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ECONOMICS 131

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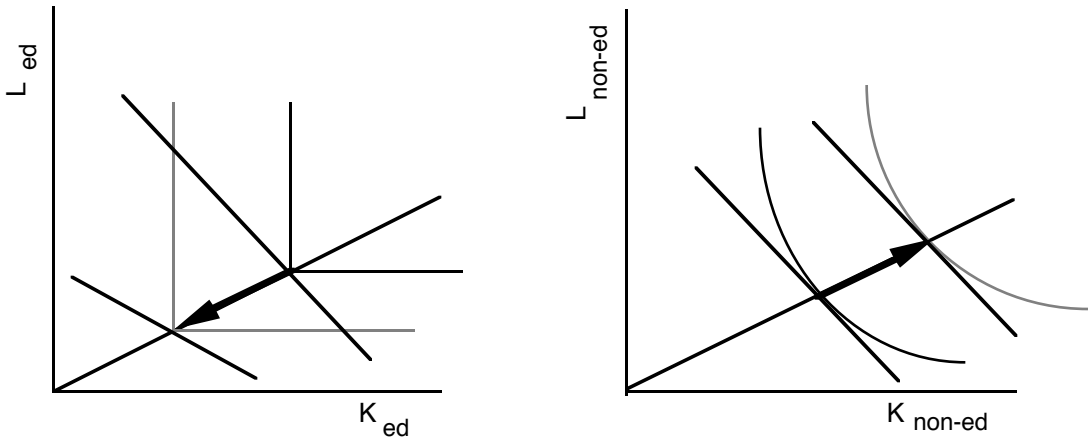
Answers to Problem Set #2

1. The Burden of a Selective Payroll Tax (continued)

b. In the education sector there will be a substitution of K for L. The labor that they expel will move to the non-education sector, driving down the price of labor. The output effect will be nil due to the equal capital/labor ratios—that is, a mere output reduction (without substituting K for L) will release K and L in the proportions used in the non-education sector and not require any adjustment in r/w. Since the factor substitution effect increases r/w and the output effect is nil, we know that r/w increases and that L bears more than a proportional burden.

c. In the education sector the tax will cause a substitution to more capital intensive production since the relative price of capital has fallen. The expelled labor will again tend to increase r/w. The output effect works in the opposite direction: relatively more capital will be expelled from the education sector. To induce the less capital-intensive non-education sector to absorb the excess capital the price of capital must decrease. The combined effect is ambiguous.

d. With fixed proportions in the education sector there can be no substitution of K_{ed} for L_{ed}, and therefore no factor substitution effect. As output in education declines, K and L will be expelled in exactly the proportions used in the non-ed sector, so the expansion in the non-ed sector will leave the technical MRS (and hence r/w) unchanged there. Thus K and L bear the burden in proportion to their income shares.

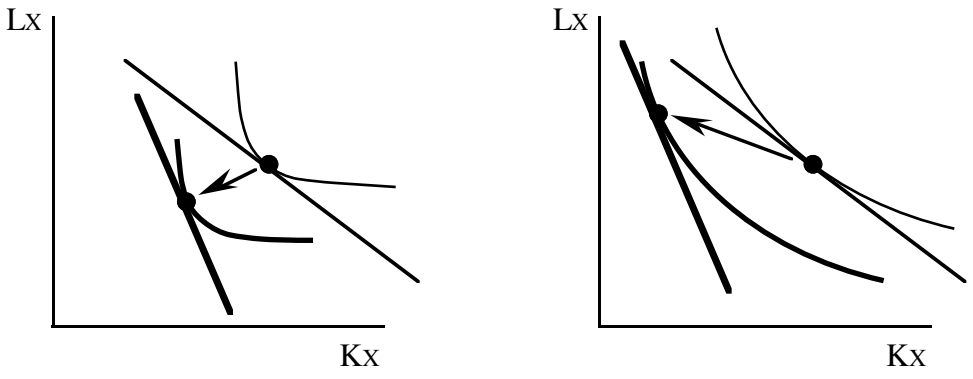


2. General Equilibrium Tax Incidence and the Elasticity of Substitution

a. The owners of capital must receive the *same* rate of return in X (after taxes) as in Y. If they did not, capital would move from the low-return sector to the high-return sector.

b. An increase in S_X increases the degree to which the corporate sector will substitute labor for capital in response to the increase in the (gross) rental-wage ratio to the new level of $(r+T)/w$. This is shown by comparing the left diagram below (in which S_X is lower) to the right diagram (in which S_X is higher). In the figures, the thin isoquants and isocost lines are before the tax is imposed, and the thick ones are afterwards.

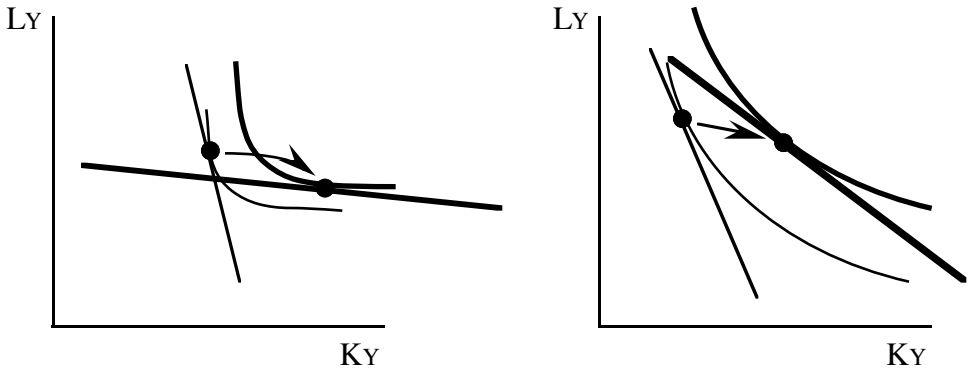
When S_X is lower the left figure shows there is a reduction in demand for labor as well as for capital. In contrast, the right figure shows that, when the S_X is higher, demand for labor increases and demand for capital decreases. Thus, the higher is S_X, the greater the induced demand for labor (and glut of capital), which drives down r/w and causes capital to bear more of the burden.



SX low ***SX high***

c. We need to assess what change in r/w is necessary to induce the Y sector to absorb extra capital. Again, we compare the left diagram below (in which S_Y is lower) to the right diagram (in which S_Y is higher).

When S_Y is lower, the left figure shows that a large reduction in r/w (meaning a flattening of the isocost curve) is required in order to induce Y to absorb the extra capital. In contrast, the right figure shows that, when the S_Y is higher, little reduction in r/w is required. Thus, the lower is S_Y, the greater is reduction in r/w which is required and the greater is the burden on capital.



SY low ***SY high***