recent civil strife, scientists with PhD's may work at manual labor and earn low wages. Firms have a large pool on unemployed (or under-employed) skilled labor for the remaining jobs, so the cost of hiring skilled labor decreases. Even workers who retain skilled jobs do not have the capital needed for full production, so they are not producing as much as they otherwise would.

For Part B: The real wage rate depends on the marginal product of labor.

For Part C: The values of leisure does not change, but the real wage rate changes. In many countries with recent civil strife, skilled workers may be unemployed. In some cases, no jobs are available. In other cases, the workers have savings, and the pay for manual labor is so low that the value of leisure exceeds the value of working.

For Part D: Barro assumes that

- *Income effect:* If workers are paid subsistence wages, they may work long hours to pay for food and clothing. As wage levels increase, they can afford some leisure time.
- *Substitution effect:* If workers are paid good wages, they work enough hours that they are indifferent between an additional hour of work and an additional hour of leisure. A higher real wage rate induces them to prefer an additional hour of work.

For most workers, the substitution effect is stronger than the income effect. For your homework assignment, state your assumption about the relative strength of these two effects and the implication for hours worked. In this homework assignment, the workers who previously used capital equipment are skilled workers, who have savings and are willing to spend more leisure time now until the capital stock is rebuilt.

For Part E: The capital per worker decreases, so the marginal return per dollar of capital increases. After the Maoist insurrection, many skilled workers are unemployed or doing manual labor, so each new dollar of capital causes a large increase in real GDP.

For Part F: Firms borrow money to buy machines, so the real interest rate is the net return on capital. If the economy is in a steady state at the optimal capital to worker ratio, the technology is not improving, and the population is not growing, the return on capital is low. On the transition path, with a lower capital to worker ratio, the return on capital is higher. This homework assignment is consistent with the concepts of economic growth.

For Part G: How does the new return on capital affect the investment in new capital? Each dollar of capital produces a higher return, so the incentive to acquire more capital changes.

If the economy is entirely closed, foreigners can not invest in the country and domestic firms can not borrow from outside the country. Economies that are entirely closed stagnate even though they have low capital to worker ratios, because they do not have domestic savings to increase capital. Myanmar, North Korea, and many of the Communist countries twenty years ago are examples. If a country has an open economy, it attracts foreign investment even if it has little political freedom (China and Iran are current examples). The effects on investment depend on how open the economy is. You may answer two ways:

- Assume that domestic firms can borrow outside funds to raise capital (or foreign firms are allowed to supply capital).

- Assume that the economy is fully closed.

The two assumptions give different answers for the amount of new investment. You may choose either assumption. The second assumption is in this chapter. The first assumption is in chapter 17, which you can read on the book's web site.