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An Overview of the Commodity Risk Management to the Business Process

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Abstract—

Commodity risk is the risk that a business's financial performance or position will be adversely affected by fluctuations in the prices of commodities. Producers of commodities are primarily exposed to price falls, which mean they will receive less revenue for the commodities they produce. Commodity risk refers to the uncertainty about the expected value of profit raised from purchase and sale of commodities. Consumers of commodities, such as airlines, transport companies, clothing manufacturers and food manufacturers, are primarily exposed to rising prices, which will increase the cost of the commodities they purchase. In this paper the study of commodity risk management to the business process is presented.

Keywords—Commodity trading, Hard commodity, Risk factors, Hedging risk, Risk-neutral valuation.

I. INTRODUCTION

Risk Management is the process with the objective of ensuring effective Group-wide implementation and management of risk management processes regarding all risks that affect the economic and financial performance of the Group and its supplementary, as well as their assets. The process includes,

- ✓ Define and implement Group-wide risk management governance.
- ✓ Define Group-wide methods for the identification and measurement of risks.
- ✓ Implement a risk control system.
- ✓ Transfer unmanageable risk to the insurance market.
- ✓ Define a risk mitigation strategy.
- ✓ Monitor risk.

This approach is based on a single risk management model that guarantees each component, complement the other while ensuring the unity of the whole. Awareness of risk has been brought to the Group by the integration of the guide lines into the operations of all its subordinate companies.

II. COMMODITY RISK MANAGEMENT (CRM)

Commodity risk is the risk that a business's financial performance or position will be adversely affected by fluctuations in the prices of commodities. Producers of commodities, for example in the minerals (gold, coal etc.), agricultural (wheat, cotton, sugar etc.) and energy sectors (oil, gas and electricity), are primarily exposed to price falls, which mean they will receive less revenue for the commodities they produce. Commodity risk refers to the uncertainty about the expected value of profit raised from purchase and sale of commodities [1]. Consumers of commodities, such as airlines, transport companies, clothing manufacturers and food manufacturers, are primarily exposed to rising prices, which will increase the cost of the commodities they purchase[2][3].

Commodity risks include:

Price risk - Price risk mainly due to Price volatility caused by directional moves and correlation changes [4].

Volume risks - related to changes in expected power production and demand shifts or discrepancies between Generation/purchase and sales profiles schedules [5].

The main CRM processes are:

- ✓ Identify risk factors – identify the risk factors involved in the system and its components.
- ✓ Prioritize the risk factors, defining the most relevant for the business – list out all the possible risk factors and categorize based on parameter that the effect of the risk over the system components and elaborate the risks that are relevant to the business process [6].
- ✓ Measure the relevant risks – Measure the risk listed above in the business process.
- ✓ Define quantitative limits to risk exposure – Set up the environment extent to the risk over the business and define the quantitative limit to the risk [7].
- ✓ Monitor the evolution of the exposure against the limits
- ✓ Managing the limit trespassing events.

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Commodity Risk exposure is measured with reference to two different types of portfolios:

- ✓ **Industrial books** related to core business activities (fuels and power purchases, power sales, power generation)
- ✓ **Trading books** related to speculative trading activities, carried out to hedge exposures in industrial portfolios and catch opportunities offered by future changes of commodity prices [8][9].

III. CATEGORIES OF THE COMMODITY

Commodities generally fall into three categories:

- ✓ Soft commodities include agriculture products such as wheat, coffee, sugar and fruit.
- ✓ Metals include gold, silver, copper and aluminium.
- ✓ Energy commodities include gas, oil and coal.

A business should consider managing commodity risks where fluctuations in commodity pricing and/or supply may impact on the business's profitability. In an organisation in which the core operations are anything other than financial services, such risk should be appropriately managed so that the focus of the organisation is on providing the core goods or services without exposing the business to unnecessary risks.

IV. TYPES OF COMMODITY RISK

There are four types of commodity risk to which an organisation may be exposed:

- ✓ Price risk: arises from an adverse movement in the price of a commodity as determined by forces outside the control of the organisation
- ✓ Quantity risk: arises from changes in the availability of commodities
- ✓ Cost (input) risk: arises when adverse movements in the price of commodities impact business costs
- ✓ Political risk: arises from compliance or regulation impacts on price or supply of commodities. Generally, there are three groups that will be exposed to commodity risk:
- ✓ Producers: can include farmers, other agricultural producers and miners. They can be exposed to all of the types of risks noted above.
- ✓ Buyers: can include cooperatives, commercial traders and manufacturers who consume commodities in their production processes. Such organisations can be exposed to commodity risk through the time lag between order and receipt of goods.
- ✓ Exporters: face risk from the time lag between order and receipt from sales, as well as political risk where compliance, regulation or availability can adversely impact sales price.

V. COMMODITY AND FOREIGN EXCHANGE RISK

Generally speaking, most commodities are priced and traded in US dollars (USD), and organisations that are exposed to commodity risk may also carry foreign exchange rate risk. Managing commodity risk in isolation of any exchange rate risk will leave the organisation exposed to adverse movements in the currency in which the commodity is priced and/or traded. This may materially influence the organisation's profitability [10]. Therefore, when undertaking any strategy to manage commodity risk, due consideration should also be given to managing foreign exchange rate risk.

A. *Effects of commodity price fluctuations*

Falling commodity prices can:

- ✓ decrease sales revenue for producers, potentially decreasing the value of the organisation, and/or lead to change in business strategy
- ✓ reduce or eliminate the viability of production — mining and primary producers may alter production levels in response to lower prices
- ✓ decrease input costs for businesses consuming such commodities, thus potentially increasing profitability, which in turn can lead to an increase in value of the business.
- ✓ Rising commodity prices can:
- ✓ Increase in sales revenue for producers if demand is not impacted by the price increase. This in turn can lead to an increase in the value of the business.
- ✓ Increase competition as producers increase supply to benefit from price increases and/or new entrants seek to take advantage of higher prices
- ✓ reduce profitability for businesses consuming such commodities (if the business is unable to pass on the cost increases in full), potentially reducing the value of the organisation.

B. *Methods to measure commodity risk*

Nature of commodity risk for an organisation means that measurement of this risk requires a structured approach across all operational business units. Given the types of commodity risk, many organisations will not only be exposed to a core commodity, but may possibility have additional exposures within the business. For example, a commodity producer such as a gold mining company is obviously exposed to movements in the gold price; however, it is likely high consumption of fuel can also impact on profitability and cash flow.

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When measuring commodity risk, it is important to identify all the key risks to the organisation. If this procedure is not undertaken accurately, the management of the commodity risk can in fact create additional risk. This is particularly relevant where the commodity price is managed in isolation of foreign exchange rate risk. Measuring commodity risk requires analysis of the potential exposure and an understanding of how changes in commodity prices affect both financial and operational drivers of the organisation. This guide provides some examples of measuring commodity risk.

C. Sensitivity analysis

One of the simplest measures is to undertake sensitivity analysis to measure the potential impact on the organisation of an adverse movement in commodity prices. This may be done by choosing arbitrary movements in commodity prices or by basing commodity price movements on past history. For example, the organisation may wish to know how much it will gain or lose in the event of a given change in commodity prices. Where commodities are priced in foreign currency, organisations sometimes develop a matrix showing the combined result of currency and commodity price movements. For example, wheat prices are based on USD. When measuring the exposure to movements in wheat prices, an Australian wheat farmer will need to look at both the USD price for wheat and also the AUD/USD exchange rate variations to measure the different scenarios in both exchange rate and wheat price.

D. Portfolio approach

The portfolio approach encompasses the sources of commodity risk to the organisation and allows for a more detailed analysis of the potential impact on financial and operational activities. For example, organisations that are exposed to fuel pricing may do scenario testing on the adverse movement in fuel price, but they will also include in the measurement of risk the potential impact of limited fuel availability, changes in political policies, and/or the impact on operational activities by any one or combination of these variables. Just as an organisation assesses the effectiveness of advertising on sales, analysis of commodity price movements can be modeled across various operational activities within the organisation, such as sales, margins and costs. The portfolio approach should be undertaken, utilising stress testing for each variable and combination of variables.

E. Value at Risk

Some organisations, particularly financial institutions, use a probability approach when undertaking sensitivity analysis known as 'Value at Risk'. While it is useful to know the potential impact of a given change in commodity price, the question will arise: what is the probability of this event occurring? Accordingly, sensitivity analysis can be conducted using past price history and applying it to current exposure. The organisation can then say that, given its current exposure and based on commodity prices observed over the past two years, and given a quantified movement in commodity prices, it can be 99 per cent confident that it will not experience a loss of more than a particular amount. In effect, the organisation has used actual price history to model the potential impact of commodity price movements on its exposures.

VI. CONCLUSIONS

Commodity risk is the risk that a business's financial performance or position will be adversely affected by fluctuations in the prices of commodities. Producers of commodities are primarily exposed to price falls, which mean they will receive less revenue for the commodities they produce. Commodity risk refers to the uncertainty about the expected value of profit raised from purchase and sale of commodities. Consumers of commodities, such as airlines, transport companies, clothing manufacturers and food manufacturers, are primarily exposed to rising prices, which will increase the cost of the commodities they purchase. In this paper the study of commodity risk management to the business process is presented. Commodity Risk Management (CRM), Categories of the Commodity, Types of commodity risk, Commodity and foreign exchange risk are discussed in this paper.

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