

TECHNOLOGY AND ORGANIZATION OF CONSTRUCTION

UDC 69.003.13

Moscow State University of Civil Engineering

D. Sc. in Economics, Prof. of Dept. of Organization of Construction and Management of Real Estate

K. Yu. Kulakov

Ph. D. student of Dept. of Organization of Construction and Management of Real Estate

S. D. Stepnova

Russia, Moscow, tel.: 8-903-523-25-75; e-mail: stepnovasd@mgsu.ru

K. U. Kulakov, S. D. Stepnova

OPTIMIZATION OF THE WAYS OF INVESTING IN THE COMMERCIAL PROPERTY

Statement of the problem. This paper merely looks at commercial effectiveness of an investment project based on the judgment that the investor is the one to be held accountable for the cost and quality of services and to stand to benefit from the outcome of the business activities they engage in.

Results and conclusions. The main criteria and common principles of their collaborative use are looked into. The terms of the comparability of the investment options and ways to tackle the problem of investment optimization are discussed.

Keywords: commercial real estate, commercial effectiveness, optimization, discounting, turnover, risks.

Introduction

Let us assume the investor holds an investment portfolio of K roubles. Now we will seek to formulate the optimization task for managing this portfolio. There is a myriad of options for allocating investments. In our case we will consider investment in the design, reconstruction and renovation of property for its commercial use. Hence we have in hand a set of options for creating a property, each of which is sure to demand capital investments of $K_1, K_2, K_3, \dots, K_i$ roubles which will secure income through renting out the premises through their entire service

life. In general the options could be alternative or non-alternative depending on the terms and conditions of the project. It is pretty much obvious that the portfolio of K roubles can be invested entirely in an investment project or a number of non-alternative investment projects. Since there are invariably many more investment options than there is funding, the investor is under pressure to come up with a viable alternative to secure the maximum profit from the portfolio K . Let us examine the decision-making logics in this case considering the contemporary taxation system in the Russian Federation and bearing on the widely accepted in economic practices “dynamic” (allowing for the time factor) investment valuation criteria for businesses which are subject to the general taxation system.

It is worth mentioning that all of the above options are expected to meet environmental and social regulations.

Applying the evaluation criteria to certain cases poses the following methodological questions to be addressed:

- what prices to use in the calculations (current, predicted or deflated ones);
- how to make quantitative allowances for uncertainties and risks.

Predicted prices are calculated based on the current ones for each time period of the calculation according to the predicted changes in cost estimates over time using the elements of cost. Deflated prices are predicted prices brought to the price level at a fixed moment of time by the division by the basic inflation rate [2].

1. Price build up and consideration of risks in investment decision making

There has been an extensive research into price build up and risk consideration which revealed a spectrum of opinions on the problem. Without going deep into the matter, we are making the following suggestions.

At the preliminary stage of deciding on an investment project with a relatively small realization period (of up to 10 years) and small capital investments (of up to 50 mln roubles) current prices are recommended to use if the expert estimate of the elements of cost over the realization period does not call for drastic changes to be made. In the other cases predicted prices are recommended for use. This being the case, the effectiveness (discounting) rate E used in the criteria is determined with regard to the anticipated average annual inflation rate over the rea-

lization period. In fact E determined in this manner along with predicted prices should yield similar calculation results by the effectiveness criteria with the use of deflated prices and “deflated” discount rate.

As for the uncertainties and risks, they can basically be accounted for in two major ways.

1. Increasing the rate of effectiveness (discounting) with growing predicted risks, i. e. bringing in amendments E in a range of risk factors.
2. Correct step-by-step cash flows: reduce the inflow and increase the outflow in accordance with the assumed risks. In doing so, various scenarios of the realization of the project are produced and the most likely ones are used in criteria cases.

The first method is the simplest but least accurate one. It is flawed due to its artificial nature. The thing is that risks do not have any effect on the quantitative assessment of the time factor and they do only on the value of anticipated cash outflows and inflows. Thus the amendment E that makes up for a possibly underachieved income is determined exclusively using professional expertise and is entirely dependent on an expert’s subjective view. Above all, risks can be changeable through the realization period and if at some point in the calculation, given the risk factor, the effect of renting out the property turns out to be zero, the quantitative effect of this happening on the design criteria effectiveness is not dependent whatsoever on the value of a discount rate.

The above concludes that the second way proves to be the best for the estimation of the effectiveness of capital investments since it makes allowances for the factors of uncertainty and risks based on looking at different scenarios of the realization of the project. On the downside, this method is time-consuming. Another advantage it has is that the single effectiveness rate E is applied through all possible options. The methodology behind this is given a detailed consideration and thus we chose to overlook it in the present paper. Anyway all the options decided on have to be brought to the level to enable the comparison against certain factors of risks and uncertainties.

2. Investment portfolio optimization

It is imperative that in order to tackle the problem of optimizing an investment portfolio TЭO is developed for each examined investment options. It would be central to the technology solutions, construction periods, operation of property and finally, cash flows through the entire period of

the realization of the project. A calculation step is a year even though for small investment projects with the construction period of a year and it is not likely to be a quarter or a month.

Now let us proceed to determine certain cash inflows and outflows for a property investment project for the general taxation system. A capital investment in the year of t K^t would be the cost of all construction maintenance works and other associated costs as well as the costs of purchasing, installing and maintaining equipment. In order to calculate the effectiveness we assume that capital investments K^t include VAT on capital investment and it is made to the start of the year of t . Value added tax on capital investment should be recovered while accounting for the major generated funds and is a cash inflow to the end of the last year of the construction (the start of the first operational year) [3]. The necessary current asset K_{oo}^t should be generated to the start of the first operational year. For the operation period the annual inflow is

$$\Pi^t = \Pi_p^t + A_M^t + K_{oo}^t, \text{ roubles,} \quad (1)$$

where Π_p^t is the net income (income tax deductible) annual income; A_M^t is the annual amortization; K_{oo}^t is the current asset recovered at the end of the year t .

For the sake of calculations this inflow is assumed to be earned to the end of the year t . Generally if a business is to pay liabilities out of the net income (stock dividends, payment of working capital loan, etc.), the annual effect should be decreased by income payments which are basically the expenses incurred by a certain company (in fact they are after-tax expenses). The options compared should be comparable in a way payments are calculated from the net income.

3. Economic effectiveness criteria evaluation

In fact after we are done with determining cash inflows and outflows of a property investment project, we can look at accepted basic criteria of economic effectiveness in the process of investment decision-making. Three discounting criteria are normally used.

1. Net Present Value (*NPV*).
2. Profitability Index (*PI*).
3. Internal Rate of Return (*IRR*).

In this case a property investment *NPV* is written as follows

$$NPV = \sum_1^T (\Pi_p^t + A_M^t + K_{o\sigma}^t)(1+E)^{T_o-t} - \sum (K^t + K_{o\sigma}^t)(1+E)^{T_o-t+1} \geq 0, \text{ roubles.} \quad (2)$$

Generally, cash flows T_o can be averaged from any year since the sign of NPV and the outcome of comparison of PI with a unit is not dependent on the year it was averaged. But the absolute value of these indicators does depend on the year of averaging. That is why the year of averaging should be the same for all the evaluated options. For the sake of convenience, all the flows are normally averaged to the end of year zero (the start of the first year of realization), i. e. they $T_o = 0$ is assumed. The internal rate of return IRR does not depend on the year of averaging T_o .

An additional unit in the discount rate for capital investment is indicative of the fact that capital investments in the major capital and current assets are settled in the beginning of the year t . In order for NPV to be considered economically beneficial, it should be negative. The profitability index of discounted investments is defined to be

$$PI = \frac{\sum_1^T (\Pi_p^t + A_M^t + K_{o\sigma}^t)(1+E)^{T_o-t}}{\sum_1^T (K^t + K_{o\sigma}^t)(1+E)^{T_o-t}} \geq 1, \text{ parts of a units.} \quad (3)$$

It is plain to see that PI is a transformed formula of the criterion

$$NPV \geq 0.$$

In the course of the calculations of PI , we account for either all the capital investments made during the design period including the investments to substitute for the retired assets either only for initial capital investments made before the property is ready for occupancy (the corresponding indicators will vary) [3].

The internal rate of return IRR for the examined property investments is determined using the expression

$$\sum_1^T (\Pi_p^t + A_M^t + K_{o\sigma}^t)(1+IRR)^{T_o-t} - \sum_1^T (K^t + K_{o\sigma}^t)(1+IRR)^{T_o-t+1} = 0, \text{ roubles,} \quad (4)$$

$$IRR \geq E.$$

Following the formulas (2) and (4)

$$NPV = 0 \text{ IRR} = E \text{ and at } NPV > 0 \text{ IRR} > E.$$

It should be noted that in order to deem the option economically beneficial, we can put to use any of the below criteria, i. e. if the conditions (5) are met so are conditions (6), K_{oo}^t is inferred from the determination of the criterion PI and IRR . Or

$$\begin{aligned} \text{if } NPV \geq 0(5), \text{ then } PI \geq 1, \\ \text{and } IRR \geq E. \end{aligned} \quad (6)$$

Looking at the economic benefits of the investment options at hand is the first stage of optimizing the investment portfolio K . At the second stage out of all the selected options this combination is used where all portfolio funds K are completely allocated and likely to provide a maximum economic performance. The second stage entails us comparing the alternatives and combining the conjunctive options. The methodology guidelines suggest that “while comparing the alternative projects preference is given to the one with the greatest value of NPV (provided that it is positive)” [3]. In compliance to the above first we choose alternative options according to the criterion $NPV \geq 0 \rightarrow \max$ and then the investment portfolio is filled with conjunctive options as their NPV decreases.

No valid reasoning behind the value E is another factor that contributes to low reliability of valuations according to the NPV criterion. Even if we free the discount rate from a non-typical function of the evaluation of certain optional risks, we will have to concede that “risk-free commercial discount rate used to evaluate the outcome of the company getting on board with the project is left at the investor’s discretion” [3].

It is pretty much understandable that while using current or predicted prices risk-free discount rate is not to be lower than the largest of the two values:

- average annual inflation rate for the examined time period;
- average annual profitability of long-term bank deposits (bank interest rate reduced by the income tax). The upper threshold of E is rather blurred. In order to perform commercial property investment valuations with consideration of risks it is recommended that a discount rate is increased 12.5—24.5 % [1].

A question arises whether it is imperative to settle and examine the total investment cost

while handling comparison tasks. While comparing two alternative options, a choice according to the criterion of the maximum NPV of a capital intensive option is absolutely correct if otherwise released additional capital investments are spent with efficiency of no less than E . But is this condition always met?

Let us give the simplest example. The construction of a shopping centre that costs 1 bln roubles is looked upon as an alternative to the construction of a pay car park in the same area that costs 1 mln roubles. Let both projects have a positive NPV at a specified E with the first option NPV significantly higher than that of the second option one. As a result of the comparison as set out in the Methodological Guidance it is inferred that since the absolute effect of an investment of 1 bln roubles is to a degree higher than that of the investment of 1 mln roubles. This therefore means the first option is more effective. This is fair enough if the remainder of 999 mln roubles in the choice of the second option can be invested with either a negative or positive NPV . If there are projects at hand that provide a positive NPV of 999 mln roubles, the decision made is not really straightforward and it is definitely the effect the projects are set to produce is paramount here.

Note that if the compared projects have different realization periods, special methods will have to be used that ensure the comparison according to the NPV criterion is correct.

Conclusions

While looking into alternative property investment options the choice in the maximum NPV criterion is black and white if the compared options are brought to the initial investment cost (i. e. there should be a conjunctive assessment of a less capital-intensive option and possible effectiveness produced by additional capital investments that are recovered unless the investor makes a decision to go through with the less capital intensive option).

References

1. N. V. Ivanova, *Methodical Bases of Management of Municipal not Inhabited, Dissertation of PhD in Economics* (Moscow, 2004) [in Russian].
2. *Methodical Recommendations for the Assessment of the Efficiency of Investments Projects* (Moscow, 2004) [in Russian].
3. *Tax Code of the Russian Federation* (Moscow, 1998) [in Russian].