

Risk management issues in a company

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Abstract

In the energy sector, the most significant risk is price risk. Everyone knows that the price of oil is determined by the free market, which can be whether fast growing or rapidly falling. In recent years, oil prices have behaved ambiguously, showing that the facts support the changes in oil prices. Risk management of changes in the price of oil requires special attention to companies whose main source of income is the production and export of crude oil. The main income of these companies accounted for revenue derived from oil export sales.. In this situation, the calculation of potential losses from the sale of exported crude oil is a must, and should clearly distinguish between the roles, functions and levels of responsibility in risk management of all participants in the system of company risk management.

JEL classification numbers: G32

Keywords: Corporate Risk Management, Value-at-risk, Back-testing, System of risk management roles, Functions and levels of responsibility in risk management.

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1 Introduction

Factors contributing to increasing the role of risk management were due to the globalization of financial markets, increased international competition, increasing market volatility and an increase in the intensity of the defaults. The important role played by the efforts of regulators to maintain system security, originally developed in 1988. The Basel Committee agreement on capital adequacy for banks [1] refers to the engagement in international operations. In 1996 there was an important addendum regarding market risk, in 2006 and because of this there is a new add-on management of credit and operational risk management, supervision and market discipline. As a result, such standards of the industry as Value-at-Risk (VaR) or Risk Adjusted Return on Capital (RAROC) have been developed.

Accumulated methodological basis for determination of VaR and RAROC is very broad. Most empirical studies have been based on the calculation of the value VaR, focused on market risk in the stock market and the forex market. In contrast, relatively few researchers have attempted to measure the market risk for commodity market.

Recent works on the evaluation of VaR in the commodities market include work of Cabedo, Moya (2003) [4] and Giot, Laurent (2003a) [2]. Cabedo and Moya (2003) [4] used the approach HSAF to estimate VaR based on the daily spot price of oil brand Brent, from 1992 to 1998, and conducted several tests on the forecast 1999.

The influence of jumps in prices for asymmetric information of VaR performance, perform VaR, Chiu (2005) [3] determined GARJI, ARJI and asymmetric GARCH models to analyze the accuracy and efficiency of the stock index and exchange rate on the high and low confidence levels.

Such activities are actively engaged in research quantities by VaR Russian scientists such as Peresetskii AA (1999), [5], A.A. Lobanov, A. Chugunov [6], S.N. Smirnov, A.Y. Nagpal, P.P. Neumann (1998) [7] and others. Along with Russian scientists, risk management in Kazakhstan developed by following scholars: A. Zharkynbaeva [8], and B.Z. Zhuzbaeva [9], R. Reva [10] B. Lysak [11], E.S. Masalin [12].

In our study, the calculation of VaR is based on the method of variation-covariation (the hypothesis of multivariate normal distribution), followed by verification of the model calculation of VaR by historical data (back testing), which allows us to establish the adequacy of the model estimates of market risk in the form of VaR figure the real market conditions.

2 Risk Management in Kazakhstan Companies

In the modern history the 20th century with a high degree of confidence can be called the era of oil and gas. Minerals are an essential element of economic growth and human development. Also high is the political role of the considered resources,

control of production, processing and distribution is a key element of foreign policy.

In the energy sector, the most significant risk is price risk. Everyone knows that the price of oil determines the free market, which can be as fast growing as rapidly falling. In recent years, oil prices have behaved ambiguously, showing that the facts support the changes in oil prices. We emphasize that the volatility of prices for crude oil Brent in 2011 amounted to 25.85% (historical volatility), which is quite an unstable phenomenon.

In this connection, the management of exposure to risk management of changes in the price of oil requires special attention to companies whose main source of income is the production and export of crude oil. One such company is JSC "KazMunayGas Exploration Production" (hereinafter – KMG EP), which occupies a leading position on the nationwide scale.

According to the annual audited consolidated financial statements for the KMG EP for 2011 the basic data, necessary for calculation of parameters for this article provided in the table below:

Table 1: Data audited consolidated financial statements for KMG EP 2011 [13]

Name of indicator	The value of the indicator
Volume of production of export of crude oil, tons	5 758 008
The volume of crude oil to supply the domestic market of RK (hereinafter – Republic of Kazakhstan), in tons	1 812 156
Income in thousands of Tenge.	721 194 169
- from the sale of the export of crude oil – thousands of Tenge.	655 594 910
- from the sale of crude oil in the domestic market of RK, thousands of Tenge.	65 599 259
Balance sheet, thousands of Tenge.	1 541 033 325
Equity, thousands of Tenge.	1 298 679 169
Obligations, thousands of Tenge.	242 354 156

As can be seen from the data given in Table 1, the main income of KMG EP accounts for revenue received from the sale of oil exports, is accounting to 91% of total revenue. The price of crude oil is determined by the market, in contrast to the cost of oil destined for sale on the domestic market of RK. Prices of crude oil on the domestic market are determined by agreement with the parent company - JSC National Company "KazMunayGas".

In this situation, the calculation of potential losses from the sale of crude oil exported by KMG EP in 2012 is a must. This should take into account changes in exchange rate of USDKZT. To calculate the problem we assume that the value of crude oil sold is a constant, i.e. it is assumed that in 2012 the volume of crude oil will be sold unchanged from the 2011 year. Also, assume that any change in the price of oil and exchange rates USDKZT have only a negative impact on the income of KMG EP.

3 Performing Calculations

To solve this problem we apply the method of VaR [6]. In the model of VaR calculation assumes an assumption about the proximity to the normal distribution of random variables characterizing the intensity of changes in the price of oil / exchange rate of USDKZT (logarithms of the rate of change in the price of oil / exchange rate of USDKZT) and applies the tools of mathematical statistics to estimate the potential losses by calculating the relevant parameters.

The main features of the model include: calculation of the period equal to the depth of 250 measurements (250 working days, or about twelve months of the date of calculation), the time horizon of 1st working day and the confidence level of probability equal to 95%.

The calculation is based on daily data of changes in the price of oil denominated in the U.S. dollars a barrel of oil, as well as changes in exchange rate of USDKZT. From the data on the dynamics in the price of oil / exchange rate of USDKZT exclude all incorrect measurements (measured at the date of which there is no information of any data, such as holidays). Then, all measurements should be numbered in succession, starting from zero ($t = 0, 1, 2, 3, \dots, T$), the total number of measurements is equal to $T + 1$ for each i -th value of oil / USDKZT exchange rate of the total number n of the cost of oil / exchange rate of USDKZT.

Further, based on daily data on oil prices / exchange rate USDKZT the natural logarithms are calculated on the daily changes in the following formula [14]:

$$x_t^i = \ln \left(\frac{price_t^i}{price_{t-1}^i} \right), t = 1, 2 \dots T; i = 1, 2 \dots n \quad (1)$$

where: x_t^i - logarithm of the rate of i -th instrument at the time of measurement t ;

$price_t$ - price of the i -th instrument in the measurement of t ;

$price_{t-1}^i$ - price of the i -th instrument in the measurement of $t - 1$;

$\ln(\)$ - function symbol of the natural logarithm.

Further, based on natural logarithms of daily changes in the price of oil / exchange

rate USDKZT the covariance matrix is calculated using the following formula [14]:

$$C_{ij} = \frac{1}{T} \sum_{t=1}^T \left(x^i_t - \frac{\sum_{t=1}^T x^i_t}{T} \right) \times \left(x^j_t - \frac{\sum_{t=1}^T x^j_t}{T} \right), i = 1, 2, \dots, n, j = 1, 2, \dots, n \quad (2)$$

where: C_{ij} - covariance; x^i и x^j - natural logarithms of daily changes in the price of oil / exchange rate.

The volatility of the i -th value of oil / USDKZT exchange rate calculated by the formula [14]:

$$\sigma_i = \sqrt{C_{ii}}, i = 1, 2, \dots, n \quad (3)$$

Further, based on the calculated covariance matrix of the correlation matrix using the following formula is calculated:

$$K_{ij} = \frac{C_{ij}}{\sigma_i \times \sigma_j}, i = 1, 2, \dots, n, j = 1, 2, \dots, n \quad (4)$$

where: C_{ij} - covariance; $\sigma_i \times \sigma_j$ - volatility.

Further using the obtained values VaR estimates of possible losses for a time with a confidence level of 95% are calculated on sales of oil exports in the i-tool using the following formula [14]:

$$VaR_i = 1.645 \times \sigma_i \times V_i, i = 1, 2, \dots, n \quad (5)$$

where: 1.645 – coefficient corresponding to 95% level of confidence; V_i - volume of exported crude oil.

Using the above algorithm, we find that between oil prices and exchange rates in USDKZT a small link in 11% was traced. In this particular one-day potential loss of KMG EP about the risk of changes in oil prices is likely to reach 95% of 177 million Tenge. And the risk of exchange rate changes USDKZT - 11 mln.tg.

Taking into account both the risk factor, we find that the total one-day potential loss (diversified VAR) could reach 176 mil. tg. or 0.01% of the equity capital of KMG EP.

In this case, the results on an annualized basis are as follows:

- possible loss in 2012, KMG EP about the risk of changes in oil prices is likely to reach 95% of 2.8 billion Tenge.

- The risk of exchange rate changes USDKZT - 176 million Tenge.
- simultaneous consideration of both types of risk shows that the total potential loss (diversified VAR) of KMG EP in 2012 with a share of 95% could reach 2.78 billion Tenge, or 0.23% of the equity capital of KMG EP.

In order to calculate the fair and correct data, you need to back test VAR [1, 14], to determine the adjustment factors, as well as to adjust the calculated results of VAR (potential loss of KMG EP in 2012). The back testing is based on daily changes in oil prices / rates USDKZT, using the correct value of the projected oil prices / exchange rates USDKZT, calculated with 95% probability.

Carrying out the back testing and determining adjustment factors, we obtained the following result:

- correction factor of the price of Brent crude oil = 1,15;
- correction factor rates USDKZT = 1,33;
- one-day potential loss of KMG EP with probability 95% the risk of changes in the price of oil is 203 million Tenge;
- one-day potential loss of KMG EP with probability 95% the risk of exchange rate changes in USDKZT could reach 15 million Tenge;
- one-day diversified potential loss of KMG EP with probability 95% of the risk of changes in oil prices and exchange rates in USDKZT could reach 202 million Tenge, Representing 0.02% of the equity capital of KMG EP;
- The annual potential loss of KMG EP with probability 95% the risk of changes in oil prices could reach 3.2 billion Tenge;
- The annual potential loss of KMG EP with probability 95% the risk of exchange rate changes in USDKZT could reach 234 billion Tenge.

4 Summary

Thus, the potential loss of annual diversified KMG with a share of 95% relative risk of changes in oil prices and exchange rates in USDKZT could reach 3.19 billion Tenge. That almost amounts to 0.25% of the equity capital of KMG EP.

We would like to also point out that are 4 ways to minimize risks:

- Reduce (or probability of harm);
- Transfer of risks;
- Avoiding risks;
- Risk-taking.[15]

For the case under consideration by KMG EP the most appropriate way to minimize the risks with respect to changes in oil prices is a method of risk transfer, in particular the use of hedging techniques. In order to insure the size of potential losses KZT.blm 3.19, by KMG EP they would be required on the amount of hedging 208.5 thousand barrels of oil (calculation was made on the price of oil equal to the average oil price for 2011. [15]) It is also necessary to consider that a decision on further action to minimize risks to be made by the Board of Directors. If the Board of Directors of KMG EP considers that the size of the loss for the

company is not essential, in this case, KMG will choose the method of taking risks. Methods of reducing (or the probability of damage) and avoiding the risks less suitable for use in this case, KMG, as the price of oil is determined by the global free market.

5 Recommendations for Risk Management through the Distribution of Roles, Functions and Levels of Responsibility

Meanwhile, the above-mentioned risks are not the only ones that come into contact in the company. In the company there are many events and factors influencing its activity. Knowledge of the potential losses on the major risks faced by the company, as well as timely monitoring and control parameters has the advantage of possible losses in the company's management in a timely response to the risk assessment of the significant risks and building the company's strategy to achieve goals.

To achieve the strategic objectives of the company- the management has made certain decisions and actions. In each unit of time is likely not achieving the goal. This is most likely not achieving the goal, we understand the risk. The generally accepted definition of risk is as follows: the risk - the possibility of occurrence of adverse events, which would adversely affect our ability to successfully achieve their strategic and operational goals.

Never before has the issue of risk management was not as relevant as after the onset of the global financial crisis, which resulted in significant changes in various aspects of virtually all sectors of the economy. The crisis has clearly outlined the severity of the problem of risk management in particular in countries with relatively young market economies. According to some studies, the least affected by the crisis, the companies that are already more than ten years, the task of collecting, processing and analyzing data, and also engaged in risk assessment. These companies viewed risk management as a key strategic principle and a source of competitive advantage, long before the tipping point. Unfortunately, those who adhered to the reaction point of view on risk management today are not reaping the best fruits.

Responsible for the process of organizing, as well as for the proper functioning of the corporate risk management system in the company is the risk manager, or a structural unit whose responsibilities include the management of risks.

Given the above-mentioned circumstances, we believe that our success is a clear division of roles and responsibilities in risk management, distribution of functions responsible for risk management, as well as the construction of a corporate risk management system. The formation of the latter, i.e. management organization and control over its activity is crucial, because its elements are the shareholders, the Board of Directors, CEO and management (tasks, interests and powers are different - investment, responsibility, accountability). For the purpose of

Corporate Governance (hereinafter - CC) is to ensure responsible management and control of the organization.

An effective risk management system is a necessary part of effective corporate governance. Typically, risk management is a way of influencing the risk of leading to a change in the characteristics of risk (change in the probability or consequences of changes in the onset). [15]

Hence, within the organization we consider a legitimate representation of the following recommendations for the management of risk, taking into account the fact that:

- Risk management is a complex process characterized by the continuity inherent in the normal course of managing the organization, permeates the entire organization. It is used when choosing a strategy at all levels of decision-making and in all units in compliance with a comprehensive approach to risk. The Board of Directors and staff at every level, and is designed to identify potential events that affect the organization's activities within the organization to the risk of propensity, and provides reasonable assurance to the Board and management of the organization in meeting the goals and objectives of the organization.
- Risk management - a set of elements (strategy, processes, methodology, organizational structure, responsibilities and powers of IT technology, etc.) to achieve the objectives of risk management [15]. The purpose of the same risk management is to achieve a reasonable confidence in management, leadership, and the company's shareholders in achieving the objectives of the company. Reasonable assurance [15] is a concept that implies that the risk management process in an organization cannot provide a guarantee of achieving the objectives of the organization, as management of risk inherent limitations (the influence of the external environment, changes in legislation, etc.). Reasonable certainty implies a low probability of adverse events (risk).

Hence it is advisable for the company to use the following phased introduction of a scheme of corporate risk management system:

- Step 1: you must install the holding company's ability to develop a risk register and risk map, highlight a list of critical risks, and draw up an action plan to manage the critical risks to determine the levels of responsibility and develop rules, procedures, risk management.
- The 2 step is to approve the organizational structure, roles and responsibilities of risk management that meets the above requirements.
- The 3 step is to conduct training of all personnel of the organization for a common understanding by all personnel management system concept of risk management, their role in the overall system of risk management. And so it is necessary to systematically organize vocational and advanced training of risk managers, the company's management to continuously improve the management system of risk management.
- The 4 step is to ensure that the evaluation of the effectiveness of risk

management system for the continuous improvement of the management of risk management.

- Stage 5 involves preparation, review reports, and monitoring: the most important risks to the effectiveness of risk management.

For effective risk management of differentiated distribution functions can be represented as follows:

For the Board of Directors, playing a key role in overseeing the corporate risk management system and risk management of the company, the object of attention should be:

- setting goals (short and long term) of the Company;
- approval of the Concept;
- approval of Risk Management Policy of the Company;
- adoption of the rules and procedures for risk management of the Company;
- approval of levels of responsibility to monitor and control risks of the Company;
- analysis of external audit to improve internal control and risk management and results of audits conducted by the Internal Audit;
- monitoring risk management by obtaining statements established by the Board;
- review of reports on major risks;
- review of reports on the effectiveness of risk management;
- definition of forms and deadlines for the submission to the Board financial and management reporting, providing an opportunity to analyze and evaluate financial performance;
- determine the level of retention and appetite of the company to risk;
- monitoring activities through committees under the Board of Directors.

For the Management, responsible for organizing an effective system of risk management and establish a framework of risk control to ensure compliance and adherence to corporate policies are important:

- concepts and implementation of Risk Management Policy of the company;
- organization of effective risk management system helps identify and assess potential risks;
- provision of the Board of Directors and sole shareholder of the Company reports in accordance with the approved regulatory documents;
- ensuring compliance with the provisions of this Policy, the structural units of the company;
- approval of the organizational structure of the company that meets the needs and providing adequate control and risk reduction;
- review of reports on risk management in the group of the company and the adoption of appropriate measures within its competence;
- approval of response activities and techniques for risk management in the Company and certain events in the group of companies under regulations approved by the Board of Directors;

- improvement of internal procedures and regulations in the field of risk management.

For the structural unit of the company, in the responsibilities of which include questions on risk management needs:

- coordination of risk management in the company;
- identification of possible cases of risk, real or potential, negative trends, indicating the strengthening of risk analysis of factors underlying the risk assessment of the scope and expected loss;
- development and improvement of regulatory and methodological framework of risk management of the company;
- analysis of the effectiveness of risk management systems of the company;
- organization statistical database by type of risk used for the analysis and risk assessment;
- development of recommendations based on risk analysis;
- organization of control over the observance of the established limits;
- providing methodological and educational organizations with business units within the group of the company;
- preparation of summary reports on risk management in the Fund and the Group Company as a whole;
- identification, evaluation, measurement and monitoring of risks in accordance with those the developed and approved by the Board of Directors and Board policies, practices and procedures;
- the provision of the Board of the company reporting on risks, set internal regulations;
- implementation of stress - and back - testing;
- monitoring compliance with both the internal and external regulatory requirements in terms of risk management;
- to find ways to prevent the risk or the sources of his compensation;
- make recommendations based on risk analysis;
- participate in the consideration of the Company policies and procedures and develop recommendations for change in order to strengthen the management and risk control of the company;
- development of ways to motivate employees, contributing to the identification of factors (causes) of risk, as well as other functions corresponding to the specific activity of the company.

For the internal audit service with respect to corporate risk management and risk management of the company and the following should be carried out:

- Audit of risk management procedures and methodologies for risk assessment and the development of proposals to improve the effectiveness of risk management procedures;
- reporting on risk management for the Board of Directors of the Fund;
- other functions in accordance with the approved regulations.

For departments that play a key role in the process of risk management, whose responsibilities include the organization of the system of risk management which is important:

- identification of risks on a regular basis;
- participate in the development of methodical and regulatory documents within their competence;
- approving the implementation of measures to respond to risks;
- Contributing to the development of risk - Communications.

In addition it is necessary on a regular to provide the company's management reporting system of risk management with an indication of management recommendations of the most important and dangerous risks.

Thus, a clear distinction of roles, functions and levels of responsibility in risk management of all participants in the system of risk management of the company, their deep knowledge and understanding of the role of risk management system enables the company to optimize and efficiently manage, control risk and achieve strategic goals.

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