

Human Capital: Health

Lecture 5 - EE461 2/2015

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Poverty, Nutrition, and Labor markets

Introduction: Energy balance

- ▶ Energy input: the periodic consumption of food is the main source of energy input to the human body
- ▶ Resting metabolism: the energy required to maintain body temperature, sustain heart, and respiratory action, supply the minimum energy requirements of resting tissues, and support ionic gradients across cell membranes
 - ▶ Usually, a higher body mass raises resting metabolism
- ▶ Energy required for work: the energy required to carry out physical labor
- ▶ Storage and borrowing: an energy deficit will run down stores from the body while an energy surplus is partly dissipated, partly stored

Poverty, Nutrition, and Labor markets

- ▶ How does this relationship between poverty and nutrition create a vicious cycle in the labor market?
- ▶ How labor markets become part of the cycle?
 - ▶ Labor markets generate income, and hence potential source of nutrition and good health
 - ▶ Good nutrition affects the capacity of the body to perform tasks that generate income
- ▶ Can't people simply borrow their way out of the vicious circle?
 - ▶ Credit markets may not be available for poor individuals as well as consumption loans.
 - ▶ An economy with undernutrition traps may be Pareto optimal, hence no way (in SR) to make the undernourished poor better off without some amount of redistribution from the richer.

Nutrition and Work Capacity

- ▶ *The capacity curve*: a relationship between nutrition and work capacity, linking different nutrition (or income) points to the corresponding levels of work capacity generated by the individual.
 - ▶ Initial stage: nutrition uses to maintain the body's resting metabolism, so work capacity is close to zero and does not increase too quickly as nutrition levels change
 - ▶ Once resting metabolism is taken care of, there is a marked increase in work capacity
 - ▶ Finally stage: natural bodily limits restrict the conversion of increasing nutrition into ever-increasing work capacity, resulting in diminishing returns

A model of nutritional status

- ▶ A worker's current nutritional status and his ability to carry out sustained work depends not only on his current consumption of nutrients, but also on the history of that consumption.
- ▶ Nutrition intake (a scalar variable such as calories): maintenance of the body and physical activity of various types
- ▶ x_t : energy intake of an individual at time t
- ▶ r_t : resting metabolic rate
- ▶ q_t : energy expended on physical activity
- ▶ b_t : energy released from (stored in) the body
- ▶ The fundamental energy balance equation: $x_t = r_t + q_t - b_t$
(1)

A model of nutritional status

- ▶ Nutritional status = the state of physical health of individual at any date and varies from date to date depending on stresses and access to nutritional inputs.
- ▶ Let m be body mass: borrowing from the body $\gg$ lower m , storage $\gg$ increase m
 - ▶ given $m_t \rightarrow$ higher $b_t \rightarrow$ lower m_{t+1} (2)
- ▶ Equations (1) and (2) represent the trade-off to an employer who hires this individual. How?
 - ▶ The employer pays a wage $\gg$ the individual uses to buy nutrition x .
 - ▶ The pace of work or work tasks required by the employer affects q .
 - ▶ For a fixed wage, the higher the employer requires for work, the greater will be the amount of borrowing from the body (1) and the lower will be the next period's nutritional status (2)

A model of nutritional status

- ▶ How nutritional status (as captured by body mass) feeds back on the ability to carry out productive activity?
- ▶ Resting metabolism is related positively to body mass
 - ▶ A lowering of body mass brings down resting metabolism
 - ▶ Lowering r : the body eats up less for resting metabolism and can use this extra energy more efficient for work >> '*resting metabolism effect*'
- ▶ Better nutritional status may increase work capacity: '*capacity effect*'
 - ▶ A reduction in body mass might affect the way in which work input q is translated into work output.

A model of nutritional status

- ▶ Combining the two effects together:
- ▶ For a given amount of borrowing, the capacity curve of a person with lower nutritional status has a tendency to shift upward
 - ▶ From the resting metabolism effect: more energy can be channeled into work.
- ▶ The increased energy available for work can be used better by a better-nourished person at high ranges of work output, from the capacity effect
- ▶ Figure 13.12 (Ray)

Nutrition and Work Capacity

- ▶ If work capacity affects future work output, won't employers wish to offer long-run contracts that take advantage of this?
 - ▶ There is no guarantee that employees will stay working there forever. The employer then may be reluctant to invest in nutrition-enhancing for their employees.
 - ▶ If a good health person can be identified by other employers, the market will bid up the wage rate for such an employee. The employee will reap the entire benefit of the employer-financed nutrition investment in the form of a higher wage.
- ▶ If the employees do not want to sign a contract to work for the current employer in the future and the employers have no incentive to increase the nutritional status of their workers nor pay a higher wage, the casual labor market will fail to improve the nutritional status of workers. This process will make employers worse off and raises their labor costs (the capacity effect dominates the resting metabolism effect).