Economics 302/Spring 2007/1st midterm/ February 22, 2007

IV. Essay (worth a total of 20 points)

General Directions for Essay: You are to write an essay on the following topic. This should be a unified, thoughtful essay. The essay will be graded on content, expression, clarity, organization, and overall quality (including legibility).

1. During the past ten to fifteen years, the Internet has changed the way many businesses operate, leading often to an increase in firm productivity. Using the production-side assumption of constant returns to scale and an aggregate Cobb Douglass production function, in addition to the assumption of perfect competition in both the output and input markets, construct an argument which relates the effect of the Internet on GDP, real wages, firm profits, and the income share of capital. Be explicit about how the assumptions stated in the question tie into your argument.

Let the aggregate production function be given by the Cobb-Douglas function $Y=AK^{\alpha}L^{1-\alpha}$. The introduction of the Internet can be thought of as a rise in the level of technology from A to A'>A. From the production function, provided that capital and labor are fixed, output will increase as A increases due to the assumptions of the classical model.

Under the assumption of perfect competition, firms take prices as given and maximize profits. This implies, in equilibrium, that the real wage will equal the marginal product of labor. This, in turn equals $(1-\alpha)P[AK^{\alpha}L^{-\alpha}]$, which is clearly increasing in A.

Next, the assumptions of perfect competition and constant returns to scale imply that total factor payments will equal total revenue, so firm profits are zero with or without the Internet. Thus, firm profits are not affected.

Finally, under the assumption of a Cobb-Douglas production function, the capital share of income RK/PY is simply α. Since this does not depend on level of technology, it is unaffected by the introduction of the Internet.

Economics 302/Spring 2008/1st midterm/ March 3, 2008

IV. Essay (worth a total of 20 points)

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1. At the end of the Cold War, the US government was able to reduce government spending on the military by 2% of GDP. Consider the two following plans for reallocating this money:
a) The entire amount is given to households in the form of a tax cut.
b) The entire amount is given to businesses in the form of an investment tax credit.

For both a) and b), use the Classical Model to analyze what will happen to the equilibrium real interest rate, consumption, and investment relative to the situation before the defense cut. Assume that households save more when real interest rates increase, and vice versa. Which policy will result in a higher rate of long-term growth of the US economy?

(Note: while graphs may be useful in helping determine the answer, they are not themselves an answer to the question.)

For a), the tax cut will give consumers additional disposable income. As a result, equilibrium consumption will rise. Also, households will save more money, shifting the supply curve in the market for loanable funds to the right without changing the demand curve. This will result in the equilibrium real interest rate falling while equilibrium investment rises.

For b), businesses now find it relatively cheaper to invest in new projects, so this results in a rightward shift of the demand curve in the market for loanable funds. As a result, there is a higher equilibrium real interest rate and higher equilibrium investment than before the defense cut. Since the supply curve does not move, there will be more private savings due to the higher interest rate, and since GDP is determined by the level of capital and labor in the Classical Model, there must be a corresponding fall in equilibrium consumption.

One of the factors affecting long-term growth for the economy is the amount of physical capital, and investment is the formation of new plants and equipment – i.e., new capital goods. Thus, the plan which leads to a higher equilibrium level of investment should create more long-term growth. However, we do not know which of these policies creates a higher level of investment because we do not know the exact shapes of the supply and demand curves in the market for loanable funds. If we had equations for private savings and business investment, we could determine which policy leads to higher long-term growth.