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How are Derivative Accounting Applied for Hedging Activities?

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Abstract

The derivative instruments accounting plays an important role in the development of the financial instruments markets, commodity market and in the risk management process. Because, the close relationship between the methods of derivative instruments accounting and the derivative instruments in the financial markets, commodity market for hedging activities. Moreover, they bring the relevance and reliability of Financial statements. Application of derivative instruments accounting is an essential factor for the development of financial market and economy. Currently, Vietnamese accounting is using historical cost methods for the financial assets; the fair value is not applied by the enterprises. How is difference between the historical method and fair value accounting? If the enterprises apply derivative instruments accounting, how will they have benefits? The article analyses and emphasizes usage of the derivative instruments accounting method and fair value of evaluating models to find out benefits to help managers and investors manage the risk.

Keywords: Fair Value, Forward Contracts, Futures Contracts, Derivative Accounting, Financial Statements, Hedging Activities

Introduction

The research process of the economy of the developed countries shows that the role of financial markets has contributed to trade promotion and economic growth of countries, including the stock market and derivative market which are the main factors affecting to investment capital flow and capital transaction. At the same time, they are also agents causing the economic crisis. The use of derivative financial instruments contributes to minimize risk for the economy. In order to effectively use the derivative instruments, the financial instruments accounting is an instrument providing invaluable support for risk management in the business process. Also, the use of derivative instruments minimizes loss at the lowest rate for the economy in general and for the enterprises in particular. For the importance of this issue, some authors have studied the fair value accounting of financial instruments for specific application to their countries' economy.

The fair value of financial instruments will correctly reflect the nature of arising transactions when trading on the derivative market. They have the same opinion that the assessment of

the financial asset or financial liability at the fair value will bring accounting information closely with the volatility of the financial market and ensure accurate and objective value measurements of the financial asset or financial liability as well as to minimize the financial risk for the enterprises. Vietnam financial market, it is under the development and keeps up with the developed countries, but it lacks an important financial instruments accounting for promoting development of this market as well as micro – management and minimizing the financial risk. Application of the international financial instruments accounting for the Vietnamese financial market as well as the developing countries is necessary. Especially, the researched contents are interested in the fair value accounting for the recognition method regarding the financial assets and financial liabilities as trading on the market as well as presenting the financial statements of the enterprises whether it is specific and appropriate with the market development or not. It is also a promoting agent for the financial market growth and brings essential information for micro and macro managers to make future orientation and forecast. We can see the benefits from the application of the fair value accounting method to evaluate the financial assets or financial liabilities. However, the problem is how to determine and evaluate their value so as to bring real value to them. Currently, Vietnamese accounting has not been completely undertaken for application of the fair value accounting method for the financial assets or financial liabilities of the enterprises. This problem needs to be studied about the practicality of the Vietnamese financial market whether it has developed or not and which level it develops to apply derivative instruments accounting for hedging activities. However, each country has independent economic policies that follow the selected orientation of each country; it has morphological characteristics of each country such as culture, geography and literacy. Therefore, the accounting policies also have morphological characteristics of each country and service for the benefits of each nation. Hence, the application of international accounting for each nation is not simply because a general standard is applied for a specific economy, but it will be able to be imposed flexible and suitable application for each economy. This article solves the problems interested by Vietnamese enterprises and financial market as well as countries that have not applied derivative instruments accounting for hedging activities and shows the economic effectiveness of using them.

Application of Derivative Instruments for Hedging Fluctuation of Commodity Price

The definition of a derivative in International Accounting Standard No.39 (IAS 39) includes contracts that are settled gross by delivery of the underlying item (e.g. A forward contract to purchase a fixed rate debt instrument). An entity may have a contract to buy or sell a non-financial item that can be settled net in cash or another financial instrument or by exchanging financial instruments (e.g. A contract to buy or sell a commodity at a fixed price at a future date). Underlying principles of Derivative instruments in IAS 39, which its value changes in response to the change in exchange interest rate, commodity price, foreign exchange rate, financial instrument price, foreign exchange rate, index of prices or rates, credit rating or credit index, or other variable, provided in the case of a non-financial variable that the variable is not specific to a party to the contract (sometimes called the 'underlying'). Besides, the derivative instruments require no initial net investment or an initial net investment that is smaller than would be required for other types of contracts that would be expected to have a similar response to changes in market factors, and it is settled at a future date. The definition of a derivative in International Financial Reporting Standard (IFRS) includes contracts that are settled by delivery of the underlying item (e.g. A forward contract to

purchase a fixed rate debt instrument or future contracts to buy or sell commodity according to clearing etc.). An entity may apply a derivative contract to adjust the commodity price or exchange rate when he buy or sell a non-financial item. It means that it can be settled net in cash or another financial instrument or by exchanging financial instruments (e.g. a forward contract to buy or sell a commodity at a fixed price at a future date or swap contracts to buy or sell foreign exchange at a fixed rate etc.).

There are some major raw materials or scarce goods or necessities, materials, or commodities depending on import and export. Their price will change following the market price. The price fluctuation of commodities or major raw materials could affect the price of raw material input or enterprises' output of production value and it also has a direct impact on the profitability of enterprises. For example, the gasoline is one of the many types of materials with significant price fluctuation. Moreover, the price fluctuation of commodities and basic materials has a huge impact on the business performance of enterprises and the stability of the macro economy. Specific example, the garment industry and textile industry are key economic sectors in Vietnam with annual export sales up to billions of dollars. However, cotton and raw materials for textile industry have a high proportion of production costs, and the enterprise is mainly dependent on imports from foreign markets such as the U.S., India etc. In 2010 - 2011, the price of raw cotton is more expensive than from \$ 1,500/ton to over \$ 3,500/ton, causing difficulties for the textile business. In addition, the price of financial assets is frequently varied in the financial market such as: stock prices are varied daily. The stock price affects major capital investment in the economy through investors. It also affects the economy, macro management, and particularly its direct impact on the economic benefit of enterprises. The fluctuation of stock price makes managers or investors not predict the risk. This brings enterprises and investors potential risk. Therefore, the stock price volatility is a problem interested by investors and businesses. In 2012, many stocks have huge fluctuation in price, over 500 %. Notably, Stock price fluctuation of Sacombank Securities Joint Stock Company (stock code: SBS) is the strongest on the market with up to 812.50 % and after the price fluctuation of Duc Long Gia Lai Group Joint Stock Company (stock code: DLG) is 627.27% etc. (Source of website <http://ndhmoney.vn>). This case, the investors can use option contracts, forward contracts or futures contracts to avoid risk. Normally, the countries use derivative instruments (option contracts, forward contracts, future contracts and Swap contracts) to hedge financial risk.

Method of Determining the Price

The article uses financial mathematical formulas to assess fair value of financial assets and financial liabilities. This fair value is the basis to set up the value of the derivative contracts. From the facts of the volatility of commodity price, the author applies each corresponding derivative contract in recognition and measurement of each commodity. This result is analyzed to find out the effectiveness of derivative contracts and the factors affecting the financial risk. These financial mathematical formulas will be shown below.

Forward Contracts

The forward contracts are applied for big volume of goods transactions (common goods, financial assets, exchange rates etc.) and are determined at a time in the future at a fixed price which is agreed under regulations at the time of contract signing. From date of contract signing to the date of contract maturity that is called contracts period and the contract's payment date is called date of maturity.

For entities, that trade foreign currency or import goods and pay in foreign currency, the forward rate formula is as follows:

- (1)- F is the forward rates
- (2)- r_d : the interest rate of the evaluated currency, i.e. Viet Nam Dong (VND) rates
- (3)- r_y : the interest rate of the basic currency, i.e. United States Dollar (USD) rates.
- (4)- S is the current rates, such as S = USD/VND.

$$F = s \times \frac{(1 + r_d)}{(1 + r_y)} \quad \text{Formula (1)}$$

The formula (1) assesses as follows:

The first case, if the interest rate of the evaluated currency is greater than the interest rate of the quoted currency:

$$r_d > r_y \Rightarrow 1 + r_d > 1 + r_y \Rightarrow \frac{(1 + r_d)}{(1 + r_y)} > 1 \Rightarrow F > s . \text{ It calls as an increase in the forward rate point.}$$

The second case, if the interest rate of the evaluated currency is less than the interest rate of the quoted currency:

$$r_d < r_y \Rightarrow 1 + r_d < 1 + r_y \Rightarrow \frac{(1 + r_d)}{(1 + r_y)} < 1 \Rightarrow F < s . \text{ It calls as a deduction of the forward rate}$$

point.

Combining two cases above we see that the forward rate can be summarized as follows: F = S + forward point, in which the forward point can be positive (+) or negative (-) and is determined based on the current price ratio and interest rate difference between the evaluated currency and the quoted prices. Assuming that the fiscal year is 360 days and the interest rate is percentage per year.

Forward rate of purchase:

$$F_p = s_p + \frac{s_p \times (Lgt(VND) - Lcv(NT)) \times N}{100 \times 360} \quad \text{Formula (2)}$$

Forward rate of sale:

$$F_s = s_s + \frac{s_s \times (Lcv(VND) - Lgt(NT)) \times N}{100 \times 360} \quad \text{Formula (3)}$$

In which:

F_p : forward rate of purchase and s_p is the current rate of purchase,

F_s : forward rate of sale and s_s is the current rate of sale,

$Lgt(VND)$: deposit interest rate and $Lcv(VND)$ is loan interest rate in Viet Nam Dong (VND).

$Lgt(NT)$: deposit interest rate and, $Lcv(NT)$ is the loan interest rate in foreign currency.

N is the number of days of the forward contracts.

In addition, the enterprises can use the concept to evaluate the fair value to adjust the value of financial assets and financial liabilities when using derivative instruments to evaluate effectiveness of contracts by the formula of discounted cash flow. The percentage-discounted rate is evaluated as follows:

$$PV = \sum_{t=1}^n \frac{C_t}{(1 + r)^t} \quad \text{Formula (4)}$$

In which:

PV: Current estimated fair value

T: Time of cash flow

N: Total execution time

r: interest rate

C_t : The net cash flow at time t

Futures Contracts

A futures contract is a standardized contract, goods transactions on the central exchange (broker) that partners can participate to buy or sell a certain commodity (normal commodity or financial assets) at a fixed price and at a fixed date in the future. This date is called the delivery date (the last day). Price is determined at the date of contract signing, it is called the future price while the price of the goods on delivery is called settlement price. Generally, the more gradually to the delivery date, the settlement price will converge towards the future price. The futures contracts have difference with forward contracts as follows:

(1) - Futures contracts: brokers agree the purchase and sale, partners are randomly determined at central exchange. The forward contract is a direct agreement between the two parties of the contract, and the parties define their partners.

(2) - Futures contracts trade on central exchange, the forward contracts are contrary.

(3) - Futures contracts calculate daily at market prices (marking to market). The forward contracts pay at maturity.

(4) - Futures contracts on the goods central exchange and the stock central exchange are defined as follows:

(5) - The future price is determined on the basis of establishing the relationship between the future price and the spot price. Assume that a firm will join in the futures contracts for goods central exchange.

(6) - Loan is S_0 with interest rate (r_f); using this money to buy basis asset.

(7) - F_0 is future price (i.e. at maturity, we must sell the basis asset at F_0 , but at this time there is no exchange of currency or asset). During the time from now to the maturity of futures contracts, the basis assets will make a profit, which is called as D. (For example, if the basis assets are stocks, stock dividend D is paid).

(8) - Value of basis assets based on the market price is S_T .

The last period of cash flow = $[F_0 - S_0 \times (1 + r_f) + D]$. In principle, the firm cannot get profit from the different price lead to the conclusion that at the beginning, the firm gets the asset value equaling to zero VND, the end of the period the firm gets the asset value equaling to 0 VND. That means $[F_0 - S_0 \times (1 + r_f) + D] = 0$

Or $F_0 = S_0 \times (1 + r_f) - D = 0$. Called $d = D$ per S_0 (dividend rate), so $F_0 = S_0 \times (1 + r_f - d)$, the above formula for calculating future price is called cost relationship of financial assets archives that the maturity of futures contracts is T then: $F_0 = S_0 (1 + r_f - d)^T$ formula (5).

The financial assets and financial liabilities are varied following the market price in business process. Thus, application of derivative instruments is necessary. Besides, the value of financial assets and financial liabilities are evaluated and recognized by the market price. So that the financial assets and financial liabilities reflect their fair value on financial statements and bring useful information for managers and investors to have relevance and reliability of

Financial Statements so that they can invest well and bring economic benefits as well as promote economic development, avoid loss for the economy and the enterprises.

Application of Derivative Instruments for Economic Events

The article uses evaluation methods to measure fair value of each commodity transaction and it is the basis of the evaluated value of derivative contracts. These commodities are selected to evaluate and analyze and are the types of representative commodities with unstable price (price volatility). In addition, the commodities have a large impact on the country's economic development, such as the crude oil, the coffee.

Application of Forward Contracts for Commodity Purchase

Assumed oil price volatility according to the table below:

Table 1. oil price volatility in 2011 and 2012

Month	Monthly average price: \$ unit/barrel
Sep-2011	85.51
Oct-2011	86.32
Nov-2011	97.16
Dec-2011	98.56
Jan-2012	100.27
Feb-2012	102.20
Mar-2012	106.15
Apr-2012	103.60

Sources: www.worldoils.com/oilprice.php

Assume that Dung Quat oil refinery factory has to import crude oil to process and sell for domestic agents and maximum capacity of the factory is 6.5 million tons of crude oil/ year, equivalent to 148,000 barrels/day. However, price fluctuation of crude oil has affected his material input. If the factory does not use derivative instruments to hedge the price, he will pay at market price, he will suffer heavy losses due to price volatility of crude oil in the market. In case, he uses derivative instruments to perform transactions with partners, how does he get benefits? That is the problem mentioned below:

Step 1: Using forward contracts for crude oil transactions and determining the crude oil reserves of 8 months, equating to 240 dates. It means that he has to sign a contract to buy crude oil with partners in Sep - 2011, the maturity of contracts is in Apr-2012. Simultaneously, he determines deposit interest rate of Vietnam dong and foreign currency in Sep – 2011. According to Circular No. 30/2011/TT-NHNN issued by the State Bank of Vietnam specifying the maximum deposit interest rate in Vietnam dong of organizations and individuals in credit institutions and branches of foreign banks that is 14.5%/year, foreign currency is freely convertible 6.6 % /year. When the forward contracts are signed with a partner, it is considered as the assets of the enterprise. So, they are evaluated for fair value on the date of the financial statements.

Step 2: using the formula (2) to evaluate forward price of crude oil barrel with Vietnam dong interest rate of 14.5%/year, the foreign currency is 6.6%/year and the spot price is \$85.51/barrel in Sep-2011 as follows:

$$F_p = \$85.51 / barrel + \frac{\$85.51 / barrel \times (14.5\% - 6.6\%) \times 240}{100 \times 360} = \$86.07$$

Following the forward rate, the enterprise can sign the contracts with partner at level price of \$86.07/barrel. Although, he cannot forecast market price increase or decrease of crude oil in the future, he can determine the crude oil price that will be paid in the future.

Step 3: quarterly, the enterprise can use discounted cash flow (formula 4) to evaluate the value of forward contracts following market price at 6.6%/year interest rate of foreign currency, equivalently to 0.55%/month. It means that in Nov-2011, he evaluates the fair value of the forward contracts at the market price of \$97.16/barrel as follows:

The value of inventory adjustment is 148,000 barrels x (\$97.16 - \$86.07) = \$1,641,320. The fair value of the forward contracts is

$$PV = \frac{\$1,641,320}{(1 + 0.55\%)^5} = \$1,596,919$$

When the market price of crude oil increases, crude oil inventories also increase by \$85.51 (value book) + (\$97.16/barrel - \$86.07/barrel) = \$96.60/barrel equal to \$ 96.60/barrel x 148,000 barrels = \$14,296,800. This method is Mixed-attribute model. Using double entry to adjust:

Date and Account explanation	Account debits	Account credits
1a, Nov-2011– Forward contracts (lost)		
Adjustment of forward contracts	\$1,596,919	
Forward contracts		\$1,596,919
1b, Inventories		
Crude oil inventories	\$1,641,320	
Other comprehensive income		\$1,641,320

In Feb-2012, the market price of crude oil still increases to \$102.20 leading to the value of crude oil inventories is \$102.20 - \$97.16 = \$5.04/barrel, equal to \$5.04/barrel x 148,000 barrels = \$ 745,920. The evaluation of forward contracts' fair value is:

$$PV = \frac{\$ 745,920}{(1 + 0.55\%)^2} = \$ 737,782.08$$

In addition, the value of crude oil inventory is: (\$102.20 - \$97.16) x 148,000 barrels = \$ 745,920. Using double entry to adjust:

Date and Account explanation	Account debits	Account credits
2a, Feb-2012– Forward contracts (lost)		
Adjustment of forward contracts	\$ 737,782.08	
Forward contracts		\$ 737,782.08
2b, Inventories		
Crude oil inventories	\$ 745,920	
Other comprehensive income		\$ 745,920

Currently, the accumulated value of crude oil inventories is varied following market price: \$85.51 (value book) + (\$97.16/barrel - \$86.07/barrel) + (\$102.20 - \$97.16) = \$101.64/barrel x 148,000 barrels = \$15,042,720.

The contract settlement date is in Apr-2012, the enterprise only pays at forward price of \$86.07/barrel, the value of crude oil inventories is \$86.07/barrel x 148,000 barrels = \$12,738,360.

The spot price is \$103.60, and the enterprise gets different price level: $(\$103.60 - \$102.20) \times 148,000$ barrels = \$207,200. The enterprise has the accumulated loss of forward contracts: $\$1,596,919 + \$ 737,782.08 = \$2,334,701$. The accumulated value of crude oil inventories is varied following the market price: $\{11.09 + 5.04 + (\$103.60 - 102.20)\} = \$17.53/\text{barrel} \times 148,000$ barrels = \$2,594,440 or the value of crude oil inventories can be varied following the market price: $(\$103.60/\text{barrel} - \$86.07/\text{barrel}) \times 148,000$ barrels = \$2,594,440. It means that the price of the contract settlement minus the forward price and multiply the amount of commodities. This value of commodities is increasing more when the market price of commodities has volatility.

During financial assets are evaluated following the market price, the cash flows are also discounted leading to the different results between the value of the forward contracts adjustment account and other Comprehensive income account. The difference value is reduced cash accounts and other Comprehensive income account. The account balance of the other comprehensive income is recognized in profit at the date of the financial statements, when the commodities are sold.

The enterprise has to pay more about \$2,594,440, if he does not use forward contracts. Using double entry to adjust and recognize purchases.

Date and Account explanation	Account debits	Account credits
3a, Apr-2012 – purchase commodities		
Forward contracts	\$12,738,360	
Adjustment of forward contracts	\$ 259,739	
Cash		\$12,998,099
3b, Adjusted account forward contracts		
Forward contracts	\$2,334,701	
Loss of forward contracts		\$2,334,701
3c, Adjusted other comprehensive income		
Other comprehensive income	\$ 259,739	
Adjustment of forward contracts		\$ 259,739
3d, Adjusted crude oil inventories		
Crude oil inventories	\$ 207,200	
Other comprehensive income		\$ 207,200
3e, Recognized crude oil inventories following forward price.	\$12,738,360	
Crude oil inventories		
Forward contracts		\$12,738,360

From the results above, the enterprise has profited from the difference between market price and forward price. Simultaneously, when he applies forward contracts for hedging activities and they bring him effective business.

Application of the forward Contracts for Commodity Sales

Assumed Robusta Price volatility according to the table below:

Table 2. Robusta Price

Month	Robusta coffee Price	
	(US cents per Pound)	equal to (USD per Pound)
Jul-2012	113.37	\$1.1337
Aug-2012	113.01	\$1.1301
Sep-2012	110.87	\$1.1087
Oct-2012	109.89	\$1.0989
Nov-2012	102.94	\$1.0294
Dec-2012	102.3	\$1.023
Jan-2013	105.79	\$1.0579
Feb-2013	109.7	\$1.097
Mar-2013	112.67	\$1.1267

Sources: www.indexmundi.com.

The data in the table 2 shows Robusta Price volatility on the market from Jul-2012 to Mar-13. How does Robusta Price volatility affect of the enterprise's benefits? This problem is settled below:

According to data of Investment Joint Stock Company Export Coffee Highlands, he exports of 200,000 tons of coffee/year, equaling to 440,924,524.37 pounds (1 pound = 0.45359237 kg). This volume of export coffee is very big. If he does not use forward contracts, Robusta Price volatility will affect on his benefits. Therefore, the enterprise can hedge price volatility by using forward contracts.

Step1: he has to evaluate forward price following formula (3) and determine the loan interest rate (VND), deposit interest rate of foreign currency (USD) and the spot price at signing date of contract. In this case, he has to sign forward contracts with partner in Jul-2012; the spot price is \$1.134/pound. In December 2012, the Governor of the Vietnam State Bank issued circular No.33/2012/TT-NHNN specifying short - term interest rates in Vietnam dong of credit institutions and branches of foreign banks with customers. The maximum short -term interest rates in Vietnam dong is 13%/ year. In June 1, 2011, the Governor of the Vietnam State Bank issued Circular No. 14/2011/TT-NHNN specifying maximum dollar interest rate of 2%/year, and maturity date of the contract is in Mar-2013, equaling to 270 days. (Year =360 days).

Step 2: Applying the formula (3) to evaluate forward contracts as follows:

$$F_s = \$1.1337/\text{pound} + \frac{\$1.1337/\text{pound} \times (13\% - 2\%) \times 270}{100 \times 360} = \$1.1346$$

At the signing date of forward contracts, the fair value of forward contracts is evaluated equally to zero. Quarterly, the financial statements are made. Simultaneously, the fair value of the forward contracts is evaluated at market price. Assuming in Sep-2012, the fair value of forward contracts is evaluated as follows:

In Sep-2012, the market price of Robusta coffee is \$1.1087/pound; the fair value of forward contracts is evaluated following formula (4). $C_t = \$1.1346/\text{pound} - \$1.1087/\text{pound} = \$0.0273/\text{pound} \times 440,924,524.37 \text{ pounds} = \$11,435,510.919$, the discount rate of 2%/month.

$PV = \frac{\$11,435,510.919}{(1+2\%)^6} = \$10,154,406.437$. This case, the enterprise can get an amount of

\$11,596,314.99 at maturity date of contracts within 6 months. The value of forward contracts is adjusted as follows:

Date and Account explanation	Account debits	Account credits
1, Sep-2012– Forward contracts		
Forward contract	\$10,154,406.437	
Other comprehensive income		\$10,154,406.437

Dec-2012, the enterprise evaluates the value of forward contracts to determine coffee price volatility at the date of the financial statements. This time, the coffee price decreases to \$1.023/pound and the enterprise still gets the amount due to price difference of coffee. $C_t = \$1.1087/\text{pound} - \$1.023/\text{pound} = \$0.0857/\text{pound} \times 440,924,524.37 \text{ pounds} = \$37,787,231.74$. The value of forward contracts is \$37,787,231.74, within 3 months. The accumulated gains of forward contracts are $\$10,154,406.437 + \$35,607,752.43 = \$45,762,158.867$ and the forward contracts are adjusted as follows:

Date and Account explanation	Account debits	Account credits
2, Dec-2012– Forward contracts		
Forward contract	\$45,762,158.867	
Other comprehensive income (OCI)		\$45,762,158.867

In Mar-2013, the maturity of forward contracts, the enterprise sells the coffee at forward price of \$1.1346/pound, the market price of \$1.1267/pound. This case, the enterprise has the gain from the difference price, the forward price is higher than the market price. May 2012, the enterprises' input of the Robusta coffee Price is \$0.953/pound (Sources: www.thuongmai.vn). The enterprise can recognize as follows:

Step 1: Determining the factors related to recognition such as:

The purchase expenses are $\$0.953/\text{pound} \times 440,924,524.37 \text{ pounds} = \$420,201,071.72$. The cash amount of sale and sales revenue are calculated: $\$1.1267/\text{pound} \times 440,924,524.37 \text{ pounds} = \$496,789,661.61$. The Cost of goods sold is $\$0.953/\text{pound} \times 440,924,524.37 \text{ pounds} = \$420,201,071.72$. The market price is \$1.1267/pound; the loss is $(\$1.023/\text{pound} - \$1.1267/\text{pound}) \times 440,924,524.37 \text{ pounds} = \$ (45,723,873.18)$. This case, if the enterprise sells coffee at a price of \$1.023/pound, he will suffer a loss of \$45,723,873.18. Because, the Robusta coffee Price is the lowest up to now. The accumulated gain of forward contracts is $\$10,154,406.437 + \$35,607,752.43 + \$ (45,723,873.18) = \$38,285.69$ and the accumulated amount of cash flows is $\$11,435,510.92 + \$37,787,231.74 + \$ (45,723,873.18) = \$3,498,869.48$ or the amount of cash flows could be evaluated: $440,924,524.37 \text{ pounds} \times (\$1.135/\text{pound} - \$1.127/\text{pound}) = \$3,498,869.48$. It means that the sale amount of Robusta coffee x (forward price – market price at maturity date of forward contracts). Now we can see that the difference between the accumulation of cash flows and the Accumulated gain of forward contracts is $\$3,498,869.48 - \$38,285.69 = \$3,460,583.79$. Therefore, this difference level is adjusted increase recognition of forward contracts account and other comprehensive income account. This month, adjusted forward contracts account is $(45,723,873.18) + \$3,460,583.79 = \$ (42,263,289.38)$.

When the coffee is sold, the other comprehensive income is transferred to sales revenue.

Step 2: using double entry to recognize as follows:

Date and Account explanation	Account debits	Account credits
3a, Mar-2013- Adjusted loss of forward contracts		
Other comprehensive income	\$45,723,873.18	
Forward contracts		\$45,723,873.18
3b, Adjusted difference of cash flow and forward contracts		
Cost of goods sold	\$3,460,583.79	
Robusta coffee inventories		\$3,460,583.79
3c, Adjustment of forward contracts, OCI and recognized revenue - sales		
Cash	\$500,288,531.09	
Other comprehensive income	\$ 3,498,869.48	
Forward contracts (OCI)		\$3,460,583.79
Revenue - sales		\$500,288,531.09
3d, Recognized cost of commodity sales		
Cost of Robusta coffee sales	\$420,201,071.72	
Robusta coffee inventories		\$420,201,071.72

Application of Futures Contracts for Commodity Purchase

Assume that with data of the Table 1- oil price volatility in 2011 and 2012, the enterprise uses futures contracts instead of forward contracts to hedge financial risks in future. He signs futures contracts to purchase 148,000 barrels of oil. Settlement date of futures contracts is in Apr-2012. When he participates with this transaction, he needs to have his margin account in the clearinghouse. Because, before a futures position can be opened, there must be enough available balance in his futures margin account to meet the initial margin requirement. Upon opening the futures position, an amount equaling to the initial margin requirement will be deducted from his the margin account and transferred to the exchange's clearing firm. This money is held by the exchange clearing-house as long as the futures position remains open. The maintenance margin is the minimum amount a futures trader is required to maintain in his margin account in order to hold a futures position. The maintenance margin level is usually slightly below the initial margin. If the balance in the futures trader's margin account falls below the maintenance margin level, he or she will receive a margin call to top up his margin account to meet the initial margin requirement. The futures margin account requirements are set by the exchanges and are typically only 2 to 10 percent of the full value of the futures contract on the New York Mercantile Exchange (NYMEX). This information, the enterprise can realize steps below:

Step 1: the value of futures contracts is evaluated following formula (5).

The spot price is \$85.51; the duration of the futures contracts is 8 months, the interest rate is 14.5%/year, equivalently to 1.028%/month. Note (d) is stock dividend, but this formula is applied to purchase crude oil. So the stock dividend equals to zero.

$F_0 = \$85.51/\text{barrel} \times (1 + 1.028\%)^8 = \$94.13/\text{barrel}$, the future price is \$ 94.13/barrel. It means that when the futures contract is settled, the settlement price is \$ 94.13/barrel.

Step 2: determination of margin account of futures contracts.

Under regulations of the New York Mercantile Exchange, the futures contracts margin account is from 2 to 10 percent of the full value of the futures contract. Therefore, the futures contracts margin account could be assumed to be 10 percent. The total value of crude oil is

148,000 barrels x \$ 94.13/barrel = \$ 8,860.85. After that, the futures contracts margin account is \$ 8,860.85 x 10% = \$886.08.

Step 3: using double entry to recognize.

Date and Account explanation	Account debits	Account credits
1, Sep-2011– the cost of futures contracts margin account		
Futures contracts (margin account)	\$886.08	
Cash		\$886.08

For this transaction, the value of futures contracts is always recognized by market price (marketing to market) to see price volatility of crude oil. Because the price volatility will affect the enterprise's profits, the value of futures contracts are monthly evaluated. In Oct-2011, with a market price of \$86.32, the value of futures contracts is evaluated: $(\$86.32/\text{barrel} - \$94.13/\text{barrel}) \times 148,000 \text{ barrels} = (\$1,155,880)$. The recognition is as follows:

Date and Account explanation	Account debits	Account credits
2, Oct-2011– value adjustment of futures contracts		
Other comprehensive income (OCI)	\$1,155,880	
Futures contracts (lost)		\$1,155,880

This case, the enterprise has loss of \$1,155,880 leading to decrease adjustment of the OCI and the value of the futures contracts. Simultaneously, the margin account is decreased by $(\$1,155,880) + \$1,155,880 = (\$1,154,993.92)$ leading to his margin account is not enough for the exchange of the clearing firm. Thus, the enterprise needs to put more money in his margin account so that the futures position remains open. Assume that his margin account is more \$1,155,880, the recognized value of futures contracts is increased.

Date and Account explanation	Account debits	Account credits
3, Sep-2011– the cost of futures contracts margin		
Futures contracts (margin account)	\$1,155,880	
Cash		\$1,155,880

In Nov-2011, the market price is \$97.16/barrel and the previous period price is \$86.32/barrel. The value of futures contracts is adjusted: $(\$97.16/\text{barrel} - \$86.32/\text{barrel}) \times 148,000 \text{ barrels} = \$1,604,320$ that is his profit and the margin account is $\$1,604,320 + \$886.08 = \$1,605,206.08$.

Date and Account explanation	Account debits	Account credits
4, Nov-2011– value adjustment of futures contracts		
Futures contracts (gain)	\$1,604,320	
Other comprehensive income (OCI)		\$1,604,320

In Dec-2011, the market price is \$98.56/barrel, the previous month price is \$97.16/barrel, and the value of futures contracts is adjusted as follows: $(\$98.56/\text{barrel} - \$97.16/\text{barrel}) \times 148,000$

barrels = \$207,200. This case, the enterprise has profit lower than previous profits due to less volatile price. Using double entry as follows:

Date and Account explanation	Account debits	Account credits
5, Dec-2011– value adjustment of futures contracts		
Futures contracts (gain)	\$207,200	
Other comprehensive income (OCI)		\$207,200

Continue to adjust value of futures contracts in Jan-2012 with the market price of \$100.27/barrel; the previous price is \$98.56/barrel. This difference price continues to bring profit to the enterprise. This market price fluctuation is beneficial to the enterprise. The value of futures contracts has an increase of $(\$100.27/\text{barrel} - \$98.56/\text{barrel}) \times 148,000 \text{ barrels} = \$253,080$. The value of futures contracts is adjusted as follows:

Date and Account explanation	Account debits	Account credits
6, Jan-2012 – value adjustment of futures contracts		
Futures contracts (gain)	\$253,080	
Other comprehensive income (OCI)		\$253,080

In Feb-2012, the market price still increases to \$102.20/barrel and the previous price is \$100.27/barrel. Now, the Futures contracts are adjusted to their value as follows: $(\$102.20/\text{barrel} - \$100.27/\text{barrel}) \times 148,000 \text{ barrels} = \$285,640$ and the recognition method:

Date and Account explanation	Account debits	Account credits
7, Feb-2012– value adjustment of futures contracts		
Futures contracts (gain)	\$285,640	
Other comprehensive income (OCI)		\$285,640

In Mar-2012, the market price is still volatile and it is \$106.15/barrel. This price is the highest increasing level from up to now. So the value of futures contracts also gets increase of $(\$106.15/\text{barrel} - \$102.20/\text{barrel}) \times 148,000 \text{ barrels} = \$584,600$. The adjusted write-up is as follows:

Date and Account explanation	Account debits	Account credits
8, Mar-2012– value adjustment of futures contracts		
Futures contracts (gain)	\$584,600	
Other comprehensive income (OCI)		\$584,600

In Apr-2012, the enterprise's futures contracts are settled and he purchases crude oil with the futures contract's price of \$94.13/barrel. The market price is lower than the previous price. So the enterprise has loss of $(\$103.60/\text{barrel} - \$106.15/\text{barrel}) \times 148,000 \text{ barrels} = (\$377,400)$. However, he has still gained from the previous price increases.

The crude oil inventories are $\$103.60/\text{barrel} \times 148,000 \text{ barrels} = \$15,332,800$.

The Accumulated the gain of futures contracts and the other comprehensive income are $(\$1,155,880) + \$1,604,320 + \$207,200 + \$253,080 + \$285,640 + \$584,600 + (\$377,400) = \$1,401,560$ or the Accumulated gain of futures contracts and the other comprehensive

income could be calculated: $(103.60/\text{barrel} - \$94.13/\text{barrel}) \times 148,000 \text{ barrels} = \$1,401,560$. However, the account balance of the other comprehensive income will be transferred to sales revenue when the crude oil inventories are sold.

This case, if the enterprise does not participate in the clearing - house, the enterprise will draw cash from his margin account in Sep-2011 and in Oct-2011. Therefore, the margin account is $\$886.08 + \$1,155,880 = \$1,156,766.08$. The value of futures contracts is adjusted as follows:

Date and Account explanation	Account debits	Account credits
9, Apr-2012- value adjustment of futures contracts		
Other comprehensive income (OCI)	\$377,400	
Futures contracts (lost)		\$377,400
10, Adjustment value of futures contracts		
Crude oil inventories	\$15,332,800	
Cash		\$15,332,800
11, Drawing margin account & adjusted the gain of forward contracts		
Cash	\$2,558,326.08	
Forward contracts (margin)		1,156,766.08
Forward contracts (gain)		\$1,401,560

For the other comprehensive income remains on a credit balance, if its account credit is higher than account debit itself or on debit balance if its account debit is higher than the account credit itself. When the enterprise sells the crude oil, this the credit balance or debit balance is transferred to the cost of crude oil sale. This cost of crude oil sale can be adjusted increase or decrease that depends on the credit balance or debit balance of the other comprehensive income account.

Assume that the enterprise sells all amounts of crude oil inventories with domestic price of $\$113.68/\text{barrel}$. The sales revenue is $\$113.68/\text{barrel} \times 148,000 \text{ barrels} = \$16,824,640$. The crude oil inventories are $\$15,332,800$ and the credit balance of the other comprehensive income is $\$1,401,560$, and it is transferred to sales revenue. Because, the crude oil inventories are sold. Using double entry to recognize sales revenue and cost of crude oil sale as follows:

Date and Account explanation	Account debits	Account credits
12, Sales revenue of crude oil		
Cash	\$16,824,640	
Revenue - Sales		\$16,824,640
13, Adjusted gain of other comprehensive income		
Other comprehensive income	\$1,401,560	
Revenue - sales		\$1,401,560
14, Recognized cost of crude oil sold		
The cost of crude oil sold	\$15,332,800	
Crude oil inventories		\$15,332,800

From real data, the article uses accounting methods and evaluation methods of financial analysis to realize benefits of using derivative instruments for hedging activities. However,

the article emphasizes accounting methods of using forward contracts and futures contracts for commodity transaction activities. The accounting methods of using forward contracts, futures contracts, swap contracts and option contracts for foreign currency and securities transaction activities will be realized on another article.

The Result of Applying Derivative Instruments

Using the Forward Contracts for Commodity Purchase

The article also shows cash flow volatility, when value of financial assets is varied following the market price. The results in table 3 are impact of cash flows and value volatility of forward contracts that affect income.

Table 3. Summarization of the impact on income

Date	Inventories adjustment	Forward contracts adjustments	Cash flow impact
Sep-2011	\$0.00	\$0.00	\$0.00
Nov-2011	\$ 1,641,320	(\$1,596,918.995)	\$ 44,401.005
Feb-2012	\$745,920	(\$737,782.079)	\$8,137.921
Apr-2012	\$207,200	(\$259,738.925)	(\$52,538.925)
Total:	\$2,594,440	(\$2,594,440.)	(\$0.00)

Using the forward Contracts for Commodity Sale

This case, the enterprise uses forward contracts to hedge market price volatility. The results above show benefits of using them. When the enterprise uses derivative instruments for hedging activities, he can see the volatility of cash flows at the date of the financial statements and can see through the summarization tale of the impact on income as follows:

Table 4. Summarization of the impact on income

Date	Gain/loss	Forward contracts adjustments	Cash flow impact
Jul-2012	\$0.00	\$0.00	\$0.00
Sep-2012	\$11,435,510.92	\$10,154,406.44	\$ 1,281,104.48
Apr-2013	\$37,787,231.74	\$ 35,607,752.43	\$2,179,479.31
Mar-2013	(\$45,723,873.18)	(\$42,263,289.38)	(\$3,460,583.79)
Total:	\$3,498,869.48	\$3,498,869.48	(\$0.00)

Using the Futures Contracts for Commodity Purchase

This case, the enterprise uses futures contract for crude oil purchase, the result is different between using forward contracts and futures contracts. When the enterprise uses futures contracts for commodity purchase, he can see the gain or loss of existing assets through daily statements from the clearinghouse. The results in the table below show gain or loss, when the market price is daily volatile.

Table 5. daily adjusted gain or loss of existing assets

Dates	Marketing market	to	Level difference	of	Gain or loss	Accumulation of gain or loss & margin account
Sep-11	\$85.51		0,000		0,000	\$1,156,766.08
					(\$1,155,880	
Oct-11	\$86.32		(\$7.81))	\$886.08
Nov-11	\$ 97.16		\$ 10.84		\$	\$ 1,605,206.08
Dec-11	\$ 98.56		\$1.40		\$ 207,200	\$1,812,406.08
Jan-12	\$ 100.27		\$1.71		\$ 253,080	\$ 2,065,486.08
Feb-12	\$ 102.20		\$1.93		\$ 285,640	\$ 2,351,126.08
Mar-12	\$ 106.15		\$3.95		\$ 584,600	\$ 2,935,726.08
Apr-12	\$ 103.60		(\$2.55)		(\$ 377,400)	\$ 2,558,326.08
Total					\$1,401,560	

The results above are evaluated the effects as using derivative instruments and formula of discounted cash flow for hedging activities. All of them are realized in discussed item below.

Discussion on Application Effect of Derivative Instruments

Effect of accounting methods: Accounting methods play an important role in the recognition process and adjustment of the economic transactions that occur. At the same time, the methods help the enterprises track the volatility of asset value. Results above show that when the enterprise uses forward contracts to purchase crude oil, these contracts bring profits to the enterprise.

In case of using forward contracts for commodity purchase: the results above show accounting recognition and measurement method. When he uses forward contracts, these forward contracts will become his property and he needs to open account of forward contracts to track the value volatility of assets. Quarterly, the enterprise needs to evaluate the property at the date of the financial statements, and he uses a discounted cash flow formula (DCF) to evaluate their effectiveness. This article gives the accounting methods and the use of accounts to recognize the value volatility of assets such as forward contract accounts, cash accounts, other comprehensive income account and inventory account. In case the enterprise uses forward contracts to purchase commodities during contract performance two cases will occur. The first case, the market price is higher than forward prices at the date of the financial statements. The second case, the market price is lower than the forward price at the date of the financial statements. Particularly, for the cases above, the crude oil price always has increased volatility leading to forward contracts is lost, but offset by the inventory increase, why? Because, if the value of forward contracts is evaluated by

market price, when the market price of crude oil increases, the enterprise must pay more money. However, the payment amount is recognized into the value of oil inventories such as the forward price of \$ 86.07/barrel but at the date of the financial statements, the price of crude oil increase to \$ 97.16 /barrel leading to increase of the value of the contract, it means that the amount paid by the partners is also increased. The enterprise will pay more \$1,641,320 if he does not use forward contracts. Nevertheless, the inventory value is still evaluated increase following an increase of market price. The difference level between value increases of crude oil inventories and the fixed price of forward contracts is gain or loss. This case, the enterprise has profited. In the case above, the value of forward contracts is evaluated at the time that the market price always increases. Therefore, the results do not show the loss due to increase of market price, e.g. in Mar-2012 the market price is \$106.15/barrel, but in Apr-2012 the market price is \$103.60/barrel leading to the enterprise has loss of \$ 377,400. It means that if the market price approximates with the fixed contract price, the unrealized profits go down. If the market price equal to the fixed contract price, the unrealized profits will be zero. If the market price is lower than the fixed contract price, the unrealized profit will be negative lead to loss.

The forward contracts use discounted cash flow method to evaluate. Because, the maturity date of the contract is long-term, it can be considered as an investment project. Therefore, the enterprise should use the discounted cash flow method to assess the added value of the impact of the time value of cash flows.

+ $PV > 0$: to determine the discount rate r , the present value of the income flow is greater than the initial investment cost.

+ $PV = 0$: to determine the discount rate r , the present value of the income flow equals to the initial investment cost.

+ $PV < 0$: to determine the discount rate r , the present value of the income flow is less than the original investment cost.

For the reasons above, the value of forward contracts is evaluated lower than its real value to ensure safety for investment capital; lead to the difference of evaluated the value of forward contracts and the evaluated value of crude oil inventories. This difference level is adjusted decrease of cash account as the adjustment result above. Simultaneously, the unrealized gain is adjusted accordingly. If inventories are sold, debit balance or credit balance of other comprehensive income accounts would be transferred into sales revenue (this case will be discussed in part of futures contracts below). If not, it is the equity on the balance sheet. This case, the crude oil inventories are not sold leading to \$2,334,701 of credit balance of these accounts is still equity on the balance sheet. If the value of crude oil inventories is \$86.07/barrel x 148,000 barrels = \$12,738,360 and amount of payment is also \$86.07/barrel x 148,000 barrels = \$12,738,360 lead to non-different. However, the process of evaluation and adjustment of forward contracts and inventory commodities, they have different level. E.g., the sales revenue is \$ 16,724,000, the cost of crude oil inventories is \$12,738,360 and the accumulated value of crude oil inventories is varied following the market price and is \$2,594,440. Total crude oil inventories are \$12,738,360 + \$2,594,440 = \$15,332,800. The undistributed profits are \$ 16,724,000 - \$15,332,800 = \$1,391,200. This difference level of \$2,594,440 is transferred to the undistributed profit account = \$1,391,200 + \$2,594,440 = \$3,985,640. This result shows that if the enterprise uses forward contracts to purchase crude oil with a volume of 148,000 barrels per day, he will have profits of \$2,594,440. If the enterprise purchases amount of crude oil for 8 months, he has a great profit from the difference between forward price and market price.

Note: when the forward contracts are settled, it will occur two cases. The first case, the value of commodity purchase is the market price and amount of payment is the forward price leading to the difference. This difference is transferred to undistributed profit accounts in the balance sheet. E.g. the value of crude oil inventories is $\$103.60/\text{barrel} \times 148,000 \text{ barrels} = \$15,332,800$, but amount of payment is $\$86.07/\text{barrel} \times 148,000 \text{ barrels} = \$12,738,360$ and difference level is $\$2,594,440$. This $\$2,594,440$ is transferred to undistributed profit accounts in the balance sheet. The second case, if the value of crude oil inventories is $\$86.07/\text{barrel} \times 148,000 \text{ barrels} = \$12,738,360$ and amount of payment is also $\$86.07/\text{barrel} \times 148,000 \text{ barrels} = \$12,738,360$ lead to non-difference. However, the process of evaluation and adjustment of forward contracts and inventory commodities, there is the difference level and this difference level is transferred to sales revenue. This is difference of use of two accounting methods. However, the profit results are the same. The proof of this is as follows: assume that the sale price of crude oil is $\$113/\text{barrel}$. The first case, the sales revenue is $\$113/\text{barrel} \times 148,000 \text{ barrels} = \$16,724,000$, the cost of crude oil inventories is $\$15,332,800$. The undistributed profits are $\$16,724,000 - \$15,332,800 = \$1,391,200$ and this difference of $\$2,594,440$ is transferred to undistributed profit and equals to $\$1,391,200 + \$2,594,440 = \$3,985,640$. The second case, the sales revenue is also $\$16,724,000$, the cost of crude oil inventories is $\$12,738,360$ and the accumulated value of crude oil inventories is varied following the market price and is $\$2,594,440$. Total crude oil inventories are $\$12,738,360 + \$2,594,440 = \$15,332,800$. This difference level of $\$2,594,440$ is transferred to sales revenue. This sales revenue is $\$16,724,000 + \$2,594,440 = \$19,318,440$ and the undistributed profits is $\$19,318,440 - \$15,332,800 = \$3,985,640$.

The table 3 shows the inventory adjustment, forward contract adjustments and cash flow impact. At the beginning, this value is adjusted and it is zero, in Nov-2011, the inventory is adjusted increase of $\$1,641,320$, the forward contracts are adjusted decrease of $\$1,596,918.995$ and the difference between them is $\$44,401.005$. It means that the impact of the time value of cash flows is $\$44,401.005$ with determined interest of foreign currency of 6.6%/year (freely convertible), equally to 0.55%/month and for Feb-2012 and Apr-2012 they are similar. Through the results of the table, the enterprise can assess the effect of using forward contracts.

In case of using forward contracts for commodity sale: figure 2 also shows the recognition method of accounting, it is applied to commodity sale. This case, the enterprise can use other comprehensive income account and forward contracts account to adjust the difference between the forward price and market price, and they are adjusted on the date of the financial statements. The forward contracts are applied to sell Robusta coffee when the Robusta coffee Price is volatile following the market price. If the market price is lower than the forward price, the difference is adjusted increases other comprehensive income account and adjusted decrease forward contracts account, if the market price is higher than forward price, they will be adjusted to the contrary. When the forward contracts are settled, the account balance of two these accounts will be transferred to the cash account and sales revenue account like figure 2. Particularly, in Sep-2012, the difference level is $\$10,154,406.44$, in Apr-2013 the difference level is $\$35,607,752.43$ with the discount rate of 2%/month. In Mar-2013, the market price of coffee rises suddenly and is $\$1.1267/\text{pound}$. If this price compares with the price of the accounting period in Apr-2013, the enterprise has loss of $\$42,263,289.38$. However, the forward price is still higher than the market price at settlement date of forward contracts. Therefore, he gets profit of $\$3,498,869.48$. Besides, the results of table 4 show volatility of market price and cash flow impact. This case, method of discounted

cash flow is also applied to assess the effect of forward contracts. In Sep-2012 and Apr-2013, the volatility of market price follows favorable trends in the enterprise. However, in Mar-2013, the volatility of market price brings unfavorable trend due to the high sale price in the market. If the value of forward contracts is evaluated full time, the enterprise still has the gains. In addition, the results in this table are the basis for the investors to be able to fully assess the financial risk of the enterprise.

Difference of Accounting Methods between Using forward Contracts for Purchase and Sale of Commodities

Using forward contracts for commodity purchase:

For commodity purchase, the forward contracts are considered in assets and it is tracked, evaluated at the date of the financial statements. The inventories are adjusted gain or loss. After, the gain or loss of inventories is accumulated and the gain or loss of other comprehensive income is accumulated on the maturity date of forward contracts. The accumulated gain or loss is transferred to undistributed profits. When a commodity transaction is realized, the value of commodity purchase and amount of payment is calculated by forward price. Total value of inventories is value of commodity purchase equal to forward price plus accumulation of gain or loss of inventories

Using forward contracts for commodity sale:

For commodity sale, there is no inventory adjustment, but the forward contracts and other comprehensive income are adjusted. At the maturity date of forward contracts, the gain or loss of forward contracts and the other comprehensive income are accumulated. After, the other comprehensive income is transferred to sales revenue, the gain or loss of forward contracts is transferred to the cash account. Sales revenues and accounts receivable are calculated by forward price.

The Effect of using Futures Contracts for Crude Oil Purchase

The enterprise can use forward contracts or futures contracts to purchase or sell commodities. The article uses two contract types for the same case of crude oil purchase to find out the difference between them.

The difference between them:

The futures contracts

The futures contracts are standardized contracts, and the price is only agreed in each contract that is prescribed a certain quantity of goods (called the contract size). The date and the place of delivery are set by goods central exchange and there is no negotiation between two parties involved in the contract.

The futures contracts have high liquidity because the clearinghouse will act as an intermediary for both sellers and buyers.

The forward contracts:

The entire terms of forward contracts can be agreed and negotiated between the two partners.

There is no clearinghouse, the commodity transaction depends on between the two parties and it has low liquidity.

The payment of commodity purchase follows the maturity date of forward

The futures contracts are daily cleared at market price (marketing to market), so the profit or loss account is recognized daily to track them.

To participate in trading futures contracts, traders have a margin account in clearinghouse to ensure that the parties comply with the terms of the contracts.

No use of discounted cash flow method.

Forward price is evaluated by formula (2 and 3)

contracts, and profit or loss accounts are recognized at date of financial statements and it is only evaluation value. When the forward contracts are settled, the profit or loss accounts are realized.

The partners need to have a margin account

Using the discounted cash flow method

Future price is evaluated by formula (5)

From difference above, the figure 3 shows the different results. Beginning of this transaction, the enterprise has margin account of \$1,156,766.08. This account is retained throughout the realization duration of the futures contract. The gain or loss is adjusted daily between futures contracts and other comprehensive income. On the maturity date of futures contracts, the gain or loss of future account is transferred to the cash account; other comprehensive income is transferred to sales revenue. The value of inventories and payment accounts are calculated by market price. Particularly, the crude oil inventories and payment account are calculated by market price and are \$15,332,800, leading to the non - difference between them. Assume that sales revenue is \$16,824,640, the crude oil inventories are \$15,332,800. The gain of futures contracts and the other comprehensive income are \$1,401,560. The gain of futures contracts is transferred to the cash account. The cash account is $\$16,824,640 + \$1,401,560 = \$18,226,200$ and the other comprehensive income is transferred to sales revenue. This sales revenue is $\$16,824,640 + \$1,401,560 = \$18,226,200$. Profits are $\$18,226,200 - \$15,332,800 = \$2,893,400$. Besides, the futures contract can use the second accounting method. Assume that sales revenue is \$16,824,640, it does not change. If crude oil inventories are calculated by market price and equal to \$15,332,800 and the payment account is calculated by future price and equal to $\$94.13/\text{barrel} \times 148,000 \text{ barrel} = \$13,931,240$, the difference between them occurs and equals to $\$15,332,800 - \$13,931,240 = \$1,401,560$. This difference level is transferred to the undistributed profit account as follows:

Profits are $\$16,824,640 - \$15,332,800 = \$1,491,840$. After, the undistributed profit account is $\$1,491,840 + \$1,401,560 = \$2,893,400$. The article uses two accounting methods for crude oil transactions and two methods give the same results. The results of table show daily gain or loss of futures contracts and is the basis for evaluating the effectiveness of capital investment of the enterprise so that he can timely make decisions and gives business strategies in order to discontinue or continue realization of this contract because the nature of this contract is that the partner may end or terminate their position easily. The buyer can terminate it by selling futures contracts for the same commodity and on the same delivery day. On the contrary, the seller can also terminate it by buying a similar futures contract. These cases above, in Oct-11, the futures contracts have a loss of \$1,155,880, but from Nov-2011 to Mar-2012, the forward contracts have the accumulated gain of \$2,934,840. However, Apr-2012, the futures contracts have loss of \$ 377,400. Total loss of futures contracts is \$1,533,280 and total gain of futures contracts is \$2,934,840. However, on the maturity date of the contract, the futures contracts still get the gain of \$1,401,560.

Conclusion of Application of Derivative Instruments for Commodity Transaction

From the price volatility of goods which actually occur. This article uses derivative instruments to find out effectiveness when they are applied to commodity trading. Results above show that the use of derivative instruments has prevented the risk of price fluctuation. In particular, they can be applied to any category of goods that often have price volatility affecting the business results of enterprises such as crude oil, coffee etc.

The article also provides the enterprises with the accounting methods to apply to the transactions that occur. Simultaneously, the article also combines the evaluation method of fair value and discounted cash flows to evaluate the value of the property. Results above use derivative instruments for some scarce commodities that is necessary. In addition, the article also demonstrates the useful results of derivative instruments and they are effective hedging instruments. They don't only apply to the commodity markets, but also apply to the financial markets such as stock markets, interest rates, exchange rates.

For accounting methods, the article also shows the step details to help enterprises use it as references for the application of this method to realize the same commodity transactions that occur. Although this article only shows the derivative accounting method (futures contracts and forward contracts) that is applied to trade goods, it also brings effectiveness for the enterprises. Besides, the enterprises can apply forward contracts, futures contracts, swap and option contracts for hedging securities risk, and interest rate risk and exchange rate risk. These fields will be researched in another article.

Application of derivative instruments to hedge financial risk. Therefore, the enterprises should use derivative instruments for hedging activities of financial risk. Especially, for the developing countries because their financial market contains much risk. Currently, some countries have not converged toward international accounting standards such as Vietnam, Laos, Cambodia etc, which have developing economy. Besides, the research results also indicate the financial loss if the enterprise does not use derivative instruments for hedging activities as the crude oil price fluctuates, the demand for crude oil is necessary for operational businesses. Specially, the commodities affect the entire economy as crude oil price increases leading to higher transportation costs. This cost has impacted on the cost of business inputs. Mean that the cost of the business inputs increase leading to cost price increase and this make the competitiveness of enterprises be reduced.

From the above reasons, the government should consider to build the accounting policies of derivative financial instruments and issue to the enterprises for application to hedge financial risk for the economy. However, the application of derivative instruments for hedging activities does not mean that the seller or the purchaser shall suffer business loss that the commodity price has to be reconciled between the seller and the buyer. The formulas above are used to calculate the price level to purchase or sell at the average price level of commodity price fluctuation, the buyer and seller share business loss in order to minimize the business risk.

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