Correction of originality in cash flow forecasting to assess financial risk

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Correction of originality in cash flow forecasting to assess financial risk

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Annotation. Cash flow is featured by originality and, therefore, it is difficult in forecasting. The paper substantiates the significance, on the one hand, but also the difficulty in cash flow forecasting, on the other hand. The hypothesis was formulated that correction of originality in cash flow forecasting is possible with transition from absolute to relative forecast parameters. The cash flow forecast was made based on a linear least squares approximation. The hypothesis was proved using the second-rank polynomial function and moving average and exponential smoothing methods. It is concluded that the modification of forecasting by the polynomial function does not allow obtaining a reliable forecast. The required level of forecasting accuracy that is levelling of cash flow originality can be achieved using the methods of time-series analysis.

1. Introduction

Currently there are many models to assess a financial risk. The basis are the papers of Altman [1], Zavgren [2], Springate [3], Taffler [4], Chesser [5] et al. The initial data are the selected factors, which allow predicting the financial results with high accuracy based on the analyzed sample [6].

In this case, studies in the field of econometric modeling do not stop, but it is gaining momentum. New solutions appear to assess the stability of one or another process. Among the newest Russian papers we note the following. The papers of Rudskaya et al. on analyzing the econometric modeling tools [7] as well as a two-stage econometric model for innovation effectiveness assessment [8]. Studies of risk assessment of regional level projects by Rodionov et al. [9]. Studies of Dubolazova et al. are also devoted to the assessment of risk and risk-management of the innovations. [10]. Actual issues of statistical modeling are fixed in the papers of Sokolitsin et al. [11]. Tsenzharik et al. studied the investment decisions modeling. [12]. Features of the extrapolation methods application in economic forecasting by -Agranov et al. [13].

Relatively a short time ago, the use of cash flow as a key factor in risk assessment has got widespread [14]. Before then, profit was considered the most significant assessment factor.

The complexity of the cash flow forecast lies in its originality. In case of original flows, positive and negative balances alternate in separate periods.

The purpose of this study was to find a reliable method for forecasting original cash flow. Thus, the object of this study is a cash flow; the subject is a cash flow forecast. The practical part of the paper was performed on the basis of construction company reports taken from public sources.

2. Cash flow as a financial risk assessment factor

Cash flow changes feature the overall financial condition of the company as a reaction to management decisions. Namely, the cash flow forecast may not feature the real flow of funds; however it will show the company stability in terms of inflows and outflows. The study of cash flow changes provides not only an assessment of management decisions, but also simplifies the description of the cash flow trends [15].

The cash flow advantages as a financial risk assessment factor are as follows. Firstly, it is one of the most accessible assessment tools; secondly, it features the real change in financial solvency and stability; thirdly, it reflects the ability to generate funds, and, fourthly, it takes into account and represents the changes that have occurred due to management decisions making.

In this case, it seems that the conventional use of cash flow tools for assessing financial risks has significant disadvantages.

- Firstly, this is the specificity of cash flows classification; the criteria for cash flows reference to one group or another are very vague, decisions are made directly by the executer, thereby potentially distorting the result [16].
- Secondly, the basis for cash flows assessment is a large number of forecast values, the accuracy of which is very often in doubt due to a large number of systematic risks. At this time, we agree with Semionova [17].
- Thirdly, the planning horizon significantly determines the final result [18].
- Fourthly, this is probably the most important; the use of the discount rate is discussion.

When trying to describe a unitary approach to risk assessment globally, discount rates are not applicable for reasons of subjectivity and selectivity of risk and objectives assessment. Let us dwell on this in more detail.

The discount rate selection when assessing cash flows is associated with the selection of a large number of assumptions. It is reasonably assumed that the funds of the current period are not equivalent to the funds of other periods, at least due to the inflation amount.

However, very often the discount rate is not only the inflation value, but, for example, the lost profits rate that is the percentage that could be obtained from using this funds amount if they were available for an investor.

As well as one of the discount rate components may be the risk of invested capital. Systematic and non-systematic risks can be distinguished. The first group includes market environment factors that is, in fact, external risks. And the second group includes the risks arising directly due to management decisions made by the management [19]. In terms of the discount rate, it is usually possible to take into account either the systematic risks of the company, or non-systematic ones, and herewith, the criterion will be the selected calculation method.

The other “weak points” of using the discount rate when assessing cash flows are the following. Different values of discount rates are used in various approaches. Various requirements for the discount rates allow to assess the risk entirely, and to solve the specific problems. There are no uniform algorithms to calculate the cumulative discount rates.

While eliminating the conventional disadvantages of using cash flow indicators, as well as refusing the discount rate, we define the requirements for a tool based on a cash flow indicator:

1) No need to use object-analogs;
2) Integrated risk assessment;
3) Simplicity of calculation and interpretation.

3. Cash flow forecasting

To solve the cash flow forecasting problem, we use the least squares method, which belongs to the extrapolation group, thus using a linear dependence to approximate the studied data. The previous studies have shown that the least squares method allows getting the most accurate values, taking into account the selected assumptions. Herewith, for calculation, we focus on well-known foreign methods for calculation of cash flow indicators using the indirect method [20].

Let's select a company with significant dynamics of the studied indicator for the analyzed period, with the absence of clearly defined trend line, cash flows originality. The net operating cash flow (hereinafter referred to as NOCF) was calculated based on the reports (the studied object) of the construction company Lenstroytrest JSC for a period from 2003 to 2014 according to the SPARK Database (Data source: “Information resource SPARK» http://www.spark-interfax.ru).

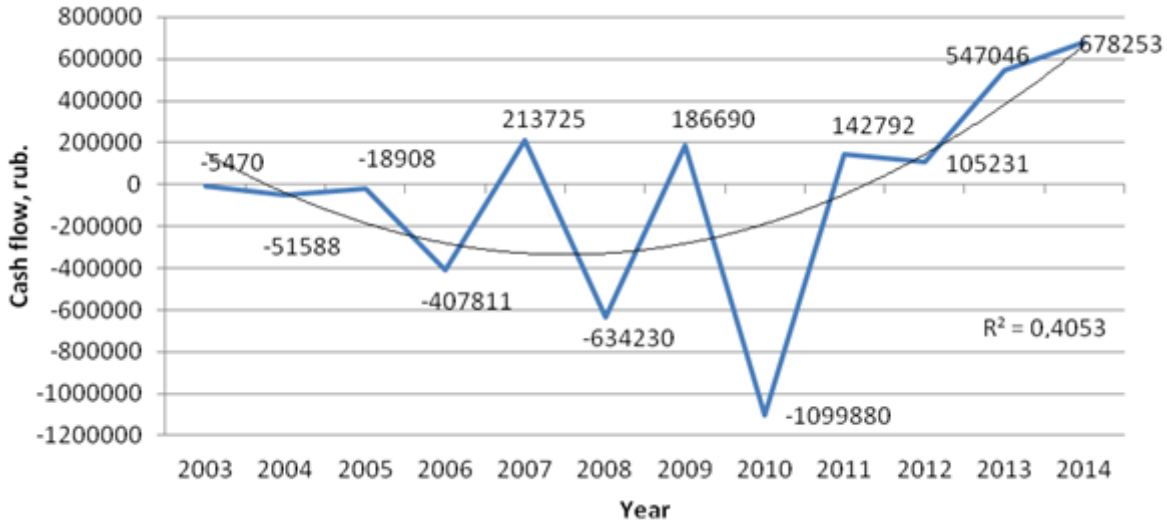

Figure 1. Dynamics of net operating cash flow.

The standard risk calculation based on the forecasting of the predicted value deviation probability (for example, using the method of three standard deviations) will not provide for sufficient accuracy due to the impossibility to describe this trend. As we can see, the forecast accuracy is about 0.41. The approximation confidence level is not high enough.

High deviations of actual values from the forecasting ones when using the exponential smoothing method could be leveled by a significant increase in the smoothing parameter. However, in this case, we can say that really only the values of the last periods are used for forecasting.

Thus, when forecasting cash flows by the methods from the extrapolation group, which, firstly, are extraordinary, secondly, are presented for a small number of periods, the greater accuracy can be obtained using the least squares method. Herewith, when studying, it is possible to come up against a situation where the trend for the studied indicators is absent or practically undetermined.

4. Correction of originality in cash flow forecasting

Let’s formulate a hypothesis that to eliminate the originality in forecasting cash flows, the absolute to relative indicators transition should be applied, which will show higher accuracy than the use of smoothing methods.

To check the hypothesis, it is necessary to calculate the forecasting cash flow value for the available sample of indicators for a period, then make a forecast for the relative indicator being tested and compare the obtained result in terms of confidence level (approximation confidence coefficient) using the example of the 2nd rank polynomial function, where relative indicator takes the following form:

$$CF_m = \ln\left|\frac{CF_i}{CF_{i-1}}\right| \quad (1)$$

In this equation, CF_m is a modified cash flow value, CF_i is a cash flow value of the current period, and CF_{i-1} is a cash flow value of the previous period.

Let's compare with the results of using the relative indicator, at which the modified cash flow values will take the following values.

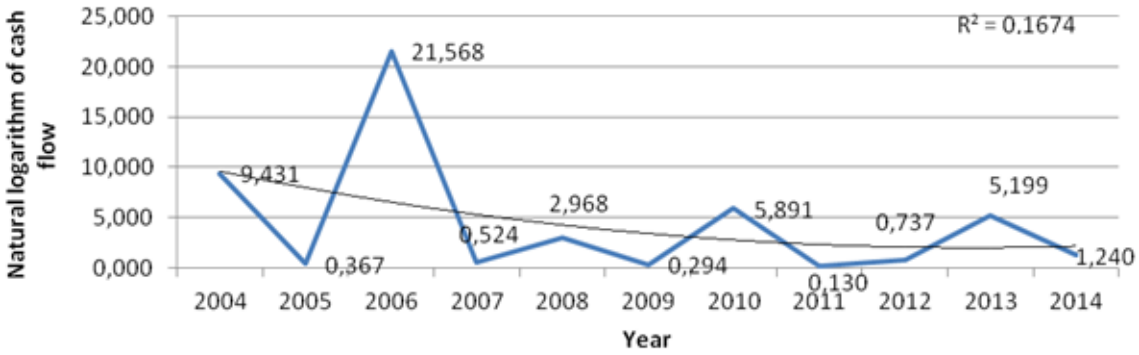

Figure 2. Dynamics of modified net operating cash flow.

The approximation confidence factor is 0.17 and, thus, the values series does not become more statistically controlled, but increases a number of bad values which cannot be described using the simple trend functions. Therefore, the proposed method of forecasting accuracy improvement by using the above described relative indicator does not allow getting the desired result.

Then we will perform the calculation using smoothing methods for time series -moving average and exponential smoothing. The study has showed that the highest approximation level provides for the exponential smoothing method, while the accuracy in applying relative indicators does not differ from the initial data level.

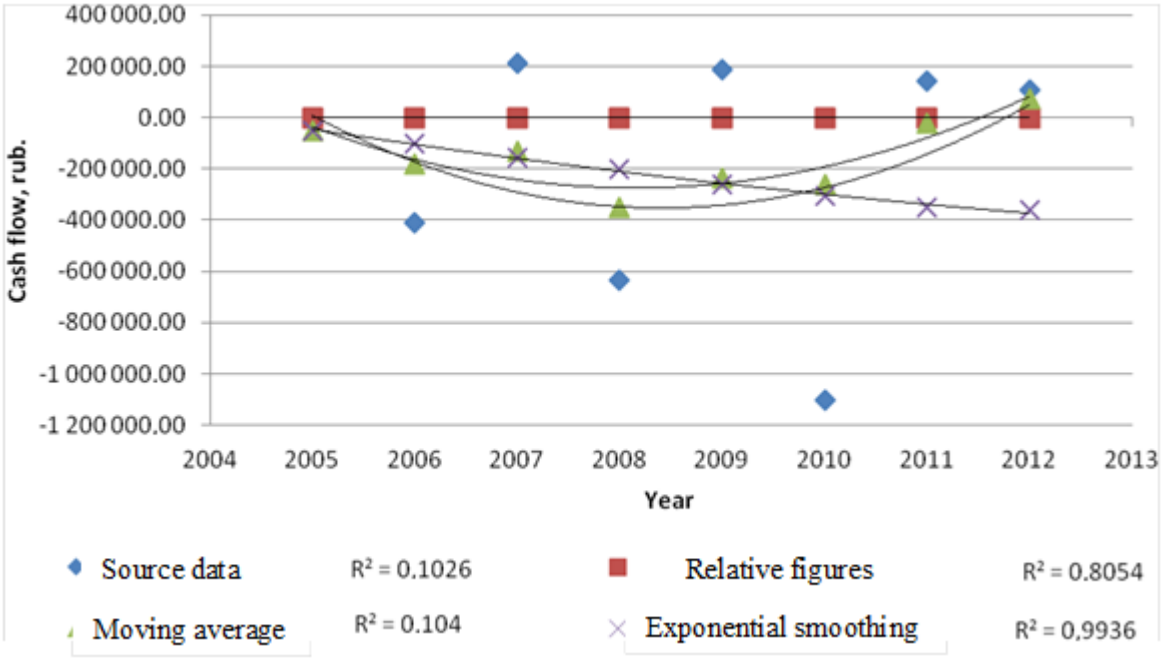

Figure 3. Comparison of approximation level.

Thus, to forecast cash flow for elimination of originality, it is possible to use updated modern econometric methodologies of relative indicators. The required confidence level is provided by the time series analysis methods -moving average and exponential smoothing.

5. Conclusion

In this article, we have shown that using the conventional cash flow forecasting tools to assess financial risks has significant difficulties. The most significant of them is the inexpediency of the discount rate use.

At the same time, the cash flow originality is a serious disadvantage, which is not possible to eliminate by using the calculation of relative indicators being typical for the most modern models of financial condition diagnostics. Despite the fact that the greater accuracy can be obtained by using the least squares method, when forecasting cash flow, it is possible to come up against a situation where there is no trend or almost undetermined.

Our results provide for a fresh approach to the cash flow forecasting. In particular, in order to forecast it for originality elimination, it is possible to use the specified methodologies of relative indicators. As opposed to the use of conventional relative indicators, the smoothing group methods, such as moving average and exponential smoothing, show a high approximation level.

Future studies shall expand the use of cash flow forecasting in financial risk assessment models.

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