POLITICAL RISK ANALYSIS IN AN INTERNATIONAL CAPITAL BUDGET

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Companies conducting foreign projects analyse prior to the implementation of a foreign project also the factor of political risk, which is connected to such government restrictions as expropriation, revolutions, wars, currency controls, tax increases, etc. Shapiro (4) gives a detailed breakdown of the models analysing political risk. The models use an analysis of the value of the break-even probability of a government intervention. The basic argument for an analysis of the influence of political risk on the capital budget is based on its impact on the rate of return of the project. In this article we shall focus on three events, which are among the factors of political risk, specifically expropriation, blocking of funds and an increase in the tax rate.

First of all we shall concentrate on the political factor of expropriation. The basic model for evaluating foreign projects is based on an evaluation of the efficiency of the project on the basis of the net present value. We can describe this relation in the following way:

$$-I + \sum_{i=1}^{n} \frac{X_i}{(1+k)^i} \qquad [1]$$

where:

I is the present value of capital expenses,

X_i is the future value of cash flows created by a given project during the period i,

k represents the estimated discount rate.

Let us assume that in the year h expropriation may occur. Then the net present value of the project will fall. The decline of the net present value we can express as:

$$-I + \sum_{i=1}^{h-1} \frac{X_i}{(1+k)^i} + \frac{G_h}{(1+k)^h} \qquad [2]$$

The net present value of the project will fall since we will receive cash flows for only two years. The model consists of the value, as it was stated in the basic version, apart from the amount which is represented by G and which may include not only direct compensation paid by the host country, but also political risk insurance, tax effects and other matters. Let us assume that the probability of expropriation in the year h is p_h and zero in the other years. We calculate the net present value of the project from the relation:

$$-I + \sum_{i=1}^{h-1} \frac{X_i}{(1+k)^i} + p_h \frac{G_h}{(1+k)^h} + (1-p_h) \sum_{i=h}^{n} \frac{X_i}{(1+k)^i} \qquad [3]$$

By converting the equation we get the value of the break-even probability of expropriation p_h as:

$$p_h = \frac{\sum_{i=1}^{n} \frac{X_i}{(1+k)^i} - I}{\sum_{i=h}^{n} \frac{X_i}{(1+k)^i} - \frac{G_h}{(1+k)^h}} \qquad [4]$$

In the case of the project, which has probability of expropriation less than 0.25, this will be acceptable for us. If, however, probability of expropriation is in the interval 0.4 – 0.5, the project will be unacceptable. As an example we can give a project that has the following parameters: capital expenses of 1 million EUR, a project life of 5 years, annual cash flow from the project of: EUR 500 000, discount rate of 20 %.

Let us assume that at the end of the second year expropriation may occur and the government shall provide compensation in the amount of EUR 200 000. The value of break-even probability of expropriation will be:

$$p_h = \frac{495\ 305}{731\ 416 - 138\ 889} = 0.84, \text{ t. j. } 84\ \%$$

If the government does not provide compensation for the expropriation, the value of the break-even probability will be:

$$p_h = \frac{495\ 305}{731\ 416} = 0.68, \text{ i. e. } 68\ \%$$

In the case that the value of the break-even probability of expropriation is higher than 84 % (or 68 %, we will implement the project, since the present value of the cash flows we are surrendering are lower in relation to the net present value of the basic version. We will not implement the project only in the case that the value of the break-even probability of expropriation is lower than 84 % (or 68 %). We may consider projects in a similar manner in the case of the blocking of funds. Our consideration will again be based on the assumption that the net present value of the project will fall, which we can describe as:

$$-I + \sum_{i=1}^{n} \frac{X_i}{(1+k)^i} \geq 0 \qquad [5]$$

If we assume that the blocking of funds will be in the year j and later, then the net present value of the project may be expressed by the following relation:

$$-I + \sum_{i=1}^{j-1} \frac{X_i}{(1+k)^i} + \sum_{j}^{n} \frac{X_i\,(1+r)^{n-1}}{(1+k)^n} \qquad [6]$$

This relation assumes that the rate of reinvestment will be r percent annually in the area where the funds are blocked, with all blocked revenues in the end gained in the year n. If the value of the break-even probability of the blocking of funds in the year j is q_i and zero in the other years, then we express the net present value of the project as:

$$-I + \sum_{i=1}^{j-1} \frac{X_i}{(1+k)^i} + q_i \sum_{i=j}^{n} \frac{X_i(1+r)^{n-1}}{(1+k)^n} + (1-q_i) \sum_{n=j}^{n} \frac{X_i}{(1+k)^i} \quad [7]$$

From this relation we express the value of the break-even probability of the blocking of funds q_i:

$$q_i = \frac{\sum_{i=1}^{n} \frac{X_i}{(1+k)^i} - I}{\sum_{n=j}^{n} \frac{X_i}{(1+k)^i} - \sum_{i=j}^{n} \frac{X_i(1+r)^{n-1}}{(1+k)^n}} \quad [8]$$

This fact we can again illustrate in an example, where the capital expenses will be EUR 1 million, project life of 5 years, annual cash flows after taxation flowing from the project in the amount of EUR 375 000 and a discount rate of 20%.

Let us assume that after the first year there occurs a blocking of funds by the government of the host country and this is to enable the reinvestment of the blocked funds in the amount of 5% annually. The value of the break-even probability of the blocked funds will then be:

$$q_i = \frac{121\,625}{808\,075 - 649\,555} = 0.76, \text{ i. e. } 76\,\%$$

In the case that the value of the break-even probability is higher than 76 %, we will implement the project. If the value is below the limit of 76%, we will reject the project.

In the application of political risk in the form of an increase in the tax rate we use similar arguments as in the analysis of the value of the break-even probability of expropriation or the blocking of funds. The starting point will be similar as in the preceding cases, the net present value of the basic project–relation [1].

If the tax rate increases in year m and π represents profit after taxation, then Δ expresses the change in the tax rate. Under these assumptions the net present value of the project will fall, which is expressed by the following relation:

$$-I + \sum_{i=1}^{m-1} \frac{X_i}{(1+k)^i} + \sum_{i=m}^{n} \frac{X_i\, \pi_i \Delta t}{(1+k)^i} \quad [9]$$

If the probability of an increase in the tax rate in the year m is p_m and zero in the rest of the years, then the net present value of the project will be:

$$-I + \sum_{i=1}^{m-1} \frac{X_i}{(1+k)^i} + p_m \sum_{i=m}^{n} \frac{X_i - \pi_i \Delta t}{(1+k)^i} + (1-p_m) \sum_{i=m}^{n} \frac{X_i}{(1+k)^i} \quad [10]$$

The value of the break-even probability of an increase in the tax rate p_m will be at the point where the net present value of the project will equal zero

$$0 = -I + \sum_{i=1}^{n} \frac{X_i}{(1+k)^i} + p_m \sum_{i=m}^{n} \frac{X_i - \pi_i \Delta t}{(1+k)^n} + (1-p_m) \sum_{i=m}^{n} \frac{X_i}{(1+k)^i} \quad [11]$$

Through a further conversion of the equation we calculate the value of the break-even probability of an increase in the tax rate p_m in the following way:

$$p_m = \frac{\sum_{i=1}^{n} \frac{X_i}{(1+k)^i} - I}{\sum_{i=m}^{n} \frac{\pi_i \Delta t}{(1+k)^i}} \quad [12]$$

We can again illustrate this version by an example. Capital expenses will again be EUR 1 million, project life 5 years, annual cash flow after taxation gained from the project EUR 375 000 and a discount rate of 20%. Let us assume that after the second year the tax rate increases from 25% to 50%. The value of break-even probability of an increase in the tax rate will be:

$$p_m = \frac{121\,625}{\sum_{i=3}^{5} \frac{500\,000\,.\,25\,\%}{(1{,}20)^i}} = 0.76, \text{ i. e. } 76\,\%$$

If the value of break-even probability of an increase in the tax rate is higher than 67%, then we will implement the project. In the case that the value of the break-even probability is under the limit of 67%, we can reject the project.

In this article we have demonstrated three models, which may be applied in the analysis of political risk in investment. The basic starting point in an analysis of political risk in all three cases is the net present value of the project, which is expressed by the relation [1]. In building political risk into an investment project the basic version was lowered by the probability of the occurrence of a political event multiplied by the present value of the cash flow, which we surrendered for reason of political risk. We calculate the present value from the relation:

$$-I + \sum_{i=1}^{n} \frac{X_i}{(1+k)^i} - p\,.\,SH \quad [13]$$

where p is the value of the break-even probability of political risk and SH is the current value of the cash flow, which we surrendered for reason of political risk.

Through a conversion of this equation we can obtain the general relation for the calculation of the value of the break-even probability of a political event, which will be equal to the share of the net present value of the basic version of the investment and the current value of the cash flow, which we surrendered in taking account of the political risk.

Sources

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