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RISK MANAGEMENT - DERIVATIVE MARKET

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ABSTRACT

Agriculture is strongly influenced by environmental factors and is often affected by the risks to which it is submitted, such as excessive rain or drought. The failure of a crop and/or price fluctuations resulting from a crisis or exaggerated offer of a commodity may cause complications to the producer, hindering him from making profits. In fact, the devaluation of agricultural products may occur in such a way that the value obtained from their sales is insufficient to cover production costs, which results in profit loss. To allow agents of agribusiness to guarantee a minimum income, it is necessary that they use some of the existing mechanisms of hedge, such as futures contracts, fixed-term contracts, options contract and swaps.

Keywords: *hedge – futures – fixed-terms - options - swaps*

Summary: 1. Introduction. 2. Hedge. 3. Derivatives market. 4. Financial agents. 5. Comparative table. 6. Conclusion. 7. References.

1. INTRODUCTION

Price's fluctuation of agricultural commodities[1] may cause the producers to lose with the sales of the harvested crops, especially in a crisis, when the drop in price can be quite big. This happens because they believe that in the future they will be able to sell their commodities for a much higher price than actually they do. However the price obtained may not cover even the cost of production, generating problems.

In the words of the financial expert, Herbert Kimura[2], the risks of uncertainty of commodity prices influence not only the agricultural planning. The economic

[1] Agricultural commodities are farm products traded internationally. For example: soybean, wheat, frozen orange juice, cotton, coffee, etc.
[2] KIMURA, Herbert. "Administração de Riscos em Empresas Agropecuárias e

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viability of a business can also be affected by adverse price fluctuations, since losses can impact the liquidity and solvency of the company, putting at risk their survival in the long run.

To prevent this, mainly after the 1990s, Brazilian farmers, especially soybean farmers, have used different ways to guarantee a minimum income. One of them is the pre-sale contract with a fixed price, also used as a form of financing.

However, this strategy happens to be problematic in the 2002/2003 and 2003/2004 crops[3] because the market price was much higher than the contracted due the big demand from China and the drop of the US soybean crop. Consequently, contracts have not been respected by some producers, resulting in significant reduction of this funding mechanism. Many buyers became apprehensive with the probable overdue and stopped making these contracts.

As a matter of fact, the refusal of these producers caused great inconvenience to buyers, leading them to judiciary in order to have their contracts guaranteed. As if that was not enough, the revision of the contract was voted by some judges making in this way the transaction of the contracts weaker.

As noted by Dr. Christiane Leles[4], "early contracts of soybean sale proved to be unable to act as an efficient mechanism in case of severe price fluctuations." Indeed, the refusal of some producers to comply with the contract undermined the others, even those who carried on with their commitment. In the later harvests many companies refused to set a contract with producers, suggesting the need of another form of protection.

Alternative to ensure profits are found in the derivative market, which includes several types of contracts that can be used for this purpose. They are developed on bases on derivative prices of the spot market[5]. In this market, hedgers and speculators operate in the Commodities and Futures Exchange – BM & F, as well in Over-The-Counter (OTC) markets [6].

Agroindustriais". **Caderno de Pesquisas em Administração**. São Paulo, v.1, n.7, 2. Trim./98.
[3] REZENDE, Christiane Leles. **Pacta Sunt Servanda? Quebra dos Contratos de Soja Verde**. Thesis submitted to the Department of Administration Faculty of Economics, Business and Accounting of Universidade de São Paulo, pg. 7, 2008.
[4] *Idem. Ibidem*. p. 101.
[5] Spot market - A market in which physical settlement (delivery of the securities by the seller) takes place on the 2nd business day after the deal have been done in trading and the settlement (payment of securities by the buyer) takes place on the 3rd business day following the trading only through the effective physical settlement. **YAHOO Finance.** Available at: <http://br.finance.yahoo.com/seubolso/glossario/#tab5 >. Access on: 25/01/2015.
[6] Over- The-Counter market - There are two distinct forms of this market: OTC not organized:

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2. HEDGE[7]

Hedging is an operation that aims to protect the hedger, transferring the risk of business to a third party, the speculator. Thus the producer guarantees the desired price for his production.

It is noteworthy that the Brazilian Civil Code of 2002 differentiates gambles and bets from future markets operations. Nowadays, in Brazil, the hedge has legal support even when it is done for speculative purposes, Article 816 of the Code: "The Articles 814 and 815 do not apply to contracts on securities exchange, goods or values, which stipulate the settlement exclusively by the difference between the agreed price and the quotation's price in the deadline adjustment".

This is an operation whose losses are predictable, making the risk part of the business. Therefore it is not possible contract review, the allegations based on the theory of unpredictability and excessive onerous cannot be accepted. As it was mentioned by judges, "(...) the theory of unpredictability does not apply to those who submit to the stock exchange or world of exchange, where currency fluctuations, more or less, are part of the gamble. The risk in such cases are perfectly predictable and integrates the nature of such business ... (...)"[8].

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buying market and selling assets without the coordination of a Stock Exchange, in which transactions are usually conducted by telephone. Company shares are traded not registered in Stock Exchanges and other kinds of securities. Participate in this market brokers, distributors, some banks and individuals. OTC Market: also called SOMA (Market Operator Open Society), acts as a " pre-university " for companies seeking to later have its securities traded on the stock exchanges. One of its main lower cost and lower requirements advantages. **YAHOO Finance**. Available at: <http://br.finance.yahoo.com/seubolso/glossario/#tab8>. Access on: 26/01/2015.

[7] Hedge - Financial protection strategy for price risk management. The futures market provides protection prices and profit margins. Hedge with futures contracts offsets the position in physical commodity, by establishing another position, reverse and equal in the future market. The fundamental reason why hedge physical positions with futures positions is an appropriate means of protection is the fact that the cash price and the future tend to move in harmony, keeping in most situations, extremely predictable relationship. This parallel price movement manifests itself because the physical markets, such as futures, are governed and influenced by the same pricing factors. **BM & F**. Available at: <http://www.bmf.com.br/portal/pages/clearing1/Derivativos/agropecuarios/glossario.asp?id=4>. Access on: 25/01/2015.

[8] TARS - AC 184 037 646 - 4th CCIV. - Rel. Judge Antonio Decio Erpen - 11/22/1984 J., in: ADIERS, Leandro Bittencourt. **Opinion About the impossibility of Exchange Contract Review Importation by virtue of the change of policy exchange rate band.** Available at: <http://jus2.uol.com.br/pecas/texto.asp?id=443&p=1 >. Access on: 29/01/2015.

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Shares this thought the judge of law Pablo Stolze Gagliano[9]: "The theory of unpredictability doesn´t simply abolished the principle of binding force of contracts nor permit the intended resolution or judicial review of the business just because the implementation was more costly, within of the natural predictability inserted in the alley of the every contract. This means the application of the theory should not be admitted just because the party made a bad deal (expected risk)".

The Superior Court of Justice (STJ)[10] expressed, in a particular case, that the theory of excessive onerous should not be applied because the changing of the soybean price results of the own nature of the business, and therefore, the signed contract should be maintained in its exact terms.

In view of all this, there is no reason to hedge doesn't be done. On the contrary, several reasons are in their favor. To illustrate this, let´s assume that the coffee bag price today costs £ 1.00 and the producers have spent £ 0.80 for their production. If they sell this coffee in about six months for the amount they expected, that is £ 1.20, they will have a profit of £ 0.40. However, there is always the risk of the price range of conversely, in which case the coffee may be sold, for example, for £ 0.60 per bag, namely £ 0.20 less than the cost price.

The producer in this position can protect himself against an eventually loss, but for that he needs to make a hedge and sell their coffee in the future for the current price. The hedge can be done also as a protection against future changes. According to Prof. Alexandre Assaf Neto[11], "if an agent has a debt in dollars, by applying in an investment pegged to the dollar, he will be protected against possible currency variations".

One opportunity that the hedge can be done is when the producer acquired equipment in the US, in installments, or who has made a loan there. In both situations they have a debt in dollars, making their assets and liabilities in different currencies, once they will receive in Brazilian Reais for the sale of their production. Thus, it shows they are not hedged, and they will lose if a devaluation of the Real happens. To avoid this, they have to chance their assets and liabilities to the same currency.

[9] GAGLIANO, Pablo Stolze. **Some considerations on the Theory of Unpredictability**. Available at: <http://jus2.uol.com.br/doutrina/texto.asp?id=2206>. Access on: 28/01/2015.
[10] **Superior Court of Justice**. Available at: <www.stj.gov.br>. Access: 27/01/2015.
[11] ASSAF N., Alexandre. **Mercado Financeiro**, 8. ed., São Paulo: Atlas, 2008.

The main mechanisms of hedge[12] are the future contracts, fixed-term, options (call[13] and put[14]), and the swap.

3. DERIVATIVES MARKET

The derivatives market offers several contracts where the hedge can be done, each with its own characteristics, thus meeting the different needs of every business. It can be said that derivatives[15] are derived from other businesses. They are therefore financial instruments established through contracts with certain prices, which varies depending on the value of the other asset. An example is the price of car insurance that comes from own car's value. The derivatives have as its main markets the future, fixed-terms, options and swap.

According to Luciano Vaccari[16], working with future contracts to farmers in the Federation of Agriculture and the State Forestry (Famato), the best way to protect the price of production is the future market. The following is a brief study of the operations used to make the hedge on the BM & F:

1) Future Market[17] - In this market the producer agrees to sell to the buyer his commodity, and he, in return, agrees to buy it on the date that the Exchange have been set. The future date shall be the date of maturity of the obligation and the value is set when the business is concluded.

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[12] FREITAS, Newton. "**OBOE Dictionary of Finance**". 6.ed., Fortaleza: Abc, 2003.

[13] Call - Contract by which the holder can buy the bidder the option commodity underlying, the due date, the exercise price. Therefore, should pay an anticipated value (premium). **BM & F.** Available at: <http://www.bmf.com.br/portal/pages/clearing1/Derivativos/agropecuarios/glossario.asp?id=7>. Access on: 25/01/2015.

[14]. Put - Contract by which the holder can sell the bidder the option commodity underlying, the due date, the exercise price. Therefore, should pay an anticipated value (premium). **BM & F.** Available at: <Http://www.bmf.com.br/portal/pages/clearing1/Derivativos/agropecuarios/glossario.asp?id=7 >. Access on: 25/01/2015.

[15] Derivatives - Financial instruments whose characteristics are linked to other securities or assets, serving him a reference. As an example may be mentioned: stock options, future contracts on the US Dollar on the Bovespa index or the DI rate. **INFOMONEY**. Available at: <http://web.infomoney.com.br//seunegocio/glossario/?key=D>. Access: 25/01/2015.

[16] Chagas, Aline. MT: future sales contracts can grow 350 % in 2007. **Cuiabá Journal**. 19/02/2007.

[17] Market Future - The future market is usually centered on a stock exchange or goods, with the primary objective of providing financial instruments that allow buyers and sellers to protect themselves from price fluctuations. The basic mechanism is the negotiation of securities or commodities, certain prices to a future date, demanding guarantees of sellers and buyers. **INFOMONEY.** Available at: <http://web.infomoney.com.br//seunegocio/glossario/?key=M>. Access: 25/01/2015.

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However, as the commodity values are in constant changes, to prevent that injury became too big on the expiring date, adjustments must be done on a daily bases[18]. This adjustment is nothing more than the settlement account between the parties, from the difference value of the commodity during one day, that is, the price at the beginning and at the end of the trading session. The result of the difference of these values is the X value to be adjusted between the parties on the same day, so the part that must receive the difference will do so within 24h.

In these contracts, if the day that the buyer wants to receive the commodity is not provided in the standard contract, he will have to accept the date established by the Exchange, what may have a lag period. It is noteworthy that the settling of the debt can be both physical and financial, which is the big difference from the outright sale to future delivery, where contracts can only be carried out by physical delivery of the goods.

This is a market that can be perfectly used by an exporter who acquires at the harvest moment a commodity to be sold later. In order to to prevent any risks he just has to sell the same quantity in the Exchange at the same date he intends to sell it.

2) Fixed-term Market[19] - It is similar to future market but there is not the daily adjustment nor the interchangeability of positions, remaining the related parties attached to each other, until the settlement of the contract[20]. It is also purchase and sale of a specific quantity of a product, with the price set at the time of completion of the deal, which is usually between the two parties interested in the product.

The price in this market is stipulated by adding the value of listed commodity on the day, the spot market, the interest shall be calculated in accordance with the terms of the contract. In this market the parties can select the date they wish, provided it is within the limits allowed by the institution.

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[18] Daily settlement. Mechanism by which the positions held by customers, the futures markets are financially right ones every day, as show gain or loss in relation to the settlement price of the previous day. **BM & F**. Available at: <http://www.bmf.com.br/portal/pages/clearing1/Derivativos/agropecuarios/glossario.asp?id=0>. Access on: 25/01/2015.
[19] Forward Market. Market where you determine the amount, price and date of settlement of a transaction. **YAHOO Finance.** Available at: <http://br.finance.yahoo.com/seubolso/glossario/#tab5 >. Access on: 26/01/2015.
[20]Oboe Dictionary of Finance. Available at: <http://www.dicionariooboe.com.br/financas/main.asp >. Access on: 11/03/2015.

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For a fixed-term contract to be signed it is necessary to make an initial deposit. There are no daily adjustments to be made. Since the difference of the values can be big after a few months, there is a possibility exists that the contractor may not be able to to pay the debt. As the BM & F is responsible for the business, it may require additional guarantees as a reinforcement of the initial warranty, if there is a devaluation of the deposited securities.

3) Options[21] - It is a contract where rights and obligations are traded at a price set by a certain date. There is the call and the put. The first gives the owner the right to buy the commodity, forcing the bidder to sell it to him, and the other gives the holder the right to sell, and the bidder has the obligation to buy.

The holder pays a X value that should be given early in the operation to the part that is only with the obligation. This value is called the premium, which is usually set in accordance to supply and demand of the options, and the time remaining until the deadline. The larger the contract time is, the more expensive is the premium. In this case, the costs are higher due to only one of the parts having the rights and the other one having the obligations. The advantage of this operation is that the losses are limited to the holder.

There is a possible that this will not be used in case it is not a good deal. Indeed, to guarantee a minimum income, the producer needs to sell the coffee bag for U$ 1.00. In this case, if he does a put to U$ 1.00, he ensures the profit while benefits from high commodity. However, if the value drops, he can uses his right to sell and will receive U$ 1.00 for the bag, once the other party is forced to buy for U$ 1.00. Whereas the price goes up, he loses the prize value but is not required to make the sale to the part and can sell the coffee on the spot market for a value that can be much higher than the contracted, for example, U$ 2.00.

4) Swap[22] - It is like the forward market, only the stipulated value is not monetary. There is an exchange of cash flows, which can be of currencies, interest rates,

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[21] Option. Instrument that provides the holder, or buyer, a future right to an asset but not a requirement; and your dealer, or bidder, a future obligation, if used by the holder. **BM & F**. Available at:
<http://www.bmf.com.br/portal/pages/clearing1/Derivativos/agropecuarios/glossario.asp?id=7>. Access on: 25/01/2015.

[22] Swap - is a jargon used in the financial market to a swap contract, be it currencies, commodities or financial assets. Ex: If you have an asset that pays a fixed rate through a swap agreement, you can exchange it for an asset that income exchange rate another coupon. **YAHOO Finance**. Available at:
<http://br.finance.yahoo.com/seubolso/glossario/#tab8 >. Access on: 26/01/2015.

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commodities, etc. It is the difference that is negotiated. As stated by Prof. Assaf[23], " The agents exchange indexes of shooting or investment of resources without interfering with the main".

Imagine an entrepreneur who signs an agreement with the bank to make an exchange of payments with different indices for a time. At the time of clearing the accounts, the payment will be in cash, in the amount of the difference between these flows. The contract must be registered at the BM & F or CETIP - Custody and Settlement, which is a management company organized by Over-The-Counter markets.

This operation is better understood with a practical example: a company must make a payment of U$ 100.00 in the following month, but wants to make sure you will pay the value date today, in Brazilian reais. Considering one dollar is equal to one real, this company will have a debt of R$ 100.00. If at the deadline the dollar values R$ 1.80, the company will receive R$ 0.80 for every dollar negotiated. However, if the dollar drops, reaching the value of U$ 0.50, it will pay R$ 50.

In another situation, the producer who makes a Commodity Swap paying variable price (coffee), to receive at a fixed price (real), in case the variable price is below the fixed price, the producer will receive from the bank the value of the difference. On the other hand, if the opposite occurs, the producer will pay such amount to the bank.

4. FINANCIAL AGENTS

Usually the farmers prefer financial agents to mediate their negotiations, as a broker. Through it they can perform operations in Exchanges as the BM & F, which is responsible for the transactions that are made on it. Despite the requirement of guaranties[24], they offer security.

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[23] ASSAF N. Alexander. **Financial Market**. 8. ed., London: The purpose of the swap contracts is do not allow imbalances between assets and liabilities due to price fluctuations. To swap the contractor protects against rate fluctuations, with the advantage of adjustment be made only at the end of the operation, that is, an instrument without cash. Atlas, 2008.

[24] Margin. Cash deposit, letter of guarantee or public or private bonds, among other assets accepted by the Exchange, required to ensure each operation, in order to cover the price fluctuation risk of two daily adjustments, or other established criteria, which is returned customer when the transaction is settled. **BM & F**. Available at: <http://www.bmf.com.br/portal/pages/clearing1/Derivativos/agropecuarios/glossario.asp?id=6>. Access on: 25/01/2015.

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Among the factors that restrict the activities of Brazilian producers at the BM & F are the high costs of administration. The rates are high and increase transaction costs. They are: fee rate[25] registration fee[26], retention rate[27] and settlement rate[28].

Another factor that keeps producers away is, in case of futures markets, the need for floating capital to cover daily margins. However, without doubt, the main issue is the lack of knowledge to act in these markets.

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[25] Fees Fee: the fee will be charged whenever there are the following triggering events:
- Negotiation of any contract, via business conducted directly on the floor, over the counter, in contract auctions held in environments authorized by BM & F or delivery due to exercise or expiry date;
- Termination of the contract for settlement at maturity;
- Settlement of the contract by reversing positions (offsetting transaction over the counter);
- Exercise of rights on the options market; and
- Assignment of rights procedures. **BM & FBOVESPA**. Available at: <http://www.bmf.com.br/portal/pages/frame.asp?idioma=1&area=informes&link=311>. Access on: 03/04/2015.

[26] Registration Fee: The registration fee will be charged whenever a contract is record the Derivatives Clearinghouse. Events such as:
- Negotiation of any contract, via business conducted directly on the floor, over the counter, in contract auctions held in environments authorized by BM & F or delivery due to exercise or expiry date;
- Settlement of the contract by reversing positions (offsetting transaction over the counter);
- Exercise of rights on the options market; and
- Assignment of rights procedures.

The registration fee will be a proportion of the fees rate in reais, with the percentage established by BM & F, for normal operation in the contract. **BM & FBOVESPA**. Available at: <http://www.bmf.com.br/portal/pages/frame.asp?idioma=1&area=informes&link=311>. Access on: 03/04/2015.

[27] Retention rate: the retention rate is a cost element for new participants and its reserve base the number of contracts held open the day before. Shall be established two criteria for determining the retention rate: one for the trading of contracts (for example: futures, fixed-term and foreign exchange swap) and another for OTC contracts (for example: swap contracts). There will be no collection of permanence rate on options contracts positions, both those traded on the trading floor as those desk. In trading contracts, the reserve base will represent the sum of all positions held open in the same commodity and in the same market, regardless of maturity. This value may be reduced, resulting business occurred with the contract at any salary or series, depending on the damping factor. **BM & FBOVESPA.** Available at: <http://www.bmf.com.br/portal/pages/frame.asp?idioma=1&area=informes&link=311>. Access 03/04/2015.

[28] Settlement rate: the rate of liquidity will be the cost generated by a physical delivery. Will be established as a fixed value, revised periodically in order to maintain the coverage of costs involved in physical delivery of the underlying asset, do not matter if it is an asset available or whether is a future contract. The payment of the settlement rate will be made along with the financial settlement of the delivery. **BM & FBOVESPA.** Available at: <http://www.bmf.com.br/portal/pages/frame.asp?idioma=1&area=informes&link=311>. Access on: 03/04/2015.

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When operations are done directly between the parties or there is some other intermediary financial institution such as a bank, contracts are made in Over-The-Counter markets. The advantage of this market is that the parties are free to negotiate, signing custom contracts, which are best suited to their needs.

5. COMPARATIVE TABLE

Future market	Forward Market	Option	Swap
Expiring date is established by the Exchange.	Part chooses the due date.	Expiring date is established by the Exchange.	Part chooses the due date.
Adjustments Diaries	Initial Deposit	Premium	None

6. CONCLUSION

There are many ways to make the hedge, which is an efficient way to protect the producers against fluctuations of prices of agricultural commodities. This is a very useful tool not only to producers but also to exporters of soy, coffee, etc., and managers of companies that issue bonds in foreign currency.

The variety of contracts offered by the derivative market allows the hedge to be done by anyone and it is quite suitable for those whose activities are related to the price of commodities, or for those who are affected negatively from the ups and downs in the Exchange market. Everyone involved in agribusiness, which have their income threatened by these price changes should use the hedge to their own benefit.

These operations avoid that the uncertainty of the price in the future may influence badly the activities, allowing business to be made safely (through BM & F), ensuring profits to producers even in case of a drop in a commodity value.

Although the mentioned rates increase the cost of operations on the stock exchange, these contracts are an alternative to the entrepreneur who wants to avoid risks. With them, the accounting can be made smoothly, since the input and output values are known beforehand, thus avoiding unpleasant surprises.

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STJ - Superior Tribunal de Justiça. Available at <www.stj.gov.br> Access on: 27/01/2015.

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