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Study on a risk-reduced production planning

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The price of oil, the spot price of DRAM, etc. are carried by Nihon Keizai Shimbun. That is because those prices change every day and affect the both sides of a producer and a buyer. A report of the effective technique about the production planning corresponding to the risk of such price change is not heard.

A company is always next to a risk, is performing management activities, and can say that reduction of a risk is an eternal subject. As a plan of risk reduction, a risk policy in Germany of the 1920s and the insurance management in the United States of the 1930s are raised, and these are the roots of present-day risk management. In risk management, it is an important point how the risk is managed rationally and scientifically. Therefore, it can be said that risk management which can perform suitable business management is a strategy aiming at the company continuation.

The technique of risk management is developed in the world of finance. This research applies and examines the engineering-for-financial-analysis-technique to the production planning of the product accompanied by the risk of price change. Application of the option pricing theory and the value at risk (henceforth, VaR) the engineering-for-financial-analysis-technique is tried, and it aims at considering the possibility and the limit as a risk reduction system.

The non-arbitrage price of an option is drawn by option pricing theory in the world of finance. A non-arbitrage price is the center of derivation valuation of assets, and is used as a benchmark. In this research, the framework of the option pricing theory in finance is applied to a production planning. Matching with finance and a production planning is performed and it is shown that option pricing theory is applicable to a production plan. Then The non-arbitrage price of the option in a production planning is clarified, and it describes what it means.

It is supposed that the J. P. Morgan bank of U.S. major banks introduced VaR first as a management index. VaR is born by the needs of wanting to see in list the maximum amount of a loss which may happen within 24 hours over the whole world and all the commodity, and is used as the calculation technique of the amount of a loss. In this research, VaR is applied to a production planning and the spot price of DRAM is taken up as a concrete example. VaR of a DRAM spot price is computed using the historical data actually observed in the market, and comparison with an actual value is performed. From the result, the risk reduction system in a production planning is considered.