Poetry and Mathematics in Skillistan

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November 4, 2017

Skillistan is a simple economy with only one type of firm that requires two types of workers: those who can do math (M-types) and those who can write poems about math in addition to doing math (P-types). The P-types are more productive than M-types. Firms require some capital investment in the form of toys for the workers to play with while they work. Residents can always choose to not work and earn a reservation wage pondering the nature of reality. Note that the residents of Skillistan only derive utility from the wage they obtain and none from leisure: pondering the nature of reality is no more pleasant than doing math or writing poetry.

1. Write down a model for the firm

   (a) How many M-types and P-types will the firm hire?

   (b) What will be the wage offered to the M-types and the P-types?

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2. All residents graduate from Skillistan High where they learn how to do math without paying any fees. When they graduate from high school, all residents of Skillistan are identical M-types. Afterwards, they can choose to attend Skillvard College where they can learn how to write poems about math and become P-types but they have to pay tuition fees.

   (a) Derive a condition in terms of the wages in equilibrium for M-types and P-types and in terms of the cost of Skillvard high for when M-types will choose to become P-types.

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3. Making any simplifying assumptions you may need to make:

   (a) Derive the labor demand curve

   (b) Derive the labor supply curve

(c) Define the 'poetry premium as the ratio of a P-types wage and an M-types wage. Plot the labor demand and supply curves as a function of the number of P-types in society and the poetry premium (in one graph).

(d) Skillvard College announces an increase in tuition fees. What does this mean for the supply of P-types and the wages they earn in equilibrium?

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4. The Government of Skillistan wants society to have more P-types than it currently does and decides to subsidize the tuition fee at Skillvard College.

(a) Does this subsidy increase the number of P-types in society?

(b) What are the aggregate consequences of this subsidy for residents and firms? In other words, who benefits from the subsidy?

(c) The Government is also a player in this economy. It cares most about the welfare of residents, somewhat less about its own welfare and the least about the welfare of firms. Is the fee subsidy a Pareto improvement over the status quo? If not, suggest an alternative policy that would be a Pareto improvement.

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