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# The Decision to Retire: Some Microeconomic Hints

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## 1 The Model

Suppose a society divided in two groups, the old (o) and the young (y). There is no heterogeneity within these groups so that every old and every young are the same. Every individual has a total amount of hours ( $T$ ) which must be divided between hours of work (the so-called *market activities*) and leisure (*non-market activities*), such as housework, babysitting and so on. Every individual gets utility from the consumption of leisure ( $l$ ) and all the other goods ( $c$ ). Indeed, every worker's problem is to find the optimal combination of leisure and consumption which maximizes his utility. I assume that the utility function is quasi-linear, so that the income effect is canceled out, and may be written as:

$$U^i = c^i + \psi^i \sqrt{l^i} \quad (1)$$

where  $c^i$  denotes the consumption of all the other goods and  $\psi^i$  is a parameter which capture workers' preferences for leisure,  $\psi^i \in [0, 1]$ . I assume also that this parameter is higher for the old than for the young; that is:  $\psi^o > \psi^y$ . Figure 1 shows a map of indifference curves when the parameter  $\psi$  is particularly low, whilst Figure 2 shows a map of indifferent curves when the parameter  $\psi$  is particularly high.

[FIGURE 1 HERE]

[FIGURE 2 HERE]

It can be seen that indifference curves depicted in Figure 1 are flatter than those depicted in Figure 2, which means that in the second case the individual has a greater preference for leisure. to solve the maximization problem

we need a suitable expression for the budget constraint which I write as:

$$c^i = w^i(1 - \tau^i)(T - l^i) \quad (2)$$

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where  $l^i$  denotes the number of hours of leisure,  $w^i$  is the unitary wage per hour,  $\tau^i$  the marginal tax rate on labour. Figure 3 and 4 show the equilibrium bundle of hours of leisure and consumption where an indifference curve is tangent to the budget constraint.

[FIGURE 3 HERE]

[FIGURE 4 HERE]

It can be seen that the equilibrium for the old, depicted in Figure 3 is characterized by a higher number of hours worked and a lower level of consumption than the equilibrium for the young depicted in Figure 4. Calculating the Marginal Rate of Substitution between consumption and leisure, we obtain

$$dU^i = dC^i + \frac{\psi^i}{2\sqrt{l^i}} dl^i$$

and setting  $dU^i$  we obtain:

$$dC^i + \frac{\psi^i}{2\sqrt{l^i}} dl^i = 0 \Rightarrow \frac{dC^i}{dl^i} = -\frac{\psi^i}{2\sqrt{l^i}}$$

Expression 4 represents the slope of the indifference curve. Finally the MRS is

$$MRS_{C^i, l^i} = -\frac{dC^i}{dl^i} = \frac{\psi^i}{2\sqrt{l^i}} \quad (3)$$

which depends on  $\psi^i$ . That is, the higher  $\psi^i$ , the higher the rate at which the worker is willing to substitute leisure with consumption

## 2 Comparative Statistics

### 2.1 Difference in wage rates

At first, suppose that workers are paid according to their productivity; that is  $MPL^i = w^i$ . Secondly suppose that a group of workers (say group i) is more productive than another (say group -i); for instance, one may imagine that group i is represented by high-skilled workers and group -i by low-skilled workers, or that group i is represented by the young and the group -i by the old, even though the second case has not general acceptance amongst economists. Thus, wages are differentiated and the young get a higher wage rate ( $w^i > w^{-i}$ ). How does this differentiation in wages affect the equilibrium bundle?

[FIGURE 5 HERE]

Figure 5 depicts a situation where both the equilibrium for the group i and group -i are present. The budget constraint of the old has a lower slope due to the lower wage rate. As a result, the equilibrium of the old is characterized by a higher level of leisure and a lower level of consumption than the equilibrium of the young.

## 2.2 Difference in marginal tax rates

The introduction of a marginal tax on labour reduces the wage rate. Suppose the existence of a proportional tax levied on the gross wage and assume that, again, one group is taxed more than another, *ceteris paribus*. The group which suffer from the higher tax rate has an equilibrium characterized by a higher level of leisure and a lower level of consumption.

## 3 The decision to retire

Suppose now that an old worker has to decide between working and retiring. If he works he earns  $w^i(1 - \tau^i)(T - l^i)$ , whilst if he retires he gets a pension transfer equal to  $b^i$ . How can the existence of this option influence the decision to retire? Figure 6 and 7 shows this situation.

[FIGURE 6 HERE]

[FIGURE 7 HERE]

It is easy to see that the different preferences of individuals for leisure entail different equilibrium. In the first case (Figure 6) the worker decides to work, whilst in the second (Figure 7) he decides to retire and the equilibrium is characterized by a corner solution.

### 3.1 An increase in the pension benefit

An increase in the pension benefit exacerbate the retirement choice. Figure 8 shows the new equilibrium.

[FIGURE 8 HERE]

Comparing the situation depicted in figure 8 with the situation depicted in figure 6 it is possible to see that, under the new pension benefit the same individual who decide not to retire previously, retires now. This simple example demonstrate how different pension policies selected by Government may drive individuals' decision to remain or to withdraw from the labour force.

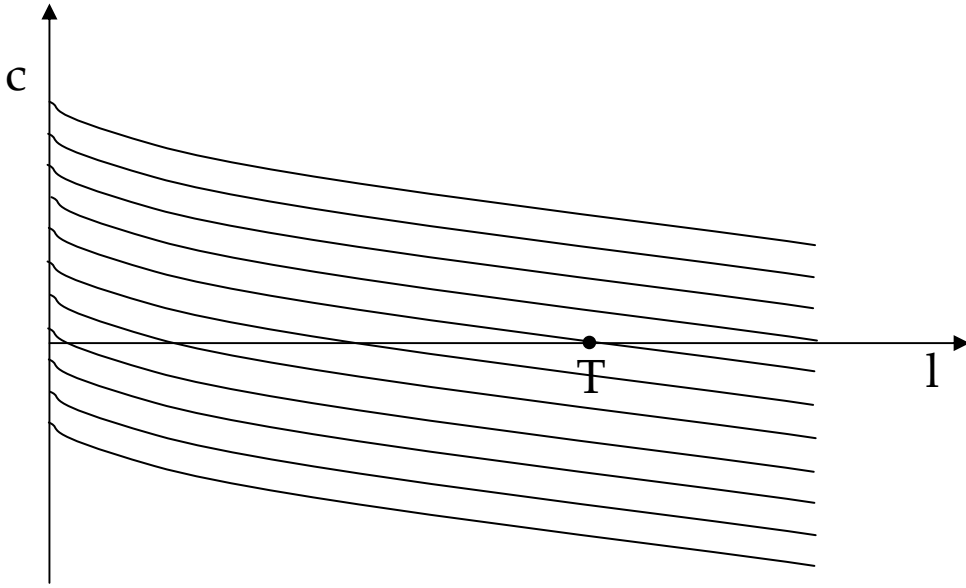


Figure 1

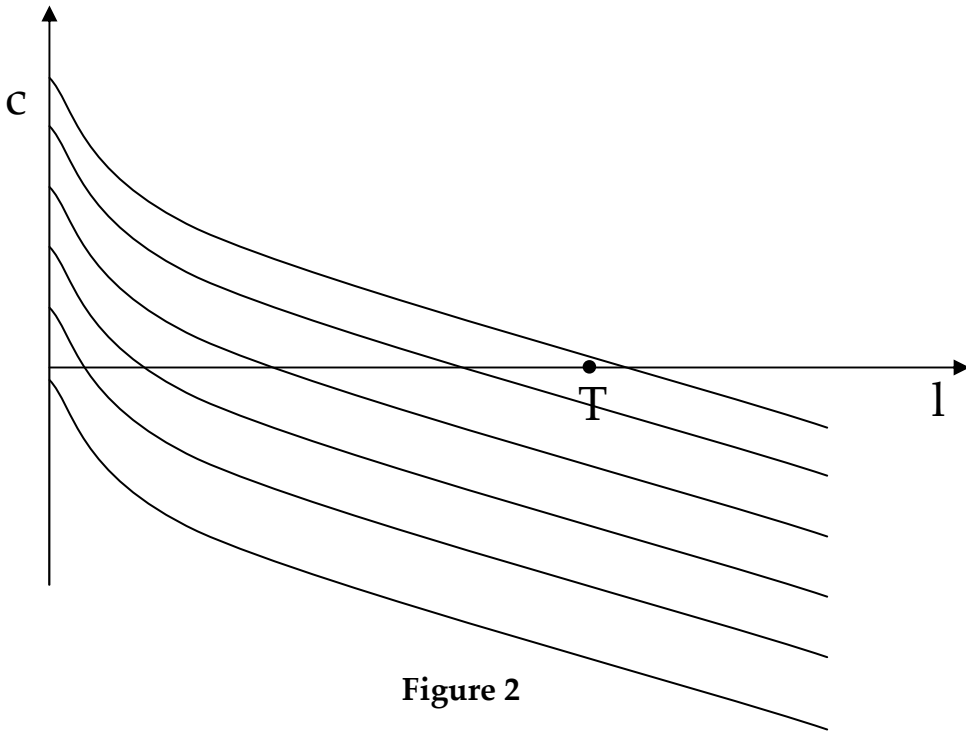


Figure 2

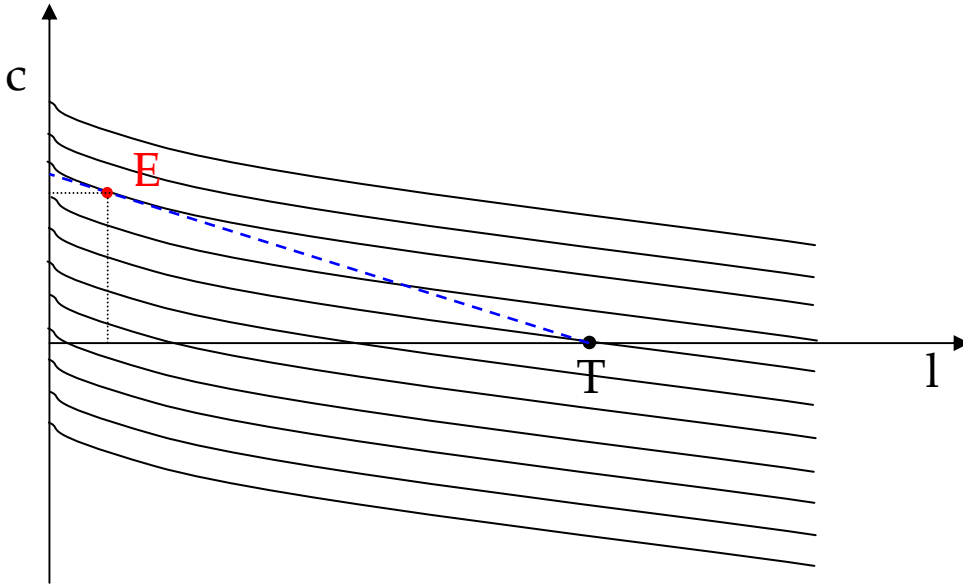


Figure 3

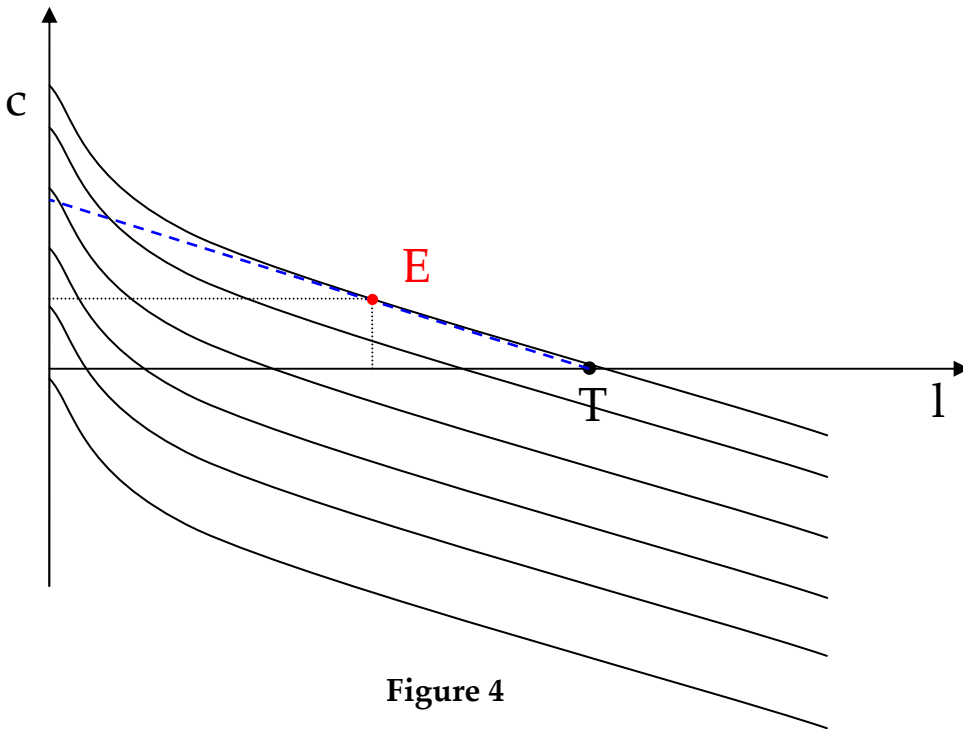


Figure 4

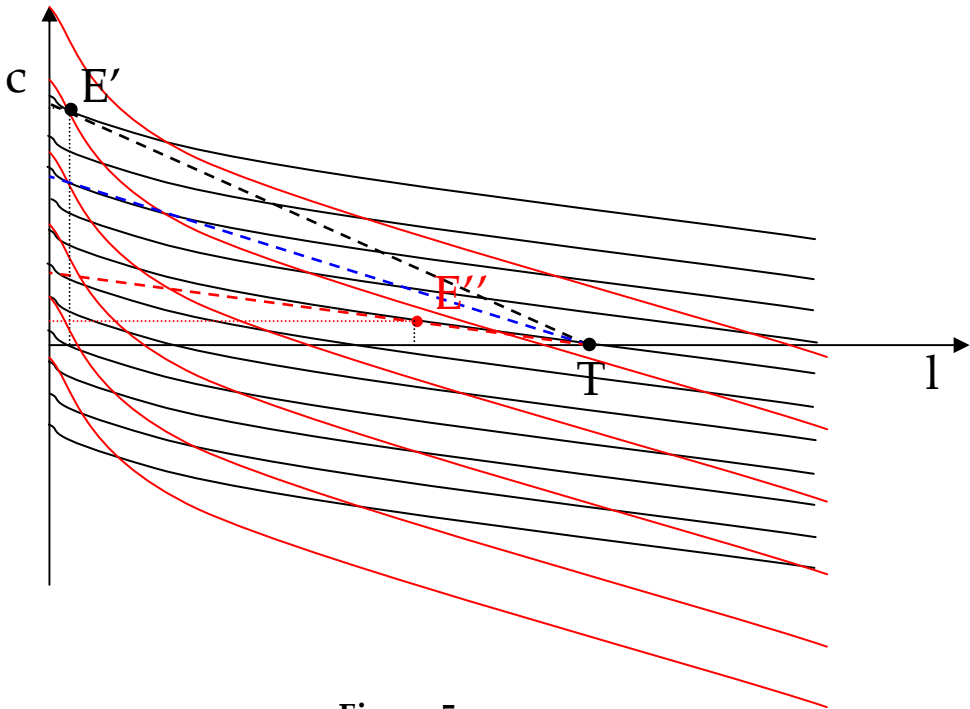


Figure 5

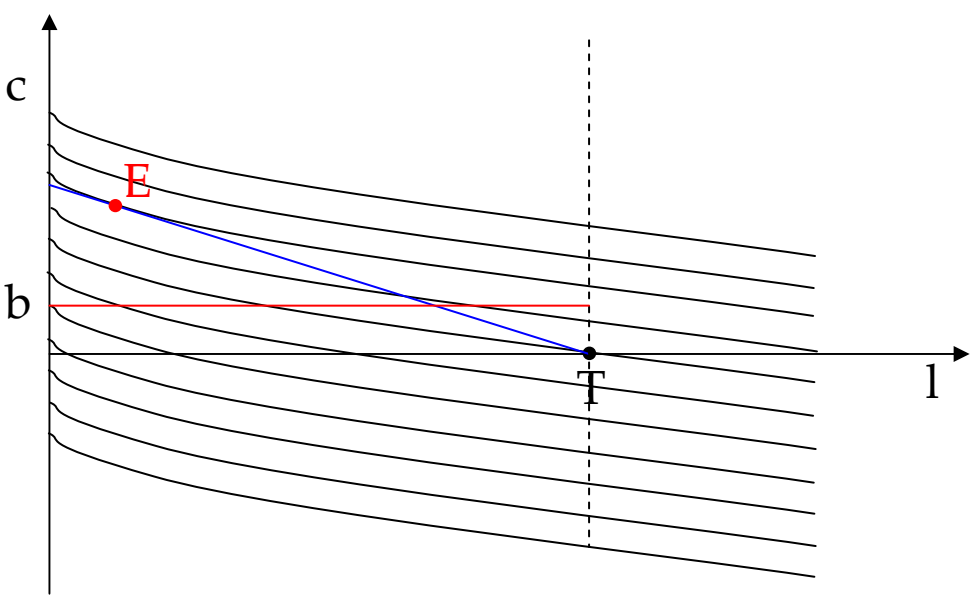


Figure 6

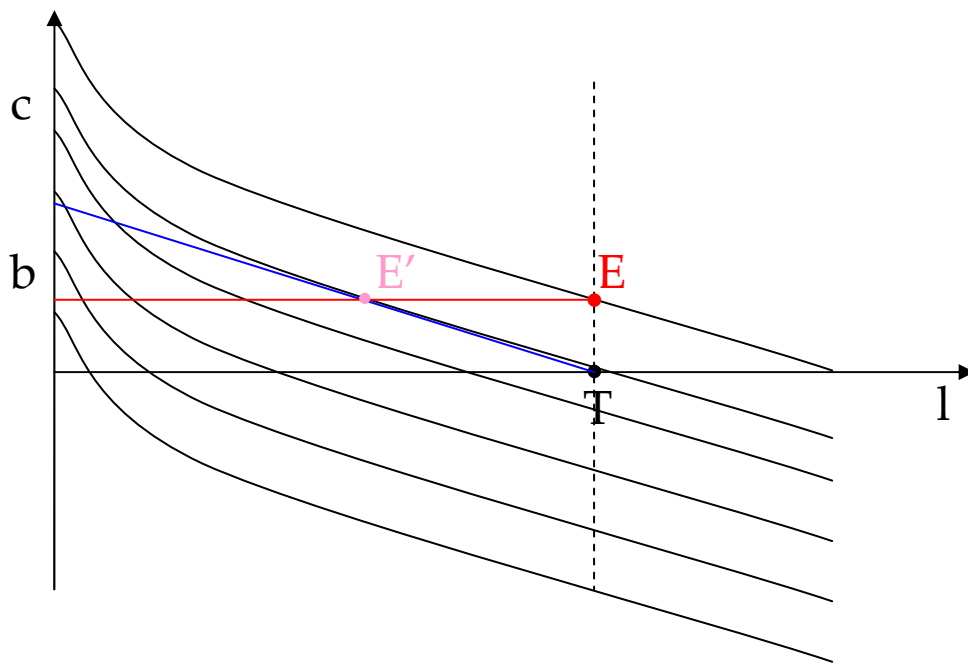


Figure 7

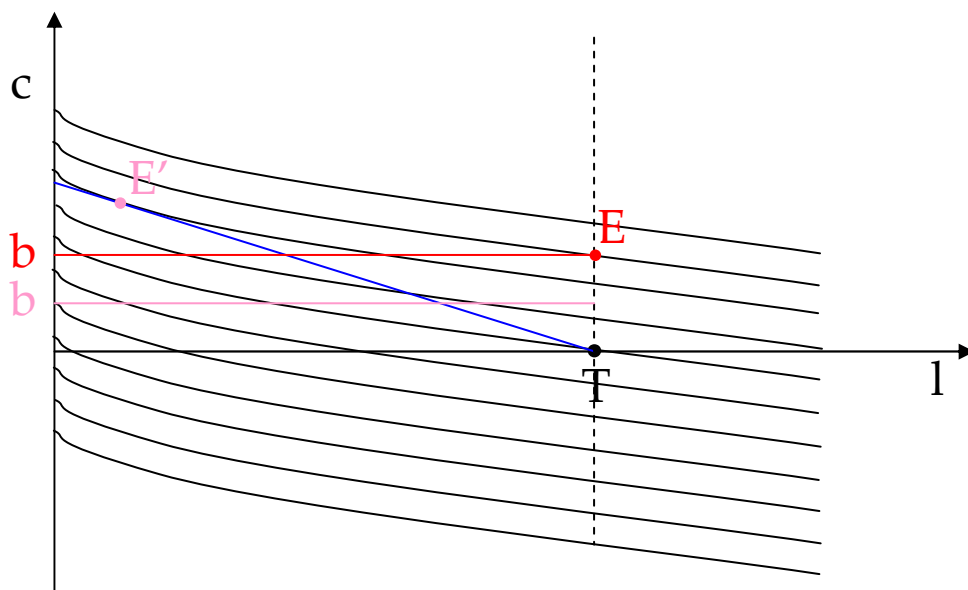


Figure 8