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## LIQUIDITY AND SOLVENCY MANAGEMENT OF OIL AND GAS ENTERPRISES

**Annotation.** One of the most popular classic methods of assessing the financial status of an enterprise is the coefficient method. The given article is about the evaluation of financial and economic sustainability of enterprises in terms of their solvency and liquidity. The evaluation is carried out by a new method using a dynamic normative model. The dynamic normative model is a matrix of paired comparisons of growth rates ratios of financial and economic indicators in certain periods. In order to design the matrix from design formulas and financial and operational coefficients, we determine the indicators of liquidity and solvency evaluation. Then, we put them in order according to their growth rates, and design the matrix of paired comparisons. Thereafter, we perform a factor analysis of results, i.e. determine what indicators' dynamics impact the results and how much they do so. The goal of using the described method is management of the enterprises' liquidity and solvency based on simulation.

**Keywords:** financial and economic sustainability of enterprises, normative model, indicators of liquidity and solvency.

**Тірек сөздер:** кәсіпорынның қаржылық және экономикалық жағдайы, нормативті модель, өтемпаздық және борыш төлей алушылық көрсеткіштері.

**Ключевые слова:** финансовое и экономическое состояние предприятия, нормативная модель, показатели ликвидности и платежеспособности.

**1. Method for Calculating Estimates of Financial and Economic Sustainability.** Nowadays, one of the main tasks of economic development is occupation of stable positions of the enterprises in domestic and international markets. Financial and economic sustainability of the enterprise is the company's ability to operate in a changing internal and external environment, while maintaining a constant solvency and investment attraction. Therefore, indicators of liquidity and solvency should be considered in evaluating and analyzing the financial and economic sustainability of the enterprise.

Pogostinskaya, N. and Pogostinsky, Y. [2] show the estimation of financial and economic sustainability or the assessment of actual and normative proximity indicators' relations on rates of their growth:

$$S = \frac{\sum_{i=1}^n \sum_{j=1}^n b_{ij}}{\sum_{i=1}^n \sum_{j=1}^n |e_{ij}|}, \quad (1)$$

where  $S$  – evaluation of economic and financial sustainability of the enterprise;  $n$  – amount of indicators in the normative model;  $i, j$  – numbers of indicators in the normative model;  $b_{ij}$  – the element of the matrix of coincidence of actual and normative relations growth rates;  $e_{ij}$  – the element of the matrix of normative relations growth rates.

Sustainability assessment varies in the range from 0 to 1. If  $S=1$ , then all normative ratios of growth rates are made, which provides financial and economic sustainability of the enterprise. If  $S=0$ , then the actual and normative matrices directly oppose each other, and the enterprise is financially and economically unsustainable. Thus, as the estimate of resistance is closer to 1, the more normative ratios between the indicators are closer to being satisfied.

**2. Formation of a Dynamic Normative Model to Assess the Financial and Economic Sustainability of the Enterprise**

In [3], we can see that the parameters for the calculation of liquidity and solvency ratios are:

C&CE – Cash and Cash Equivalents

WC – Working Capital

ShTD – Short-Term Debt

AR – Accounts Receivable

I&PE – Inventories and Prepaid Expenses

FA – Fixed Assets  
 CA – Current Assets  
 CL – Current Liabilities

In [2], we can see normative model for assessing the financial status of the enterprise for the liquidity indicators' set includes eight indicators, and is as follows:

Table 1 – Normative Model for Assessing the Financial Status of the Enterprise for the Liquidity Indicators' Set

Indicators	C&CE	WC	ShTD	AR	I&PE	FA	CA	CL	Amount
C&CE	0	1	1	0	1	1	1	1	6
WC	-1	0	1	0	1	1	1	1	6
ShTD	-1	-1	0	-1	0	0	0	1	4
AR	0	0	1	0	0	0	0	1	2
I&PE	-1	-1	0	0	0	0	0	0	2
FA	-1	-1	0	0	0	0	0	1	3
CA	-1	-1	0	0	0	0	0	1	3
CL	-1	-1	-1	-1	0	-1	-1	0	6
									32

**3. Calculation of Estimates of Financial and Economic Sustainability in the Example of the Enterprise and their Interpretation.** The knowledge base in this study was taken from data on JSC «MangistauMunaiGas», one of the largest oil and gas enterprises in Kazakhstan.

At present JSC MangistauMunaiGas is one of the largest oil and gas companies of Kazakhstan and provides more than 8% of production in the country. MangistauMunaiGas today is developing 15 oil and gas fields with general initial 969 million tons (6.783 billion barrels). The main industrial development fields are Kalamkas and Zhetybai. Today, the annual oil output of over 5 million tons (35 million barrels).

In Table 2, calculated the actual growth rates based on the consolidated financial statements of MangistauMunaiGas.

Table 2 – The Growth Rate of Financial and Economic Indicators in the Basic and Reporting Periods

Indicators	2007 (in USD)	2008 (in USD)	2009 (in USD)	2010 (in USD)	Rate 2008	Rate 2009	Rate 2010
C&CE	177411,2	81748,26	109758,7	309247,9	0,4523	1,6462	2,8146
WC	913448,7	-382750	77538,41	338506	-0,4113	1,2484	4,3612
ShTD	333788,4	267336,4	51760,43	59635,2	0,7862	0,2373	1,1509
AR	1847112	285150,7	248558,8	308440,5	0,1515	1,0687	1,2396
I&PE	170577,9	161783,3	60856,52	76367,06	0,9310	0,4612	1,2535
FA	2307214	1323801	1137355	1192390	0,5632	1,0534	1,0473
CA	2309316	793070	736544,8	845568,4	0,3371	1,1387	1,1468
CL	754395	973843,2	301753,4	268654,8	1,2671	0,3799	0,8894

Source: The Consolidated Financial Statements of JSC «MangistauMunaiGas» for 2008, 2009 and 2010 years.

On the basis of the consolidated financial statements is created a matrix of actual growth rates of liquidity and solvency indicators (tables 3, 4 and 5).

Matrix matches the actual relations with the normative model for the three periods under consideration are: 4 for the base and by 30 for the first and second reporting periods.

Consequently, generalized evaluation of financial and economic condition of the company on liquidity and solvency, which characterize the degree of approximation of the actual matrix to normative, is:

– for the base period  $S^B = 0,13$

– for the first and second reporting periods  $S^{R1,2} = 0,94$

Table 3 – Matrix of Actual Growth Rates for the Base Period

Indicators	C&CE	WC	ShTD	AR	I&PE	FA	CA	CL
C&CE	0	1	-1	0	-1	-1	1	-1
WC	-1	0	-1	0	-1	-1	-1	-1
ShTD	1	1	0	1	0	0	0	-1
AR	0	0	-1	0	0	0	0	-1
I&PE	1	1	0	0	0	0	0	0
FA	1	1	0	0	0	0	0	-1
CA	-1	1	0	0	0	0	0	-1
CL	1	1	1	1	0	1	1	0

Table 4 – Matrix of Actual Growth Rates for the First Reporting Period

Indicators	C&CE	WC	ShTD	AR	I&PE	FA	CA	CL
C&CE	0	1	1	0	1	1	1	1
WC	-1	0	1	0	1	1	1	1
ShTD	-1	-1	0	-1	0	0	0	-1
AR	0	0	1	0	0	0	0	1
I&PE	-1	-1	0	0	0	0	0	0
FA	-1	-1	0	0	0	0	0	1
CA	-1	-1	0	0	0	0	0	1
CL	-1	-1	1	-1	0	-1	-1	0

Table 5 – Matrix of Actual Growth Rates for the Second Reporting Period

Indicators	C&CE	WC	ShTD	AR	I&PE	FA	CA	CL
C&CE	0	-1	1	0	1	1	1	1
WC	1	0	1	0	1	1	1	1
ShTD	-1	-1	0	-1	0	0	0	1
AR	0	0	1	0	0	0	0	1
I&PE	-1	-1	0	0	0	0	0	0
FA	-1	-1	0	0	0	0	0	1
CA	-1	-1	0	0	0	0	0	1
CL	-1	-1	-1	-1	0	-1	-1	0

In order to determine which indicators in the reporting period had a positive or negative impact on the evaluation of a generalized economic and financial status, a factor analysis has been conducted.

Table 6 – Factor Analysis of Financial Sustainability Evaluation for Liquidity and Solvency in the First Reporting Period

Indicators	№	Matches		Deviations	Impact on			
		2008	2009	2009	Increase of sustainability		Importance of sustainability	
					Absolute	%	Absolute	%
C&CE	1	2	6	0	0,1250	13,3	0,0000	0,0
WC	2	1	6	0	0,1563	16,7	0,0000	0,0
ShTD	3	0	3	1	0,0938	10	0,0313	50,0
AR	4	0	2	0	0,0625	6,6	0,0000	0,0
I&PE	5	0	2	0	0,0625	6,6	0,0000	0,0
FA	6	0	3	0	0,0938	10	0,0000	0,0
CA	7	1	3	0	0,0625	6,6	0,0000	0,0
CL	8	0	5	1	0,1563	16,7	0,0313	50,0
Total		4	30	4	0,8125	86,7	0,125	100

Table 7 – Factor Analysis of Financial Sustainability Evaluation for Liquidity and Solvency in the Second Reporting Period

Indicators	№	Matches		Deviations	Impact on			
		2009	2010	2010	Increase of sustainability		Importance of sustainability	
					Absolute	%	Absolute	%
C&CE	1	6	5	1	-0,0313	-3,3	0,0313	25,0
WC	2	6	5	1	-0,0313	-3,3	0,0313	25,0
ShTD	3	3	4	0	0,0313	3,3	0,0313	25,0
AR	4	2	2	0	0,0000	0	0,0000	0,0
I&PE	5	2	2	0	0,0000	0	0,0000	0,0
FA	6	3	3	0	0,0000	0	0,0000	0,0
CA	7	3	3	0	0,0000	0	0,0000	0,0
CL	8	5	6	0	0,0313	3,3	0,0313	25,0
Total		30	30	2	0,0	0,0	0,125	100

**4. Recommendations for Improving the Economic and Financial Sustainability of the Enterprise.** In 2008, a sharp decline in the indicators of the enterprise. One reason is the reduction of fixed assets related to asset retirement obligations and impairment of fixed assets. Volumes of 2007 to early 2011 are not met.

In general, for the period 2009–2010 the dynamics of all the indicators has improved, which impact on the overall evaluation of the liquidity and solvency was 0.81. In the first period there is a significant approach to the regulatory model for all indicators of liquidity and solvency. The dynamics of growth rates for 2008–2010 increased from 0.13 to 0.94. Overall evaluation of the liquidity and solvency for 2009–2010 was 0.94, which is high.

During the second reporting period there has been some reduction in short-term liabilities, associated primarily with a reduction in the amount of taxes payable, which in 2010 decreased by 9 times, as well as an increase in short-term payable growth rates. At the same time Table 2 shows the company has sufficient working capital and own funds, which also indicate that the company did not fully use its financial strength and raises doubts about the advisability of borrowing.

In 2010 C&CE and WC indicators growth rates relations did not match to standard. In order to satisfy regulatory indicators of the enterprise matrix is necessary to:

- Increase C&CE by 55%;
- Reduce WC by 35.5%, by reducing accounts receivable.

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#### Резюме

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#### МҰНАЙ ЖӘНЕ ГАЗ КӘСІПОРЫНДАРЫНЫҢ ӨТЕМПАЗДЫҒЫН ЖӘНЕ БОРЫШ ТӨЛЕЙ АЛУШЫЛЫҒЫН БАСҚАРУ

Коэффициенттер әдісі – кәсіпорынның қаржылық жағдайын бағалаудағы ең кең тараған классикалық әдістердің бірі. Осы мақала кәсіпорынның қаржылық және экономикалық тұрақтылығын оның өтемпаздығы және борыш төлей алушылығы тұрғысынан бағалауға арналған. Бұл бағалау жаңа динамикалық нормативті үлгіні қолданатын әдіспен жүзеге асырылған. Динамикалық нормативті үлгі дегеніміз қандай да болсын уақыттардағы қаржылық және экономикалық көрсеткіштер өсуінің қарқындарын қос салыстырулардың матрицасы болып табылады. Осы әдістің мақсаты – үлгілеу негізінде кәсіпорындардың өтемпаздығын және борыш төлей алушылығын басқару.

**Тірек сөздер:** кәсіпорынның қаржылық және экономикалық жағдайы, нормативті модель, өтемпаздық және борыш төлей алушылық көрсеткіштері.

## **Резюме**

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### **УПРАВЛЕНИЕ ЛИКВИДНОСТЬЮ И ПЛАТЕЖЕСПОСОБНОСТЬЮ НЕФТЕГАЗОВЫХ ПРЕДПРИЯТИЙ**

Один из самых популярных классических методов оценки финансового состояния предприятия является метод коэффициентов. Данная статья посвящена оценке финансово-экономической устойчивости предприятий с точки зрения их платежеспособности и ликвидности. Оценка осуществляется на основе нового метода, использующего динамическую нормативную модель. Динамической нормативной моделью является матрица парных сравнений темпов роста соотношения финансовых и экономических показателей за определенные периоды. Целью использования описанного способа является управление ликвидностью и платежеспособностью предприятий на основе моделирования.

**Ключевые слова:** финансовое и экономическое состояние предприятия, нормативная модель, показатели ликвидности и платежеспособности.

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