APPLICATION OF ACTUARIAL CALCULATIONS WHEN BUILDING A REPORT ON COMPANY'S FINANCIAL POSITION

L. I. Kulikova. Kazan Federal University
N. B. Semenikhina, Kazan Federal University
E.Yu. Vetoshkina, Kazan Federal University

ABSTRACT

The article comprises a set of theoretical and methodological statements and practical suggestions regarding the specific ways of disclosing financial information in determining the financial position. For several centuries, actuarial calculations are used to determine financial stability and solvency of lenders. In this connection, the use of actuarial calculations in formation of indicators of modern performance reports on financial situation to be appropriate in order to project the future potential opportunities of the companies. The tried and tested during the centuries methods of application of actuarial calculations for insurance, allow us to assert the ability to build actuarial balance not only for companies in insurance industry, but for other sectors of economy as well. The authors suggest using a discounted value for the present estimation of certain assets and liabilities in the balance sheet. They also offer the theory of building actuarial balance for assessing the financial position and future potential of the company.

Key words: *Actuarial balance, Discounted value, Financial position, Value.*

INTRODUCTION

The exact origin of the term "actuary" is not currently defined. It is believed that it came from the Latin "actuaries", and meant verbatim clerk, registrar, otherwise the post of person recording the meetings of the Senate in ancient Rome (J.Richard, 2000). In the middle ages, the clerks, who led the proceedings of the courts and recorded decisions made by the Court, were called actuaries. Over time, the term has lost the Secretary meaning and since the end of the XVIII-th century the post of actuary was inextricably linked with insurance. The historical roots of modern interpretation of this notion can be traced back to 1762, when the society of fair life insurance and survival was established in the United Kingdom. Further development of profession of actuary was connected with development of insurance as both science and profession. In the early XIX-th century in the United Kingdom at the legislative level, there was defined the duty of insurance societies to testify authenticity of calculations in the tables of payments and rules, on the basis of which these calculations were made, by the opinion of at least two professional actuaries or other professionals. As noted by James Hickman (2), in the XIX-th century, accountants, as well as actuaries, ensured the interests of creditors in assessing the changes in ability to pay and emerging threats of bankruptcies of commercial organizations. In the base of actuarial calculations there are mathematical models, which can make financial forecasts for short and long term, taking into account the possible risks.

THEORY

In the base of actuarial evaluation there is formation of actuarial assumptions and determination of the basis used for the purposes of such assessment. Typical components of actuarial basis are:

-actuarial rates (discounting, anticipated growth of pensions and wages, etc.);

-models of dismissals (decrements), for example, models of death, retirement, dismissal of workers.

The actuarial rates are typically based on peer reviews. So, the Western actuarial companies recommend in determining discount rates to be oriented on the yield of long-term bonds (public or corporate with the highest reliability rating) (Aletkin P.A., 2014; Richard N. Cooper, 2010). In addition, the macroeconomic forecasts are taken into account, for example, inflation rate and average duration of discounted obligations.

The construction of such a balance will determine the real cost of any enterprise as a property complex.

We believe that in order to get the most accurate picture of property situation and financial results of activities of the enterprise and its economic value it is necessary to carry out the appropriate data corrections of accounting (financial) reporting and seek the solution of evaluation problem of the enterprise as a property complex in making the actuarial balance. As it is shown by analysis of existing methods for assessing the economic value of the company (Kulikova L.I., Goshunova A.V., 2014), such corrections are diverse in nature and can be applied both for assessing the value of the property and for the purpose of integrated assessment of efficiency and profitability of the company's activities.

Thus, the objective of actuarial accounting is to determine the market value of the company. In actuarial accounting, the interests of potential and current investors are expressed. The concept of actuarial accounting was singled out as a separate balance theory from the static concept, the founder of which is Henry Nicklish. However, actuarial accounting does not imply a return to the static and is not only the assessment of the company's assets to cover the debts. In terms of actuarial accounting instead of cost accounting comes the accounting at fair value. In this case the actuarial accounting system is expected to determine the value of the company under condition of its sale or purchase as a property complex to attract new investors.

RESULTS

The professor at the Paris Dauphine University J. Richard defines actuarial accounting as a system based on double-entry bookkeeping method that represents the information on changes in the market value of enterprises (J. Richard, 2000). J. Richard believes that in building the actuarial balance "it is not possible to assess individual assets." However, the balance made in such a way loses the informational content for user, does not represent reliable information on assets and liabilities of the company, and becomes the equivalent of report on the cost of property complex. However, the preparation of actuarial balance is also possible in "standard" form, broken down by separate articles of assets and liabilities of the company. To maintain the user-friendly format of balance it is appropriate to distribute the discounted cash flow as to individual objects of enterprise property. We believe that the process of drafting the actuarial balance for the purpose of assessing the value of the enterprise as a property complex may include the following stages - table 1.

Table 1
METHODOLOGY FOR MAKING THE ACTUARIAL BALANCE FOR THE PURPOSE OF ASSESSING THE VALUE OF ENTERPRISE AS A PROPERTY COMPLEX

Stage 1 Determination of forecast period (depending on the length of the period, during which the company plans its incomes and expenses)
Stage 2 Calculation of net (free) cash flow (it requires special training and taking into account the various factors that affect the economic results of the enterprise)
Stage 3 Determining the discount rate (the most controversial and ambiguous stage of making the actuarial balance)
Stage 4 Determination of discounted value of the fixed assets and intangible assets Determination of discounted value of financial investments Determination of discounted value of construction-in-progress Determination of discounted value of long-term credits and loans
Stage 5 Determination of discounted value of reserves for contingencies
Stage 6 Preparation of actuarial balance

Determination of forecast period depends on duration of the period, for which the company plans its incomes and expenses. Taking into account the instabilities of macroeconomic situation, it is advisable to abandon long-term forecasts (Vetoshkina E.Yu., Tukhvatullin R.Sh.). The optimal forecast period, therefore, is not more than 5 years, except the cases, when it can be justified. Thus, the forecast period in our given case is equal to 5 years.

Calculation of net (free) cash flow requires special training and taking into account the various factors affecting the results of managing the enterprise. In our opinion, the most accurate result can be obtained by the option of calculating the net cash flow proposed by Ditger Han and Harald Hungenberg (Khan D. Peak, 2005, p. 152):

$$NCF = O_{nn} * (1 + To) * M_{nn} * (1 - C_{нр}) - AI \quad (1)$$

where: O_{nn} -turnover during the previous year;
T_o - growth rate of turnover;
M_{nn} -margin of industrial profit;
$C_{нр}$ - rate of tax on profit;
AI - additional investments in the fixed and working capital.

We note that when changing the tax rate on profits, the formula must be corrected by the amount of its change.

In our view, this formula is best suited in terms of practical application. We will make the necessary calculations using the example of conditional company "X".

In our view, this stage in preparation of actuarial balance is crucial. Our proposed method of determining net cash flow allows us to calculate on the basis of past reporting periods with recalculation of their value, taking into account the estimated rate of development of enterprise that ultimately gives more reasonable from economic point of view results. The use of the proposed formula of calculation eliminates the excessive subjectivism and allows us to reverse the impact of personal preferences of analyzer, since for the purposes of calculation average branch indicators or other statistical data can be taken.

Table 2
THE PROJECTED NET CASH FLOW OF THE COMPANY "X"

Period	Turnover for the previous year (incomes) thous.of money units.	growth rate of turnover	Margin of industrial profit	profit tax rate	Additional investments in fixed and working capital (5% of the total value of predictable flow) ths. of money units	Net cash flow, ths. of money units
20x1	185 600	1,0678	0,0782	0,2	9 135	3 263
20x2	198 200	1,0878	0,0858	0,2	9 855	4 944
20x3	215 600	1,0886	0,1065	0,2	10 485	9 512
20x4	234 700	1,0822	0,1182	0,2	11 200	12 818
20x5	254 000	1,0629	0,1222	0,2	11 850	14 543
Total	x	x	x	x	52 525	45 80

Stage of determining the discount rate is the most controversial issue in the proposed methodology. Now it can be observed that there is no unified methodology for calculating the discount rate (Kulikova L.I., Ivanovskaya A.V.,). However, any, even the most complex discounting transactions, are reduced to the unified formula:

$$PV = \frac{FV}{(1+r)^n}, \quad (2)$$

where FV is the future value of cash flows;
PV - discounted value;
r - discounted rate;
n - term (number of) periods of accrual.

Of course, the discounting value depends on discount rate. The discount rates used in our calculations are presented in table 3.

Table 3
DISCOUNT RATES

Indicator	Determination of discount rate	Rate of discounting	Regulation
Non-current assets	Average-weighted cost of capital	10%	Practical application in Russia
Depreciation of assets	Discount rate on the basis of assessment model of long-term assets (CAMP)	19,9%	IAS 36 "Depreciation of assets"
Lease property	Discounted value of minimum lease payments. Discounted value of property = current fair value	13%	IAS 17 "lease"
Financial investments: Interest-free bond; Coupon bond; Provided loan	Доходность по государственным облигациям с аналогичным сроком погашения, скорректированная с учетом кредитного риска Yields on Government bonds with similar maturities, corrected taking into account the credit risk	10% 12% 10%	IAS 39 "financial instruments: recognizance and measurement"

99

Construction in progress	Percentage of normal profitability for relevant period and type of production	13%	discount rate, proposed by J. Richard
Product sales with deferred payment	In the event, if financial instruments are listed in stock exchanges, the rate of interest is assessed according to rates of similar tools	12%	IAS 18 «revenue»
Loans granted\n\nLoan	interest rate on credits granted by banks to borrowers with similar credit rating	14%\n\n16%	Practical application in Russia
Provision for estimated liabilities	Discount rate, taking into account the existing conditions in the financial market of liabilities risks associated with the expected consequences of conditional factor and other factors	14%	ПБУ 8/10 «contingent liabilities and contingent liabilities and contingent assets»

The results of determining the discounted value of fixed assets are presented in table 4.

Table 4
DETERMINATION OF DISCOUNTED VALUE OF NON-CURRENT ASSETS

Indicator	discount period						Discounted cost of fixed asset, thous. money. units.
	31.12.2x1	31.12.20x2	31.12.20x3	31.12.20x4	31.12.20x5	01.01.20x6	
Discount rate	0,9091	0,8264	0,7513	0,6830	0,6209	0,6209	
Name of fixed asset	Discounted value						
Building	374	515	901	1121	1219	683	4813
Machines and equipment	2091	2881	5038	6269	6817	2176,2	25272,2
Construction	305	421	736	919	993	312,3	3686,3
Vehicles	148	204	358	446	-	-	1156
Production and economic stock	48	65	113	-	-	-	226
TOTAL	2966	4086	7146	8755	9029	3171,5	35153,5

After calculating the discounted value of all assets and liabilities in the balance of the company "X", we shall make actuarial balance (table 5). The difference in assessments between traditional and actuarial balance of currency is offered to take into account as to independent line "Difference in actuarial valuation of the enterprise", reflected in case of excess of actuarial valuation in the liabilities side of the balance sheet, and in case of excess of traditional evaluation - as to separate line in the balance sheet. In general, this difference can be related, including the article "Retained earnings", however, in our opinion, this is not advisable, since in this case, the amount of actually earned by the enterprise profit may be distorted. We also do not support the proposals concerning the use of reflecting such differences as to articles "Additional capital" or "Reserve capital ", because we believe that in the absence of these articles in traditional balance the negative difference in the actuarial valuation of property complex is impossible to write off due to non-existent sources.

Table 5
ACTUARIAL BALANCE OF 31.12.20 X 1

Indicator	Total, thou. rub.	Indicator	Total, thou. rub.
ASSET		LIABILITY	
Non-current assets		Capital and reserves	
Intangible assets	0	Authorized capital	4906
Fixed assets	38800	Additional capital	0
Financial investments	2560	Reserve capital	2257
Other non-current assets	1040	Retained earnings	35980
		difference in actuarial valuation of enterprise - surplus (deficit)	24245
Total, as to section "non-current assets"	42400	Total, as to section "capital and reserves"	67388
Current assets		Long-term debt	
		Borrowed funds	1021
		Reserves for estimated liabilities	844
		Total, as to section "long-term debt"	1021
Stocks	10243	Short-term debt	
VAT as to purchased materials	0	Borrowed funds	3084
Accounts receivable	65097	Accounts payable	44719
Cash	22		
Other current assets	31	Other liabilities	737
Total, as to section "current assets"	75393	Total, as to section "short-term debt»	49384
BALANCE	117793	BALANCE	117793

In this example, the currency of balance of company "X" as a result of use of discounted value has not decreased (this is generally expected). This fact may indicate that the cost of non-current assets of the company is significantly marked down, because the assets were acquired rather long time ago, and their initial cost has been almost completely amortized. In addition, in our case the price of borrowed capital is relatively low and, therefore, does not exactly match the cash flow created by assets and liabilities of the company.

In our view, significant differences between the evaluation of assets and liabilities as to historical and present value indicate the need of reflecting these differences, including in systemic way, on accounts. Of course, in this case, one can offer to use the accounts system of managerial accounting.

CONCLUSIONS

Thus, the actuarial balance, based on the present value, enables us to achieve more accurate results and ensure potential investors and company management with information needed to minimize investment risks. Of course, the information generated in the system of accounting (financial accounting), conforming to the requirements of completeness and accuracy, is the most accurate system of data presentation. However, like any system, it is based on a set of principles which, on the one hand, allows us to form a holistic information model, and on the other hand, are in conflict with each other. Solution of this contradiction is the prerogative of accountant who is based not only on existing standards, but also uses professional judgment – by this, ultimately, in our view, the limitations of use of accounting

information for management purposes are stipulated, including for the purposes of business valuation.

ACKNOWLEDGEMENTS

REFERENCES

J. Richard Accounting: Theory and Practice: Per. with fr. - M.: Finance and Statistics, 2000. - 160 p.

The Deed of Settlement of the Society for Equitable Assurances on Lives and Survivorships, as the same is inrolled in His Majesty's Court of King's Bench at Westminster, in the year 1765. London: Printed by Richard Taylor, Red Lion Court, Fleet Street, 1833.

Kulikova L.I., Semenikhina N.B. Preparation of the Actuarial Balance Sheet based on the Present Value of Assets and Liabilities of the Going Concern/ Life Science Journal, 2014, 11(11S), 603-607.

Aletkin P.A. International Financial Reporting Standards Implementation into the Russian Accounting System. Mediterranian Journal of Social Sciences, vol.5, #24. November, 2014 - pp 33-38

Khan. D. Peak. Value-oriented controlling concept: Per. with it. / D.Han, H.Hungenberg; Ed. LG Golovach, ML Lukashevich et al. - M .: Finance and Statistics, 2005

Richard N. Cooper Review: From Poverty to Prosperity: Intangible Assets, Hidden Liabilities, and the Lasting Triumph Over Scarcity by Arnold King, Nick Schulz. Foreign Affairs, Vol. 89, 3 (May/June 2010), p. 136.