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UNIVERSITY OF DEFENCE
INVESTMENTS IN EDUCATION DEVELOPMENT

Lesson plan

Course Name: Economics II

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Topic: Factors markets, part III.

Course Objectives:

The aim of this theme is to describe the capital market. We will assume that the demand for capital is derived from the same principles as the demand for labor. The main issue is the allocation of resources in time.

16 CAPITAL MARKET

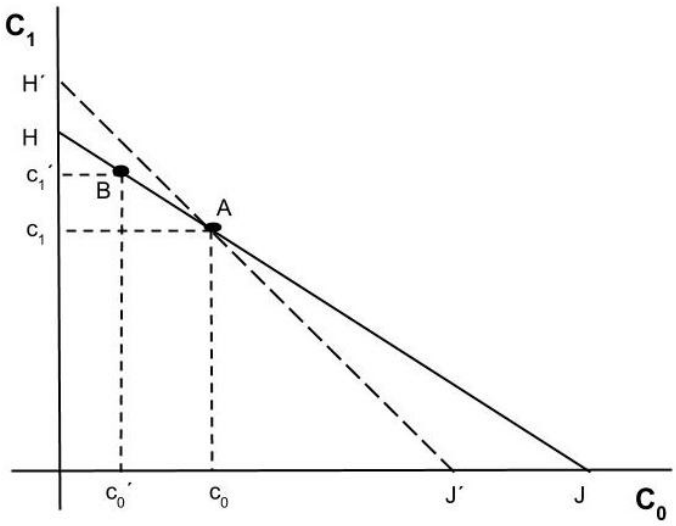
16.1 Capital

Capital has the form of cash or other financial assets (bonds, shares, etc). The third form of capital is human capital. People invest in their education for the same reasons as in capital goods or financial capital. They hope that greater knowledge and better skills will bring them in the future higher incomes.

16.2 Consumer decision-making

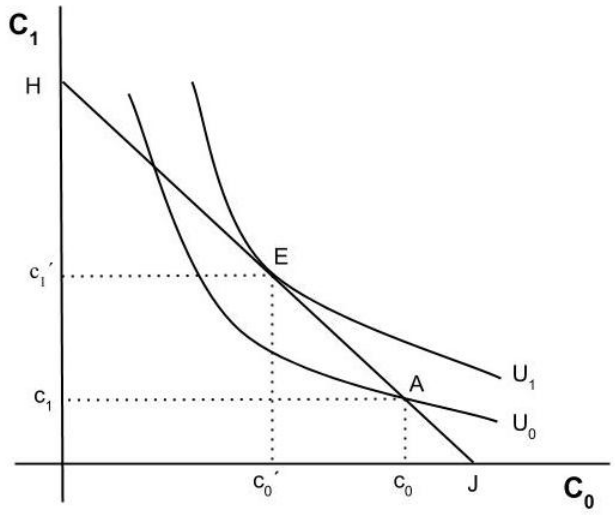
• **Line of market opportunities**

The consumer knows the amount of his current income and knows that at a certain price of product C will be able to buy today c0 units of the product C. As in our case, there is no risk of the consumer knows the amount of their income and can easily determine that it will buy in the future c1 units goods C.



• **Consumers optimum**

The formulation of the goal function (which expression are indifference curves) and consumers limit (market opportunities lines) can help us to find the consumers optimum.



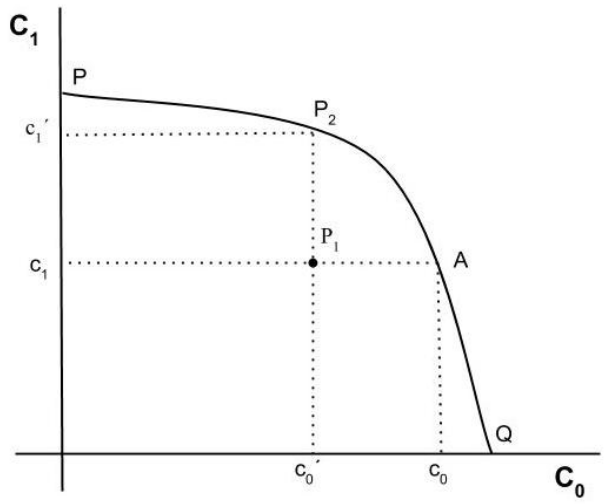
16.3 Investment Decision

Investment decisions in the absence of capital market

We assume now that the economic entity does not have any access to the capital market, but can use his existing resources in production, and through the revenue to enhance his future consumption.

Investment decisions in a perfectly competitive capital market

The original investment plan calculate with savings and investments of (c0 - c0'). After the investment entity has c0' goods C for current consumption and c1' goods C for future consumption.



The real interest rate, however, remained unchanged. The situation that we have described, is not very frequent.

Investment decisions criteria

We set up the criterion that we can optimize the investment decisions. This criterion is equity IRR and real interest rates. But there are other criteria for investment decisions.

From this fact, we can deduce two other criteria for investment decisions:

The first is the **present value of assets**. It is necessary to choose an investment that brings the highest present value of the total income.

The second criterion is the **future value of assets**. We choose the investments that will bring the highest future value of assets.

16.4 Investment decisions for more seasons

So far we have only compared the two periods. Now we assume a situation where the consumer can obtain his income in several periods.

Even in this case, the same criteria apply as for the two periods:

• investor can recalculate his future income and he will choose the investment that will bring him the highest total revenue;

• investor can also recalculate the value of his current income and will choose an investment that after his conversion brings the highest total income;

• Another option is to calculate the internal rate of return on investment.

Two basic situations differentiate:

In the first situation, the investor receives income for several periods. However, the number of periods is finite. Income that the investor receives for a certain (finite) number of periods is referred to as life annuity or **annuity**.

In the second situation, investment brings a stable income for an infinite number of periods. In this case, we will talk about forever-rent or **perpetuity**.

Present value of annuity

The present value of future income consumers I1 can be expressed as:

$$PV = \frac{1}{1+r} \cdot I_1$$

Present value of the flow of payments N1 (N1, N2, ..., Nn), where the index refers to the period in which the payment will be realized, can by calculated as :

$$PV = \frac{N_1}{(1+r)} + \frac{N_2}{(1+r)^2} + \ldots + \frac{N_n}{(1+r)^n}$$

If the same payment annually N1 = N, the formula can be simplified as follows:

$$PV = \frac{N}{(1+r)} + \frac{N}{(1+r)^2} + \ldots + \frac{N}{(1+r)^n}$$

$$PV = \sum_{t=1}^{n} \frac{N}{(1+r)^t}$$

$$PV = N \cdot \sum_{t=1}^{n} \frac{N}{(1+r)^t}$$

• The future value of annuity

If the investment brings every year for different yields, we calculate the future value of these assets as:

$$FV = N_1 \cdot (1 + r) + N_2 \cdot (1 + r)^2 + \ldots + N_n \cdot (1 + r)^n$$

In the case of regular income can edit the formula in this form:

$$PV = N \cdot \sum_{t=1}^{n} (1 + r)^t$$

• Perpetuity

Investments with different investment costs

$$NPV = PV – K_0$$

$$NFV = FV - K_n$$

16.5 Real and nominal interest rate

If we think about the moving price level, we have to distinguish between real and nominal interest rate. As we already know, the **real interest rate** expresses a premium in the additional volume of future good that must be offered to the market economic entities in exchange for a waiver of one unit of current consumption of the good. We know the formula from the analysis of the directive line market opportunities:

$$\frac{dC_1}{dC_0} = -(1 + r)$$

Now you must define the nominal interest rate r_n.. We will define it the same way as real values, but in monetary terms - as the additional amount of money that must be provided to economic entities in the future (dI_0):

$$1 + r_0 = -\frac{dI_1}{dI_0}$$

Price level P_m in both moments is measured as the amount of money we need to purchase additional units of the real estate:

$$P_{m0} = \frac{dI_0}{dC_0} \qquad P_{m1} = \frac{dI_1}{dC_1}$$

16.6 Investment decisions and risk

Now we will observe the impact of risk on investment decisions. Here we will assume:

• investors risk aversion,

• market without monopoly power,

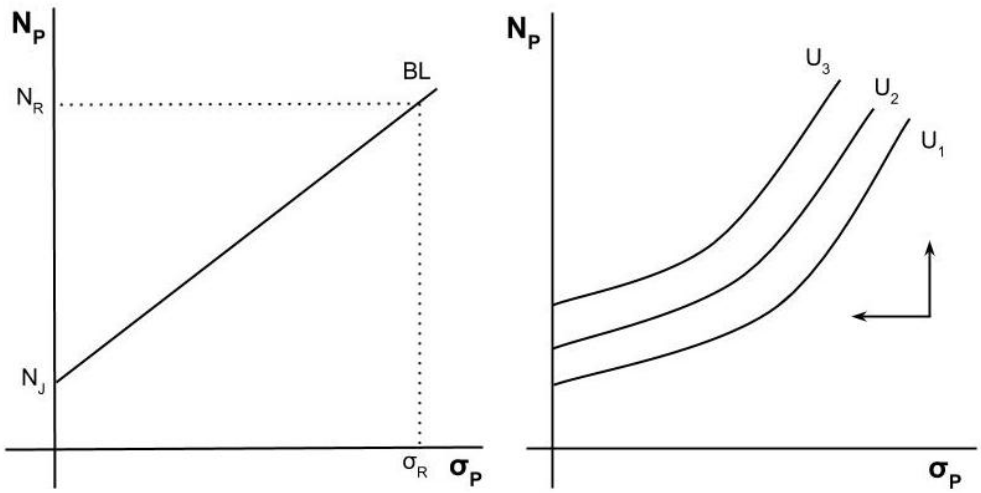
• deciding between two periods,

• independent investment alternatives.

16.6.1 Investment decisions and risk reduction by diversifying

Apart from risky assets on the contrary, there are risk-free assets, which are assets such that bring confident cash income.

- Income from assets
- Relationship between risk and return
- Budget line and indifference map



16.6.2 Criterion investment decision making under risk

The **risk premium** is the part of the return, which compensates the risk associated with the investment activities.

The present value of the expected profit (t = 1) we can calculate according to the formula:

$$PV = \sum \frac{\pi_t}{(1+r)^t},$$

The current value of the profit expected for t = 1, ..., n years considering the risk can be calculated as follows:

$$PV = \sum \frac{E(\pi_t)}{(1+k)^t},$$

where $k = r_f + r_p$,

rf = risk free rate of return,

rp = required premium ceded risk.

List of tasks for students:

1. Explain why differs the net present value and net future value of the same investment.

2. Compare the budget line and the indifference curve in decision making under conditions of certainty and risk.

3. How can the diversification reduce the risk?

4. Why some investors are investing a large part of their portfolios into risky assets, while others invest in risk-free alternatives?