Preparation of the actuarial balance sheet based on the present value of assets and liabilities of the going concern

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Abstract. The article studies the problem of applicability in the accounting practice the going concern's assets and liabilities estimation at the present value. The drawn conclusion is that it is necessary to use the present value to estimate certain assets and liabilities of the going concern and to prepare the actuarial balance. The article is the first to consider the method of preparing the actuarial balance sheet for the purpose of estimation of the financial position and future potential of the company; it describes in detail the preparation steps of actuarial balance sheet based on certain calculations (procedures).
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Introduction

A present value is recognized in some literature as the most feasible method for estimating the market value of the facilities of a going concern [1-8]. The main advantage of this method is that it is the only method based on estimation of future cash flows [5]. However, at the present time applicable Russian laws and regulations on accounting do not cover specific methodology for determining the present value of assets and liabilities of the enterprise [9]. In our study we analyzed the possibility of using the present value to estimate assets and liabilities of the going concern. In accordance with the result of the study, we drew a conclusion that proves the necessity of actuarial balance for the purposes of estimation of generated economic value and future cash flows of the concern as an asset complex. We showed the methodology of forming of an actuarial balance by the specific examples, which is indicative of future potential of the concern.

The work structure includes introduction, methodology, results and conclusions.

Methodology

The estimation of present value of separate assets and liabilities of the concern as a property complex is of particular interest from the standpoint of disclosure of their value in the financial (accounting) statements [6].

The need to use the present value estimations in economic calculations of objects arises currently from the following circumstances:

- Permanent deprecation of money (inflation);
- Change rate of the price of the property used by the concern may differ significantly from the rate of inflation;
- Periodic accrual (or receipt) of income in an amount not below a certain minimum is desirable.

Estimation based on the present value of assets and liabilities is widely used in preparation of financial statements compiled in accordance with the international standards. The internationally applied discounting method was adopted in the Russian theory and practice of accounting in the late 90s [9]. However, currently this type of estimation is quite limited in Russia. Moreover, there is no unconditional interpretation of the present value category, as well as of specific methods for its calculation.

Discounting from the general economic point of view is a process of determining the current value on the basis of the value of future cash flows and the rate of return and risk. It is obvious that the possession of such information will allow concerned persons to ‘read’ thoughtfully and objectively the company's financial statements. The investor will get an idea not only of the current value of the assets and liabilities of the concern, but also of their future (past) estimation based on the average rate of return [7].

The value of assets and liabilities of the concern and its financial performance directly depend upon the choice of the discount rate. The discount rate should reflect the current market estimations of time value of money. Due to the fact that currently there is no single approach to the determination of the discount rate, its definition depends entirely on the professional judgment of a statements drawer.

In the early twentieth century a German scientist P. Gerstner stated that the estimation of the going concerns as a whole or of parts of the capital invested in them is the ultimate goal of the analysis of results-based calculation, i.e. balance sheet, and profit and loss statement. In addition, the estimation task changes significantly in case of the owner change, the change in property relations, or liquidation of the enterprise [10].

Many prominent scientists and economists for a long period of time searched for a solution to estimate the company on basis of the values contained in the balance sheet. Certainly, the information generated in the accounting (financial accounting) system that correspond to the requirements of completeness and accuracy is the most accurate data presentation system. However, like any system, it is based on a set of principles that allow to form a coherent information model, on the one hand, and are in conflict with each other, on the other. A solution of this contradiction is the prerogative of an accountant who judges not only by existing regulations, but also by a professional opinion. That, in our view, causes limitations in using accounting information for management purposes, including the purposes of business valuation.

One of the proponents of actuarial balance theory based on the use of present value is a French scientist Jacques Richard [11]. He believes it is not possible to estimate separate assets for the purposes of the actuarial balance preparation. At the same time, the balance prepared in such a way loses informativity for the user; it does not provide information on assets and liabilities of the going concern and, thus, becomes an analogue of the document drawn up by a company evaluation expert.

In our opinion, it is possible to prepare the actuarial balance with indication of separate assets and liabilities of the organization and their estimation at the present value. The discounted cash flow of the organization's separate assets must be distributed to retain a user-friendly form of balance. Methodology of actuarial balance preparation involves certain calculations (procedures) consisting of several steps.

Step 1. Determination of the forecast period.

It depends on the duration of the period the company plans its income and expenses for. Taking into account market volatility and macroeconomic situation in general we believe that it is appropriate to put aside the long-term forecasts. So, the optimal forecast period is 5 years maximum, except for the case justifying a larger term. Thus, the forecast period in our case is 5 years.

Step 2. Calculation of net (free) cash flow.

The calculation of cash flow requires special preparation and consideration of various factors affecting the results of the enterprise operation. It should be noted that the calculation of any forecasting parameters is based on the results of previous periods with due account for trends in the industry, the level of competition, and enterprise performance in general. Net cash flow is an amount of cash available for investors, which is calculated by subtracting the investment to the working capital and long-term assets from operating activities cash flow. The value of the free cash flow should be the same from the perspective of the concern and the investor.

In our opinion, the method proposed by Dietger Hahn and Harald Hungenberg [12] can give the most accurate result in the determination of net cash flow:

$$NCF = T_{py} * (1 + Tg) * M_{op} * (1 - I_{tr}) - AI ,$$

where:
Tpy - Turnover for the preceding year;
Tg - Turnover growth rate;
Mop - Operating profit margin;
Itr - Income Tax Rate;
AI – Additional investment in fixed and working capital.

Let's note that when you change tax rates the formula should be adjusted by the amount of the change. Let us perform necessary calculations based on materials of "KSU Termosteps" OJSC. Results are presented in Table 1

Table 1. Forecasting net cash flow of "KSU Termosteps"

Period	Turnover for the preceding year (returns) (thous.RUB)	Turnover growth rate	Operating profit margin	Income Tax Rate	Additional investment in fixed and working capital (5% of the total value of forecasting expenditures) (thous.RUB)	Net Cash Flow (thous.RUB)
2011	185,600	1.0678	0.0782	0.2	9,135	3,263
2012	198,200	1.0878	0.0858	0.2	9,855	4,944
2013	215,600	1.0886	0.1065	0.2	10,485	9,512
2014	234,700	1.0822	0.1182	0.2	11,200	12,818
2015	254,000	1.0629	0.1222	0.2	11,850	14,543
Total	x	x	x	x	52,525	45,080

In our opinion, this step is crucial in the preparation of actuarial balance. Our proposed method of the net cash flow determination enables to calculate on the basis of past reporting periods by revaluation of their values with due account for the expected rates of the company development. And that eventually gives more reasonable results from the economic point of view. The proposed formula excludes excessive subjectivity and allows to neutralize the influence of the analyst's personal preferences as the calculation is open for industry-average indicators or other statistical data.

Step 3. Discount rate determination.

This is the most disputable and ambiguous step in the process of the actuarial balance preparation. At the present time we can say that there is no uniform methodology for calculating the discount rate. Of course, discounting is the most important mechanism allowing to represent the financial position of the company, because the current value of future cash flows may differ significantly from the nominal value. Nevertheless, any, even the most complex discounting operations, are reduced to a single formula:

$$PV = \frac{FV}{(1+r)^n},$$

where:
FV - future value of cash flow;
PV – present value;
r – discount rate;
n – time (number) of charging periods.

The amount of the discount depends on the discount rate. In this regard, each fixed value of expected future receivable amount may correspond to multiple values of present value depending on the discount rate selected. Thus, the determination of the discount rate is the key point, including the process of actuarial balance preparation. Certainly, the discount rate has different values in different companies in respect of different operations depending on time and goals.

Determination of the discount rate usually assumes the so-called safe or guaranteed level of return on financial investment, which is secured by the state bank for deposits or securities transactions. This may take into account the risk premium. The more risky the project or the contract is, the larger is the risk premium. The discount rate is calculated as follows:

$$R_d = R_f + R_r,$$

where:
Rf – riskfree return;
Rr –risk premium.

In addition to the above algorithm for the discount rate calculating there are other methods:

- Method associated with rates of return on investments in assets or return on equity;
- Capital weighted average cost method.

The calculation of a discount rate used in each case is different. The company should rely upon market conditions and its own needs. Note that in any case the choice of the discount rate is a matter of the professional judgment of the actuarial balance drawer and, therefore, implies a certain degree of subjectivity. The value of the discount rate, its substantiation and procedure for calculation is subject to compulsory disclosure in the notes to the accounts in order to provide users with complete and accurate information on assets, liabilities and capital of the going concern. Discount rates used in our calculations are presented in Table 2.

Table 2. Discount rates

Index	Discount rate determination	Discount rate	Regulatory actions
Capital assets	Weighted average cost of capital	10%	Practical application in Russia
Impairment of Assets	Discount rate on the basis of capital assets pricing model (CAPM)	19.9%	IAS 36 Impairment of Assets
Leased property	Present value of minimal lease payments. Present value of property = Current fair value	13%	IAS 17 Leases
Financial investment:		10%	
Interest-free bond; Bearer bond	Return on government bonds with similar period to maturity adjusted for credit risk.	12%	IAS 39 Financial Instruments: Recognition and Measurement
Granted loan		10%	
Construction -in-progress	Percentage of normal profitability for the relevant period and type of production	13%	Discount rate proposed by Jacques Richard
Selling of products on a deferred-payment basis	If financial instruments are traded on stock exchanges, the rate of interest is measured at the rates of similar instruments	12%	IAS 18 Revenue
Granted credit	Interest rate on loans provided by banks to borrowers with similar credit ratings.	14%	Practical application in Russia
Loan		16%	
Provision for estimated liabilities	Discount rate based on current conditions of the financial market, risks associated with the expected consequences of the conditional and other factors	14%	RAS 8/10 Estimated liabilities, Contingent Liabilities and Contingent Assets

Note that IAS 36 “Impairment of Assets” requires calculating the discount rate on the basis of capital assets pricing model (CAPM). This calculation uses statistical indicators of stock markets. The Russian stock and industry markets are undergoing the process of development, that is why the basic data often are taken from the USA stock markets with due adjustment to the risks specific to Russia. The discount rate calculation based on CAPM model is presented in Table 3.

Table 3. The discount rate calculation based on CAPM model

Index name	Index value, %	Commentary
Riskfree rate	4.27	Yield to maturity on U.S. 10-year Treasury Bonds
Risk premium for investment in the asset	6.97	Risk premium for investing in stocks of USA companies
Beta coefficient of assets exclusively of capital structure	0.57	How generally the profitability of the asset under consideration will change if the return on the industry is changed. Necessary information can be obtained from AK&M rating agency website
Initial cost of capital	8.24	gr.1 + gr.2 * gr. 3
Premium for company size	3.53	Necessary information can be obtained from Ibbotson publications
Risk premium for investments in the Russian company	2.96	Represents the difference between the returns on foreign currency bonds of the Ministry of Finance of the Russian Federation and on U.S. 10-year Treasury Bonds
Premium on investments in foreign currency	1.2	Represents the difference between the returns on ruble and foreign currency bonds of the Ministry of Finance of the Russian Federation
Equity after-tax discount rate	15.93	gr.4+ gr.5+ gr. 6+ gr.7
Pre-tax discount rate	19.9	All data shown above take into account the income tax, that is why to meet the requirements of the standard the discount rate needs to be adjusted: gr.8 / (1 - 0.2), where 20% - is the income tax rate

Step 4. Determination of the present value of assets and liabilities.

The calculation of the present value of assets is advisable to start with the determination of the present value of fixed assets and intangible assets. It is necessary to distribute the cash flow with the said

assets of the enterprise using the discounting method to disclose the assets and liabilities in the balance with maturity more than 12 months. It is advisable to take the amount of the residual value of the assets represented in the research report on fixed assets as the base of allocation. Assets expected to be disposed during the forecast period shall be eliminated in calculating the base of allocation after their disposal. In addition, the cost of the leased property and the leased premise will not be accepted as these assets are not involved in the production process. The information about the residual value of noncurrent assets by the end of the projection period is important for calculating the present value. The results of determining the present value of non-current assets according to the materials of "KSU Termostep" OJSC are presented in Table 4.

Table 4. Determination of the present value of noncurrent assets

	Discount period						
Index	31.12.2011	31.12.2012	31.12.2013	31.12.2014	31.12.2015	Residual value as of 31.12.2015.	Present value of capital assets
Discount coefficient	0.9091	0.8264	0.7513	0.6830	0.6209	x	
Name of noncurrent assets	Present value						
Facilities	374	515	901	1121	1219	683	4813
Machinery and equipment	2091	2881	5038	6269	6817	2176.2	25272.2
Constructions	305	421	736	919	993	312.3	3686.3
Motor vehicles	148	204	358	446	-	-	1156
Fixtures and fittings	48	65	113	-	-	-	226
TOTAL	2966	4086	7146	8755	9029	3171.5	35153.5

The present value of financial investments made by the organization mainly to receive future economic benefits or income should receive close attention in preparation of the actuarial balance sheet. In this regard, it is necessary to make a separate calculation for each type of financial investments: securities, authorized (share) capitals of other entities, deposits with credit institutions, loans to other entities. Methodology of calculating the present value of the granted loans is presented in Table 5. The conditions of loans and interest rate, which is taken as the discount rate, need to be considered in calculation.

Table 5. Present value of the loan granted

Period	Rate calculation	Discount coefficient	Cash flow, thous.RUB	Present value, thous.RUB
2011	$1:(1+0,10)^1$	0.9091	150	136.37
2012	$1:(1+0,10)^2$	0.8264	150	123.96
2013	$1:(1+0,10)^3$	0.7513	150	112.7
2014	$1:(1+0,10)^4$	0.6830	150	102.45
Nominal value	$1:(1+0,10)^4$	0.6830	1000	683
TOTAL	X	X	X	1158.48

It is necessary to determine the present value of liabilities of the going concern, in particular, received credits and loans when forming the actuarial balance sheet. The simplified annuity payment formula may be used to calculate the amount of credit as a cash flow to maturity:

$$\sum CF = L \times \frac{i}{1-(1+i)^{-n}}$$

where:
CF – cash flow,
L – Loan amount;
i – Loan interest rate;
n - Number of payout periods for credit.

The calculation of the present value of the received loan according to the data of "KSUTermosteps" OJSC is presented in Table 6.

Table 6. The present value of a long-term loan received

Period	Rate calculation	Discount coefficient	Cash flow, thous.RUB	Present value, thous.RUB
2011	$1:(1+0,14)^1$	0.8772	430.8	377.9
2012	$1:(1+0,14)^2$	0.7696	430.8	331.54
2013	$1:(1+0,14)^3$	0.6750	430.8	290.79
TOTAL	X	X	X	1000.23

Likewise, it is necessary to make the calculation of the present value of estimated liabilities.

Step 5. Actuarial balance preparation.

The final step after calculating the present value of all assets and liabilities on the balance sheet is the actuarial balance preparation.

Results

When forming the actuarial balance sheet there appears a difference in assessments between the currency of traditional and actuarial balances as they use different types of assessment of assets and liabilities for the basis. It is appropriate to reflect the said difference in actuarial balance by an independent line – "The difference in assessment of the going concern - surplus (deficit)".

Thus, the proposed methodology of actuarial balance preparation based on discounted estimates enables to determine the value of the company as a property complex.

We consider it appropriate to calculate on the basis of actuarial balance the value of the net assets and further in case of the availability of reliable information about the market value of a company's capitalization to evaluate its goodwill. Thus, according to our estimates, the net asset value of "KSU Termosteps" OJSC amounts to 67 388 thousand rubles. Let's assume that the market value of capitalization of this company is 70 000 thousand rubles, hence the value of goodwill is 2312 thousand

rubles. The subjective factor in a fair value estimation which does not allow Russian companies to practice the procedures recommended by the IFRS is excluded from our calculation. Thus, the actuarial balance preparation allows not only to estimate the real value of the enterprise as a property complex, but also to make calculations of analytical indexes essential for appropriate management decisions.

Conclusions

We believe, that, in general, the actuarial balance based on the present value achieves more accurate results and provides potential investors and the company's management with information necessary to minimize risks in case of the property complex purchase and sale. The recommended estimation methodology based on the information disclosed in actuarial reports offers the most accurate and objective information about the transaction price without compromising the interests of the buyer or the seller.

In addition, the actuarial balance is needed for management decision making and organization performance determination. Balance composed with the help of cash flow discounting method gives an opportunity to identify inefficiently used assets of the organization. The actuarial balance allows the enterprise managers to 'look into the future' rather than to examine the results of accomplished facts of the business activity.

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References

1. Cunningham, B.M., L.A. Nikolai and J.D. Bazley, 2000. Accounting: information for business decisions. The Dryden Press, pp.: 1-1024.
2. Ernst and Whinney (Firm), 1984. The Impact of the Seventh Directive. Financial Times Business Information, pp: 1-111.
3. Hickman, J., 2004. History of Actuarial Profession. Encyclopedia of Actuarial Science, 2: 831–838.
4. Machlup, F., 1967. Theories of the Firm: Marginalist, Behaviorial, Managerial. The American Economic Review, 57(1): 1-33.
5. Martin, J.D., J.W. Petty, 2000. Value based management: the corporate response to the shareholder revolution. Boston Harvard Business School Press, pp.: 1-506.
6. Penman, S.H., 2007. Financial statement analysis and security valuation. 3rd edition. McGraw-Hill Higher Education, pp.: 1-784.
7. Stewart, G., 1991. The quest for value. Guard for senior managers. New York Harper Collins Publishers, pp.: 1-800.
8. Williamson, O.E., 1979. Transaction-costs economics: the governance of contractual relations. Journal of Law and Economics, 22 (2): 233-261.
9. Decree of the Government of the Russian Federation "The Program of Accounting Reform in accordance with international financial reporting standards" of 06.03.1998 Volume 283.
10. Gerstner, P., 1926. Analysis of Balance. Second edition. Moscow Publishing House "Economicheskaya Zhizn [Economic Life]", pp.: 1-352.
11. Richard, J., 2000. Accounting: Theory and Practice: Translation from French. Moscow Publishing House "Finance and Statistics", pp: 1-160.
12. Khan, D.P., H. Hungenberg, L.G. Golovach and M.L. Lukashevich, 2005. Value-oriented controlling concepts: Translation from German. Moscow Publishing House "Finance and Statistics", pp: 1-152.

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