REVISTA ESPACIOS

Business valuation of industrial enterprises in the information uncertainty conditions

Valoración de empresas industriales en condiciones de incertidumbre de la información

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ABSTRACT:

Business valuation is an important part of economic activity. The business valuation of industrial enterprises which shares are not traded on the free market is carried out on the basis of the company's financial statements. Financial indicators of industrial enterprises often do not provide an opportunity to adequately calculate a business valuation, indicate insolvency, dependence on external sources of financing, a high bankruptcy probability, loss-making, negative balance sheet value of equity and reserves, which indicates information uncertainty of estimates. The aim of the study is the formation of the business valuation of industrial enterprises specific principles in the conditions of information uncertainty of financial and economic performance indicators. The proposed methodology covers all three approaches (cost approach, income approach, market approach) that allows to evaluate the business using atypical quantitative indicators presented in the annual financial statements: Form No. 4 "Cash Flow Statement", Form No. 5 Balance sheet appendix. The approach allows to get an adequate positive reliable business valuation in conditions when traditional methods give a formal, including negative, price of the assets of the industrial enterprise.
Keywords: business activity rating, business valuation methods, business valuation, financial reporting forms, information uncertainty.

RESUMEN:

La valoración empresarial es una parte importante de la actividad económica. La aplicación de dicha valoración a las empresas industriales cuyas acciones no se negocian en el mercado libre se realiza sobre la base de los estados financieros de la empresa. Los indicadores financieros de esas corporaciones a menudo no brindan la oportunidad de calcular adecuadamente el valor de un negocio, su índice de insolvencia, su dependencia de fuentes externas de financiamiento, la probabilidad de bancarrota, las pérdidas o el valor negativo del balance de capital y reservas. Todo ello conduce a una situación de incertidumbre en la información disponible sobre el valor estimado de dichos parámetros. El objetivo del presente estudio es la formación de unos principios específicos de valoración de empresas industriales en las condiciones de incertidumbre de la información relativa a los indicadores de rendimiento económico y financiero. La metodología propuesta cubre tres enfoques (enfoque de costos, enfoque de ingresos y enfoque de mercado), lo cual permite evaluar un negocio utilizando indicadores cuantitativos atípicos presentados en los estados financieros anuales: Formulario N.° 4, "Estado de flujo de efectivo"; y Formulario N.° 5, apéndice del balance general. El enfoque dado en el documento permite obtener una valoración comercial confiable y adecuada en condiciones en que los métodos tradicionales dan un precio formal desfavorable, incluso negativo, de los activos de una empresa.
Palabras clave: g

1. Introduction

Industrial enterprises are the object of research. The subject of the research is business valuation methods.

The relevance of the study topic depends on its demand in market relations, which is regulated by applicable law, as well as business interests. There is a need for business valuation when investing, insuring, calculating the tax base, establishing authorized capital, entering into transactions for the disposal of assets, and lending. The most complex cases from the methodological point of view of business valuation correspond to the conditions under which it is necessary to carry out calculations in the format of information uncertainty, in which the financial statements give the negative value of a developed business that determines the level of industrial country development.

2. Theoretical basis

Business valuation is carried out in accordance with the Federal Valuation Law of the Russian Federation, federal and international valuation standards.

The cost approach, which is presented by the net assets market valuation method, is based on the representative quarterly balance sheet information of the enterprise. In essence, valuation is the market value of the equity and reserves.

However, due to the significant accumulated value of the negative value of retained earnings, the value of a business may be less than zero. This happens when a financial analysis simultaneously indicates a high bankruptcy probability and an unsatisfactory balance sheet structure, which, as the study of company reporting shows, is a frequent occurrence for large industrial enterprises (Christauskas, Kazlauskiene, 2007).

A market approach, which is presented by the methods of correlation and regression of functional dependencies, allows us to identify functional relationships (linear, multiplicative, exponential type) between an industrial enterprise's capitalization and income. If the financial statements show losses, then the business value is also negative (Bondarchuk, Burdina, Gracheva, Karpasova, 2018). At the same time, there is a sharp decrease in the correlation coefficient if profitable and unprofitable companies are presented in the sample at the same time. The situation can be improved by means of argument transposition, for example, by replacing income with revenue. However, for the distribution business (for example, for companies that manage budget funds for the state defense order implementation), such a recombination does not give a reliable result (Lin, Su, 2008). The income approach, which is represented by the method of net present value, estimates the cash flow generated by net profit and depreciation. With significant losses in the last reporting year, the forecast of future flows does not allow to unambiguously reliably estimate the business value.

All these dwells upon information uncertainty in calculating the business value. As signs of information uncertainty for a business valuation of industrial enterprises, it is worth highlighting: losses, the negative value of retained earnings, the negative value of the reported and market value of equity and reserves, the absence of reliable, including insider, officially positioned calculations of capitalization based on differentiated data on all assets, a high bankruptcy probability, as well as the absence of transactions on disposal, reorganization (mergers, acquisitions, etc.) and bidding with valuation object's shares (Palepu, Healy, 2007).

3. Methodology

The method of business valuation based on form 4 of the financial statements "Cash Flow Statement" section of cash flows from current operations (Ministry of Finance of the Russian Federation, 2011). The method relates to the income approach, is a type of capitalization method.

Currently, the most frequently used method for assessing business value within the framework of the income approach is the net present value (NPV) method, which is based on forecast and post-forecast flows of income and expenses. Long-term forecasting is a probabilistic process, which allows to qualify the results of business value assessment as a calculation with a low degree of reliability. It is proposed to estimate the NPV method using actual a priori flows, which are averaged over several previous periods. The identified trend in the income and expense flows reflecting the achieved financial results of the evaluated industrial enterprise is most often extended for at least 6 months, due to the length of the production cycle of such business entities. Since business valuation is also legitimate for 6 months from the date of valuation in accordance

with applicable law, the use of averaged a priori information for the NPV method increases the validity of the estimates obtained (Matschke, Brösel, Matschke, 2010). The justification of the discount rate for forecast flows is also based on the future information situation, which also reduces the effectiveness of the calculations. If the business value is determined for an industrial enterprise having unprofitable activities for more than one reporting period, the forecast of income and expenses is always oriented to future profit, which reduces the reliability of estimates. The proposed approach to the assessment allows to solve these problems.

The main concept of this method is the innovation of well-known indicators that determine cash inflows and outflows to associative ones, which are interpolated for a selective time interval based on the average function. The calculation is reduced to discounting the difference in average annual values (for example, for the last two before the valuation date of the year) of sales proceeds $\left(C^s_{(n+1)}, C^s_{(n)}\right)$ products, works, services (line code 4111)

$$C^s = \frac{C^s_{(n+1)} + C^s_{(n)}}{2}$$

and annual average for similar periods of payments for the following lines of balance:
- payments to suppliers and contractors $\left(C^{sh}_{(n+1)}, C^{sh}_{(n)}\right)$ for raw materials, materials, work and services (line code 4121),

$$C^{sh} = \frac{C^{sh}_{(n+1)} + C^{sh}_{(n)}}{2}$$

- payments in connection with salaries $\left(C^{p}_{(n+1)}, C^{p}_{(n)}\right)$ of employees (line code 4122),

$$C^p = \frac{C^p_{(n+1)} + C^p_{(n)}}{2}$$

- profit tax payments $\left(C^{pt}_{(n+1)}, C^{pt}_{(n)}\right)$ of enterprise (line code 4124)

$$C^{pt} = \frac{C^{pt}_{(n+1)} + C^{pt}_{(n)}}{2}.$$

Net flow (Cf) is calculated using the following formula:

$$Cf = C^s - C^{sh} + C^p + C^{pt}.$$

The business value, taking into account the industry pace of business growth, excluding inflation, is calculated by the formula:

$$C^b = \frac{Cf}{r - g}$$

where r is discount rate, the value is taken based on the six-month libor rate, country risk, business risk, inflation is not taken into account, the range of values is 8%-15%,
g is sectoral business growth rate, the value is taken in accordance with the forecast of the Ministry of Economic Development, for industry, the growth rate excluding inflation, as a rule, is up to 2%.
The business value can also be calculated using the forecast data on revenue growth excluding inflation using the formula:

$$C^b = \frac{Cf(1 + k^e)}{r}$$

where k^e is revenue growth rate according to the data of financial reporting form No. 2 "Report on financial results", including the time interval that can be used for forecasting.
A specific feature of revenue growth rate for industrial enterprises is its unstable trend character. A number of factors determines instability, the most important include the long implementation period of especially innovative projects, the irregularity of state funding, especially the reflection of financial results in reporting (Mercer, Harms, 2008). The analysis, including industrial enterprises whose shares are traded on the free market, shows that the temporary nature of the decrease in revenue does not affect the decrease in the value of their shares and the business as a whole, and does not show market prices with a correlation with the company's income. In this regard, growth factors are recommended to be considered as the average value for time periods from three to five years (Ratner, Stein, Weitnauer, 2009). The same principle should be taken into account when calculating other average values that take part in calculating the value of the business in the method under consideration. Thus, the general formula for calculating the business value by the income approach under uncertainty is as follows:
- using industry growth

$$C^b = \frac{\sum_{i=1}^{n} \frac{\left(c_i^s - c_i^{sh} + c_i^p + c_i^{pt}\right)}{\square} n}{(r - g)}$$

- using revenue growth rate

$$C^b = \frac{\sum_{i=1}^{n} \left(\left(C_i^s - C_i^{sh} + C_i^p + C_i^{pt}\right) * (1 + k_i^e)\right)}{n} / r.$$

To increase the valuation's reliability, it is necessary to use both formulas. To get a pessimistic assessment of business value by adjusting for weight: the maximum value is multiplied by 0.3, the minimum by 0.7.
The business valuation method based on Form 5 of the financial statements "Explanations for the balance sheet and statement of financial results". The method is of additive in nature, relates to a cost approach using an income approach (capitalization method) in relation to depreciable assets.
The main concept of this method is to summarize the value of the business valuation of industrial enterprises main assets of industrial enterprises, which provide a guaranteed level of cash inflow to a current account, and also show the size of investments in creating a vertically and horizontally integrated business, including land plots on which the company's scientific and technical potential is based. In Russia, land value is often not placed in financial statements, which leads to an underestimation of business valuations. The method involves the summing up of four assets (Trugman, 2012).

1) Intangible assets. Depreciation of intangible assets is its own source of financing for the enterprise; it forms a net cash flow. To determine the amount of actual depreciation, Form 5 Section 1 is used. "Intangible assets and expenses for Research and development works (R&D)". In paragraph 1.1. The presence and movement of intangible assets in Column 9 for calculation is used the accrued depreciation(A^{IA}) value.

2) Fixed assets. Depreciation of fixed assets is also its own actual source of financing of the enterprise, forms a net cash inflow. To determine the amount of depreciation, Form 5 Section 2. "Fixed Assets" is used, 2.1. The presence and movement of fixed assets in the line "Fixed assets (excluding profitable investments in tangible assets)" in column 9, the value is used for calculation, which is charged depreciation (A^{FA}). To calculate the business value according to the proposed method, the value of intangible assets and fixed assets is collected for an infinite period in the future. In this case, the capitalization method is used, including taking into account the industry-wide business growth rate without inflation:

$$C^{IA+FA} = \frac{A^{IA} + A^{FA}}{r - g}$$

3) Land. Valuation of land significantly affects the business value. To determine the balance sheet value, use Form 5 Section 2. "Fixed Assets", 2.1. The presence and movement of fixed assets in the line "Land" in column 12 for calculation the initial cost value is used, due to the fact that the land is not a depreciable asset (C^{L}). Industrial enterprises that have obtained land during privatization often do not indicate its value in reporting. In this case, it is also recommended to include the land cost, calculating its market value according to the data of public offers for rent, purchase and sale.

4) Financial investments. Investments in the development of vertical or horizontal business integration also significantly affect the business valuation of industrial enterprises. To determine the magnitude of such investments, Form 5 Section 3. "Financial Investments" 3.1. The presence and movement of financial investments in the line "Total financial investments" in Column 11 for calculation the initial cost value is used (C^{FI}).

Thus, the general formula for calculating the business value with a cost approach with the elements of the income approach in the situation of uncertainty is as follows:

using industry growth pace

$$C^{b} = \frac{A^{IA} + A^{FA}}{r - g} + C^{L} + C^{FI}$$

using revenue growth rates, in this case, the calculation is made taking into account the features described in the previous method

$$C^{b} = \frac{\sum_{i=1}^{n}(1 + k_i^e)}{n} * \left(\frac{A^{IA} + A^{FA}}{r} + C^{L} + C^{FI} \right).$$

To increase the reliability of the estimates for this method, it is also necessary to use both formulas. To get a pessimistic score by adjusting for weight: the maximum value is multiplied by 0.3, the minimum by 0.7.

It is also proposed to use the principles of a comparative approach to further increase the reliability and validity of calculating business value within the framework of uncertainty.

For analysis, it is necessary to choose three analogues, which are industrial enterprises with a similar profile of activity in relation to the valuation subject and calculate their business activity ratings. As analysis shows, such analogues can have a high degree of affiliation.

It is proposed to replace the standard set of indicators (asset turnover ratio, current assets turnover ratio, capital productivity, equity capital turnover, borrowed capital turnover, accounts receivable turnover, accounts payable turnover) with the following list – intangible asset utilization rate, intangible asset return on assets, the renewal intensity fixed assets coefficient, return on fixed assets (Astrachan, Jaskiewicz, 2008).

These indicators affect the net cash flow of the enterprise. The intensity of renewal of fixed assets shows a possible increase in the share of depreciation in the structure of cash inflows. The intensity of use and capital productivity determines the level of labor productivity and the prospects for increasing net profit of the organization.

These indicators are also considered according to the financial statements: Form 4, 5, which formed the basis of the proposed methods for business valuation. According to these indicators, it is necessary to calculate their average growth rate in relation to the previous period or in relation to the selected base (Agrawal, Agrawal, 2017). Each of the indicators should grow criterial; therefore, the maximum rating will be given to that industrial enterprise, which average value by the four indicators will be higher (Spiridonova, 2018).

As a result of business valuation calculations, several estimates can be obtained that are ranked in descending order. The choice is proposed in accordance with the ranking number. If the evaluated company has a rating of 2, then preference is given to the second in descending order of calculated business value (Aluko, Amidu, 2005). Application of the rating allows to consider the prospective financial inertia of the enterprise for 6 months. Also, the proposed approach allows to compare the value of the business at the same time for profitable and unprofitable analog enterprises in dynamics.

4. Conclusions

A posteriori analysis of the activities of industrial enterprises shows that traditional business valuation approaches give divergent results with respect to exchange expectations. Such a situation can be justified by actual losses and, as a result, a high probability of bankruptcy, which has no legal consequences for industrial enterprises. The disproportion of estimates obtained by instrumental and factographic methods can be qualified as information uncertainty, which is proposed to be compensated for by special valuation principles, which allow correcting the inaccuracy of the results of business valuation calculation.

The proposed methods allow eliminating the influence of all factors that qualify information uncertainty, which are of stochastic nature to the valuation results. Two business valuation finite algorithms are presented, which are related to cost and income approaches, which in practice give coherent results.

The proposed procedure for selecting a reasonable valuation result based on a relational rating, which is formed on the basis of special coefficients, for industrial enterprises belonging to the same field of activity, also allows to increase the calculations' validity.

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