

**FLEXIBLE
OPTIONS ON
THE SECURITIES
MARKET**

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COULD OPERATIONS WITH FLEXIBLE INDEX OPTIONS IN THE OVER-THE- COUNTER MARKET CREATE ARTIFICIAL DEMAND, OFFER OR PRICE CONDITIONS?

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Abstract: This article analyzes the meaning of the changes to the flow of flexible put or call option orders placed in the secondary market, a critical element to create artificial demand, offer or price conditions of securities, as provided for in item II, subitem “a”, of CVM Instruction no. 08/79. From such analysis, this study aims to analyze whether negotiations of flexible options with index in the over-the-counter market create artificial conditions, and if they can change the order flows of these same agreements, as negotiated in the stock exchange market.

One of the critical roles of the Brazilian Securities and Exchange Commission (CVM), defined since its creation under Act no. 6.385/76, is to prevent and prohibit types of market fraud or the rigging intended to create artificial demand, offer or price conditions of securities traded in the capital market.

Such a hard task is meant to maintain the health of the market, requiring the joint effort of all independent agency professionals, ranging from the technical audit area to the board of directors, thus the reason for the existence of CVM Instruction no. 08/79, a “legal relic” of the Brazilian Capital Market which was able to predict the four possible types of discrepancy in the market: a) artificial demand, offer or price



conditions of securities; b) price rigging; c) fraudulent operations; and d) non-equitable practice.

Specifically, such instruction conceptualizes the artificial demand, offer or price conditions of securities as “being created as a result of negotiations whereby bidders or stock brokerage firms, either for fraudulent acts or out of concealment, directly or indirectly cause changes to the flow of securities put or call option orders.”

The concept of artificial conditions as provided for in CVM Instruction no. 08/79 points to two elements required to configure the irregularity: (i) fraudulent act or concealment; and (ii) direct or indirect change to the flow of securities put or call option orders.

1. FLOW OF ORDERS AND TRANSACTION FLOW

In order to grasp the meaning of the artificial conditions created in the market, it is necessary to understand what a flow of orders is and how the process of change to the flow of market orders occurs.

Order is the procedure through which an investor appoints a brokerage firm to purchase or sell assets on its behalf (the investor’s name) and under conditions specified¹. Thus, for example, a holder of an account in a stock brokerage company wishing to invest purchasing 1,000 Petrobrás PN shares must state its intended purchase to its brokerage firm either verbally or in writing, by specifying the company (Petrobrás), the type of PN share, the number (1,000 shares) and occasionally, the maximum price for accepted payment in each share, as well as other conditions.

Afterwards, the brokerage firm must enter the order issued to the negotiation systems of the Stock Exchange with all details informed by the investor.

In turn, the flow of orders of a certain asset relates to the time sequence of all call and put option orders issued by all investors associated with such asset in the market. The flow of orders for Petrobrás PN shares, for example, is the set of

¹ BM&FBOVESPA, Stock Market Operation Regulations. Chapter XII, item 12.1. Definition of Call or Put Option Orders, p. 39, available through <http://www.bmfbovespa.com.br/pt-br/regulacao/download/BMFBOVESPA-Regulamento-de-Operacoes-Versao-Completa.pdf>.



all orders issued by all customers for call and put options of such share, in time sequences. The Stock Exchanges, in particular BM&FBovespa, based on the flow of orders, arranges a book of the call and put option offers for each asset, first placing for service the call orders with the highest price and put orders with the lowest price in the chronological sequence of entry of orders into the negotiation systems.

Thus, worth of notice is the fact that the concepts of order, flow of order and offer book only make sense in the trading markets.

However, not all transactions in the capital market have the participation of brokerage firms which would handle orders issued by a customer; some transactions are carried out in the over-the-counter market directly between two investors. In such cases, no order to the market is issued as these transactions are only listed with entities/systems arranged for such, besides their listing flows not having the same consequences.

Therefore, when it comes to flow of operations, as a whole, not to mention only the stock exchange market, but also the OTC market, regardless of the presence of a brokerage firm, the definition of flow of orders is broadened and reference is made to the transaction flow. Thus, we can define the transaction flow of a certain asset as that consisting in the time sequence of all transactions occurred with the same asset.

Accordingly, there are many transaction flows, each of which related to a certain asset traded in the market. For example, there is a transaction flow for Petrobrás ON shares, a transaction flow, other than the prior one, for Petrobrás PN shares, a third transaction flow for futures Ibovespa agreements with their due date in February 2015, and so forth.

Occasional interference of such transaction flow may change the conditions in which the asset concerned is traded, therefore, we may assert that changes to the transaction flow occur by means of any act influencing (i) the price of the asset corresponding to that flow of orders; (ii) the offer of that asset; or (iii) the demand for that asset. Such act may



be an operation under conduction involving the asset, or even a simple outcry.

Such interference, as mentioned, occurs differently in trading and OTC markets.

In trading markets (either electronic or open outcry), transactions are public and centralized. A new operation on the trading floor may affect other following operations even preventing their accomplishment. Such would be the case if the new operation caused a change to the market price of the corresponding asset, causing it take distance from the prices offered by other bidders. In such case, this operation would have effectively changed the transaction flow of the asset.

Accordingly, it may be immediately asserted that negotiations with a certain asset held on the trading floor may directly affect the transaction flow of such asset.

In case of the regulated OTC markets, either organized or not, the definition of transaction flow of a given asset is the same: the time sequence of all transactions occurred with that asset. The reason is that such markets have critical differences in relation to the stock exchange market.

Resolution no. 3.505/2007 issued by the Brazilian National Monetary Council (CMN), when providing for the possibility of conducting derivative operations in the over-the-counter market by the financial institutions and further institutions authorized to operate by the Brazilian Central Bank (BACEN), determines that:

Art. 1. Multiple banks, commercial banks, savings banks, investment banks, foreign exchange banks, securities and stock brokerage companies, and securities and stock trading companies are authorized to conduct - in the over-the-counter market, inside the country, on their own account and on behalf of third parties - swaps, futures operations and operations with options, subject to a list with organized over-the-counter markets or with a system managed by Stock Exchanges, commodities and futures exchanges, by asset listing and financial settlement entities duly authorized by the Brazilian Central Bank or the Brazilian Securities and Exchange Commission.



Sole paragraph. For the purposes hereof, operations conducted out of the trading floor, open outcry or online trading environments, based on bilateral agreements and parameters decided between the parties, are considered as being practiced in the over-the-counter market.”

In accordance with the previous Resolution, derivative operations may be practiced in over-the-counter markets (either organized or not); and such operations are construed as those conducted out of the trading floor environment, based on bilateral agreements, with parameters covenanted between the parties, i.e., with a primarily private nature.

For the CVM, as determined under CVM Instruction no. 461/2007, which regulates markets, negotiations conducted in the non-organized over-the-counter market are those which, although having the participation of an agent comprising the securities trading system, are not carried out or listed with organized markets².

Regarding organized over-the-counter markets, since they are self-regulated, a fixed place is required to conduct their businesses, as well as the means for centralizing offers or for pricing (electronic system), which is not required from the non-organized over-the-counter markets.

For markets to be considered organized, they require³: (i) a system or environment to list previously conducted operations; (ii) standards adopted in their environments or trading systems for pricing, as listed under CVM Instruction no. 461/2007; (iii) the possibility to directly operate in the market, without an agent; (iv) the possibility to postpone the disclosure of information involving the conducted operations; (v) the volume operated in their environments and systems; and (vi) market-targeted investors.

The organization of these over-the-counter markets provides increased credibility for compliance with the listed businesses, since the settlement of the operation is

² Art. 4 of CVM Instruction no. 461/2007. “Trading of securities in which a member of the securities trading system operates, as an agent, as provided for in items I, II and III of art. 15 of Act no. 6.385, dated 1976, is construed as conducted in non-organized over-the-counter markets, without the business being conducted in or listed with organized markets as defined under art. 3. Sole paragraph. The trading of securities in which a member of the securities trading system intervenes, as a party, shall be equally construed as non-organized OTC market trading, when such trading results from exercise of the securities subscription activity for one’s own account for resale in the market or purchase of outstanding securities for resale on one’s own account.”

³ Art. 5 of CVM Instruction no. 461/2007.



contractually assured by the organized OTC market managing entity.

The arrangement of listing and settlement in the organized over-the-counter market makes it a CVM-regulated and inspected environment; notwithstanding, such arrangement does not outdate the private structure of such businesses, after all, (i) listing of negotiations previously conducted is permitted and, even with the possibility to determine the counterparty; (ii) trading or listing of operations may occur without the direct participation of a member of the securities trading system; and (iii) the business information, such as prices, numbers and hours shall also be provided, but these may be postponed, not requiring continuous disclosure, depending on the market specificities⁴.

To that effect, we should point out that, by listing businesses with the organized over-the-counter market, some rules and parameters must be observed, e.g. prices cannot be distorted, to the extent that businesses out of the market price are not even allowed in the listing.

2. BRAZILIAN STOCK EXCHANGE AND OTC MARKETS

After understanding the concepts of order flows and the transaction flow in the capital market, we must analyze how markets are organized in Brazil and, accordingly, a question is raised: do over-the-counter markets and trading floors operate just as they do in the rest of the world?

In Brazil, as well as in many other countries, we can see two core types of markets in which financial assets are traded. The first is the trading floor market or stock exchange market, where all operations are conducted in a centralized environment.

Such environment in Brazil is the trading floor system of BM&FBovespa which, as of July 2009, ceased to be an open outcry and moved entirely online. In such a market, brokers

⁴ Such characteristics of the organized over-the-counter market are listed at the Investor Portal of the Brazilian Securities and Exchange Commission: regulated Stock Exchange and OTC markets, as available through http://www.portaldoinvestor.gov.br/menu/Menu_Investor/sistema_distribuicao/markets_regulamentos.html



issue offers for asset call and put options which can be openly viewed by all remaining bidders.

The second type of market is called over-the-counter market, and its major characteristic, as defined by Duffie⁵, is that there is no central mechanism allowing for one to view the call or put offers, the transactions conducted or the outstanding positions at any given time. In this type of market, bidders have to find another broker interested in operating on the other side of the intended business.

Over-the-counter markets are markets in which exchanges are not made by means of a centralized environment, such as trading floor. When purchasing assets from a seller on the trading floor, the purchaser is, in fact, doing business with the stock exchange, which purchases the assets from the seller just to resell them to the purchaser whereas in the over-the-counter market the parties directly negotiate their transactions with each other, bilaterally and privately. Thus, in over-the-counter markets no offer of a certain asset is listed, as with assets traded on the trading floor, where all calls and sale offers of such an asset are disclosed in real time to all parties in the market.

As mentioned above, on the trading floor market, all transactions are mediated by the stock exchange. In this market, such transactions are completed by a centralized broker, the central counterparty, serving as an agent between purchasers and sellers. The over-the-counter markets, in their turn, are decentralized. They actually have purchasers and sellers searching for counterparties to the operations intended for conduction.

Another remarkable, key characteristic of over-the-counter markets is that the assets traded there are not standardized. On the other hand, the assets in a negotiation on a trading floor are, without any exception, standardized for the stock exchange operates as a guarantor of all businesses carried out.

In over-the-counter markets such assets are traded in accordance with the exclusive need of the parties; following their interest in the characteristics of the assets: quality, number, physical and financial settlement, etc. Since there is

⁵ DUFFIE, D. **Dark Markets: Asset Pricing and Information Transmission in Over-the-Counter Markets**. 1st. Ed. Princeton: Princeton University Press, 2012.



no central authority to guarantee such exchanges, the credit risk of such negotiations is reasonably high.

The credit risk inherent to such trading operations, known as counterparty risk, is the third remarkable characteristic of this market. When conducting a private transaction in an over-the-counter market, there is always the risk of not obtaining what the parties traded for. The counterparty may not be able to deliver the financial product that it traded for within the terms agreed. It is also possible that a financial asset different from the one promised be delivered, whereas on a trading floor, there is no counterparty risk. Exchanges between parties occur under the monitoring and guarantee of the stock exchange. In fact, in stock exchange-organized trading markets, such entity assumes the physical and financial settlement of all transactions, as well as the credit risk of all businesses.

As regards visibility and disclosure of information, the trading floor market is an open market where participants have immediate access to the prices practiced, the offering book and the specificities of assets traded. On the over-the-counter market, however, such information is concealed from further participants, and disclosed in an orderly manner.

It is also possible to find some over-the-counter markets holding a structure (usually electronic) disclosing the business prices selected to a wide group of participants of such market. Another common practice in some particularly active over-the-counter markets (such as the default swap market, credit market) is the availability to customers of a list of the prices offered by the market makers (typically, investment banks and brokerage firms) on a potential exchange menu. Market makers take the risk of losing their reputation if they frequently refuse to do business at the prices they have listed⁶.

It must be noted that the over-the-counter markets may generate potential transparency issues, even on an electronic structure when compared to trading markets. The reason is that trading markets use electronic communication networks, which provide an immediate, full report of the transactions conducted by the market players, ensuring a high level of pre-exchange transparency (which, in accordance with the

⁶ Duffie, 2012. Op. cit. p. 4-5.



author, always includes, as a minimum, the best enforceable call and put offers).

Nevertheless, such lack of transparency in over-the-counter markets is precisely a core element to their operations. Earnings made by market makers, for example, depend on the volume of business they are able to conduct as well as the spread between the put and call prices that they practice. Such difference depends on the level of information the customers and counterparties have in relation to the prices in the remaining market for the assets intended for exchange. Therefore, it is correct to state that market makers aim at a certain level of opacity in the over-the-counter market, thus ensuring usefulness to their services.

Consequently, as market transparency increases, market makers are required to decrease spread between put and sale to be able to offer competitive pricing to their counterparties. However, if such transparency is excessive, some of those market makers shall fully lose the incentives to work in the market, due to fixed costs and the adverse selection risk by informed counterparties. Accordingly, there is a risk for increased transparency in the over-the-counter markets ending up by generating decreased opportunities for exchanges by investors, by means of their adverse consequence on the incentives of market makers.

3. CHANGED ORDER FLOWS IN ORGANIZED OTC MARKETS

Once it is accepted that trading operations with a given asset may influence the flow of their transactions or even the flow of some other asset, the question can be more specific: may the changes to transaction flows occur indistinctively in stock exchange and OTC markets?

Considering that the trading operations listed with organized over-the-counter markets are privately conducted, such trading operations do not directly interfere with each other, with nothing preventing, for example, the same asset from being subject to two or more parallel transactions at different prices.

As noticed in trading operations with certain assets occurred in over-the-counter markets, they have no direct impact



upon any transaction flow, either of the same asset, or of some other. Such impact, if any, should result from some indirect process for assignment of pressure between markets.

As to such possible indirect assignment of pressure between markets, it may occur in three different mechanisms:

I. A trade with a certain asset may lead to the requirement of a trade with another asset in another market. That is what happens, for instance, with banks trading swap agreements with their customers. It is widely known that non-financial institution investors prefer to operate Pre vs. DI Interest Rate Swap Agreements (over-the-counter market) instead of DI Futures Agreements (trading floor market) with a similar consequence. Since financial transactions of swap agreements are solely upon agreement expiration, differently from futures agreements with daily financial settlement, there is a clear preference by non-financial institutions to use swap agreements. For price purposes, banks prefer to adjust their portfolios with futures agreements. Thus, when a bank trades a customer's swap agreement, such trade may generate an operation in the DI agreement futures market. Investment Funds using "long-short" type strategies for shares represent another common example in which trading with an asset leads to operations with another asset.

II. An arbitrage operation between markets is another mechanism where the trade in one market affects the transaction flow in another market. Let us for instance consider the Petrobrás PN shares traded in BM&FBovespa concurrently with the trading operations of Petrobrás PN ADR in the New York Stock Exchange. Any changes to the price of such share in either Stock Exchange is immediately assigned to the other stock exchange. Trading desks focused on exploiting price differences for the purpose of arbitrage profit launch purchase orders to the cheapest site and sale orders to the most expensive site, and the process continues until the price difference cannot cover the operating costs.

III. Information found when trading in a certain market of an asset represents the third mechanism for change to the transaction flow of another asset. For example, we have the case of trading with Petrobrás ON options at the Bovespa segment. Such trading reveals the expected futures volatility (the so-called implied volatility), by the market brokers, for



such share. This information may change the decision-making process of investors operating with both Petrobrás ON options and with Petrobrás ON at sight. Therefore, disclosing information generated in a given market could affect the operation of other markets. The very price generated in trading operations in a market could influence the prices practiced and, accordingly, the transaction flow of other markets.

4. IBOVESPA FLEXIBLE OPTION AGREEMENT LISTED WITH OTC MARKETS AND POSSIBLE CHANGE TO FLOW OF ORDERS OF SUCH ASSET IN THE STOCK EXCHANGE

In regard to the businesses involving a certain asset subject to listing with a stock exchange, it should be confirmed that such businesses, if also traded in the over-the-counter market, could affect the transaction flow or the flow of some other asset traded in the stock exchange market.

To answer that question we shall refer for illustration to the Ibovespa Flexible Option Agreement traded in the stock exchange, BM&FBovespa and, due to such asset, we shall analyze (4.1) the specificities of option agreements; (4.2) the specificities of BM&FBOVESPA Ibovespa Flexible Option Agreements; and (4.3) the trading process of the flexible options listed with OTC market, defining the role played by the stock exchange in such trading.

4.1. Option Agreements

Option agreements are financial assets from the derivative category because their value derives from another asset. In this specific case, options are assets that entitle their holders to purchase (in case of call options) or to sell (in case of put options) another financial asset (shares, commodities, an index, etc.) at a fixed price, referred to as exercise price. Such asset is known as the option subject matter, and the option value derives from such asset. Options are traded in trading markets or in over-the-counter markets. An option price is called option premium or merely premium. Such name results from the fact that the option agreements assure to investors the authority to arrange insurance operations against undesirable fluctuations of the price of the financial asset under the option agreement.



Since such operation is only worth, from the financial perspective, when the option subject matter reaches a specific sight price, the intrinsic value of an option varies so as to reflect such changes to the price of their subject matter. As previously mentioned, options are financial agreements which enable their holders to purchase or sell an asset at a fixed price. Such type of agreement has some common characteristics requiring individual analysis.

An option is an agreement executed between a bidder (seller of the option) and a holder (purchaser)⁷. There are six critical characteristics defining an option agreement.

Lack of information on any of such characteristics makes the assessment of the option agreement impossible. Such characteristics are: (i) The asset under the option agreement; (ii) the nature of the operation that the option authorizes the holder to conduct; (iii) the call right or the put right; (iv) the maturity or exercise date; (v) the exercise price; (vi) when the call or put right can be exercised; and (vii) the possible limitations as to exercising the right.

The option subject matter is the asset on which the option was drafted, known as underlying asset. It can be a share, an index or a commodity, for example. Furthermore, options are distinguished by the right they give to their respective holders: an option granting the call right of a certain asset is named call option (or simply call), while an option granting the right to sell a certain asset is named put option (or simply put).

The third critical characteristic of options is their maturity, i.e., the maximum term their holder has to either exercise or not the right granted by the option. Any option getting to the due date of the exercise right without being exercised entirely loses their value, thus ceasing the holder's right to purchase (or sell) the asset under the option at the exercise price. Options still differ as to the period their holders are authorized to exercise them: a US-option allows its holder to exercise it at any time prior to its due date, while a European option can only be exercised on its precise due date.

⁷ Such nomenclature is used by BM&FBovespa in its regulations and manuals, and shall be used throughout this text.



An option agreement has an exercise price, title given to the price of the subject asset, either for purchase or sale, at which the agreement holder can exercise its right.

Finally, option agreements may occasionally hold special clauses limiting the right granted to the agreement holder. Trade barrier clauses, usual in BM&FBovespa flexible option market, for example, fit to such type of characteristic.

The lack of information on any of such six items prevents information on businesses occurred with the option agreement from being properly assessed. If, for example, BM&FBovespa failed to report to the market the exercise date of a business occurred with an option agreement of Petrobrás PN shares, the information as to the value of their premium would be useless to any party. No investor could use such information in their purchase and/or sale upon deciding for any asset or agreement in any market whatsoever.

A simple example of option can help understand better the nature of option agreements. Let us suppose a US-call option of company XYZ with exercise price of BRL 50.00 and due date on 05/19/2015. Such option grants its holder the right to sell a share of company XYZ at BRL 50.00 per share. Since it is a US-option it grants its holder such call right to be exercised at any time before 05/19/2015. On the day following the date of the exercise such call right granted by the option ceases to exist, and then the option loses its value.

Let us consider that the sight price of company XYZ shares is BRL 40.00 on 05/19/2015. In this case, it would not make sense for the option holder to exercise its right to sell the share at BRL 50.00, because such share is being traded on the day at a market price lower than the exercise price. If the holder wishes to purchase the share, he/she may do so directly in the market at a price lower than the exercise price. In such case, the premium of such option, on such day, has negligible value, after all, its value is so defined by the remote possibility that, until the end of the businesses, the price of the XYZ share will increase in excess to BRL 50.00.

On the other hand, if on this same exercise day, the XYZ share amounted to BRL 60.00, the option premium would be traded at approximately BRL 10.00, since such option



agreement permits the purchase, at BRL 50.00, of an asset which is being traded in the market at BRL 60.00.

However, the question remains: what is the value of an option premium prior to the exercise date? Or else, what should be the premium at which the option should be traded in the market? Obviously, the term for exercise, the share market price and the difference between such price and the exercise price of the option should influence the option premium. If the XYZ share, used in the previous example, is being traded at BRL 49.00, with one month left for the exercise, a certain premium is set. Nevertheless, with the same month left for the exercise, the share is being traded at BRL 30.00, and the remaining items constant, the premium of such call option should be much lower.

Another critical factor that can also influence an option premium is: the expected volatility of the underlying asset price. The higher the expected volatility, i.e., the higher the expected fluctuation in the price for the asset under the option, either for more or for less, the higher the premium should be, of both call options and put options. The reason is that there are greater chances for the asset price to reach the exercise price. If an asset has expected volatility of 10% aa, the premium of its options, both call and put, is quite lower than that in a situation where the expected volatility is 40% aa. In the first case, the asset price is expected to fluctuate way less than in the second, evidencing a reduced chance to exceed the exercise price.

A call option agreement grants its holder time to decide whether it is interesting or not to purchase the asset under the option. Let us consider the same example of company XYZ shares, this time traded at BRL 50.00. If the investor purchased such shares, he would be risking BRL 50.00, as well as the cost of the opportunity to invest such fund in another asset or in a public bond. On the other hand, by purchasing a call option of such share, with exercise price of BRL 50.00, and exercise date on 05/19/2015, if the share is occasionally decreased to less than BRL 50.00 until the exercise date, it will have lost only the amount of the premium paid.

Accordingly, a call option is a replacement of a share purchase. In such case, it is clear that the interest rate of a risk-free investment is a factor influencing an option market



premium. In a scenario where interest rates are at 20% p.a., the premium of the call options is entirely different from that found when the interest rates are at a level of 8% p.a., for example.

Thus, if the call options provide alternative means to purchase an asset, the put options provide an alternative for sale in asset markets. Therefore, put options are equally influenced by the interest rates of the market.

In summary, the factors usually influencing the premium of the share call and put option agreements are the following: (i) the intended asset price; (ii) the exercise price; (iii) the term until exercise; (iv) the intended asset volatility until the exercise date; and (v) the interest rates⁸.

Four of the five factors above are noticed in the market and that is no new information: the intended asset price, the exercise price, the term before the exercise and the interest rates. The fifth factor: the intended asset volatility before the exercise date, cannot be noticed. The intended asset volatility is the only new item that trading in the market with options generates for investors, in addition to the option premium itself. Such factor, the volatility, is not noticed, but can be estimated by adopting specific circumstances for operation of the intended asset market. For example, the so-called Black-Scholes model⁹ for the pricing of options on European shares (exercise possible only on the due date) requires the adoption of the following circumstances regarding the stock market:

I. The intended asset price follows a movement called geometric Brownian motion;

II. There is a single risk-free interest rate, which is constant during the option maturity, for which loans may be borrowed and applications may be made;

III. There are no transaction costs, i.e., there is no brokerage, fees, listing fees, settlement fees, purchase and sale spread, etc.;

⁸ DON M. Chance. *An Introduction to Derivatives*, Third Edition. Harcourt College Pub; 3^a ed. (November, 1994), p. 123.

⁹ The Black Scholes Model may be found in any finance text book. Refer to, for example, Hull, John C. (2008). *Options, Futures and Other Derivatives* (7^a ed.). Prentice Hall.



IV. The option agreement intended asset does not pay dividends or any other type of payments;

V. The intended asset volatility is constant during the option maturity;

VI. The option agreement intended asset may be "short sold"¹⁰, free from any restrictions.

Based on this set of circumstances there is a mathematical expression determining the proper premium of an option agreement. By using the sight price, the exercise price, the term before the exercise date and the risk-free interest rate, such expression enables to find out the expected volatility used when pricing that option. This is called **option premium implied volatility**.

Thus, determination of the only information not known by the market players in trading with option agreements, i.e., expected volatility of the intended asset before the exercise date and implied with the option premium, requires: (i) the adoption of a set of circumstances on the operation of the option intended asset market; (ii) familiarity with the contractual clauses of the option, including the exercise price and the term to exercise the option; as well as; (iii) the intended asset price; and (iv) the risk-free interest rate that was in the market precisely at the time of the trading.

Furthermore, for a given investor to determine such implied volatility, it is required to follow up in real time the operations with options, associating their premiums with the intended asset price and with the interest rate of the instant the trade occurs. Any other procedure (for example, use of mean or closing prices) generates distortions to the estimated volatility, which will increase as the lack of competition between the sight price of the intended asset, the interest rate and the option premium value increases.

We may then notice that, even in trading markets, information on trading operations with options serve only to influence investors in making their decisions with their orders being changed, if: (i) all characteristics of each agreement are properly disclosed along with their premium; (ii) the

¹⁰ An investor "short" sells an asset when it sells an asset not existing in its investment portfolio, thus requiring the asset to be borrowed from another investor.



premium of the options is real-time reported for investors to be able to calculate the intended asset price at the time of the transaction. As we shall detail below, the conditions are not complied with by Ibovespa Flexible Option Agreements.

4.2. Ibovespa Flexible Option Agreements

In Brazil, BM&FBovespa provides a system for listing operations for three different types of derivative agreements traded in the over-the-counter market: (i) swap agreements; (ii) forward contracts; and (iii) flexible option agreements.

Specifically, in regard to the flexible option agreements, these are financial instruments which differ from the options traded in the trading floor, since they allow, as mentioned previously, the option issuer and holder to directly and privately trade, in a free manner, the agreement characteristics. For example, while traditional options, listed and traded on BM&FBovespa trading floor, have a preset due date, a flexible option can have any due date as desired by the parties. The set of characteristics of the option agreement freely chosen by the option holder and bidder include:

- agreement size;
- exercise price;
- exercise date;
- type of option, if US or European;
- type of quotation to serve as price reference on the exercise date;
- occasional barrier prices;
- occasional rebate premiums (if the options have a barrier);
- occasional price caps.

BM&FBovespa enables financial market players to list flexible option agreements that may be executed on the following



intended assets ¹¹ : Ibovespa (Ibovespa) Index, BOVA11 (Ibovespa Index Fund iShares), FIND11 (It Now IFNC Index Fund), GOVE11 (It Now IGCT Index Fund), IBrX-50, ISUS11 (It Now ISE Index Fund), Metals, Bulk Grain Soy, Foreign Exchange Rates, Interest Rates.

With regard to the flexible options on Ibovespa, the first topic worth of attention is that the parties can negotiate the specific Ibovespa quotation to be used upon the agreement settlement. There are three options the holder and the bidder can use:

- **PM**: Mean Ibovespa, corresponding to the mean value of Ibovespa, which may be D+0 (same due date as the agreement) or D-1 (business day prior to the due date of the agreement);
- **PF**: Closing Ibovespa, corresponding to the last value of Ibovespa (closing quotation), which may be D+0 (same due date as the agreement) or D -1 (business day prior to the due date of the agreement);
- **PL**: Settlement price Ibovespa, as calculated and disclosed by Bovespa, which may be D+0 (same due date as the agreement) or D -1 (business day prior to the due date of the agreement).

The parties may also negotiate the specific period to be used in order to calculate the mean PM Ibovespa, if that is the alternative chosen as Ibovespa quotation. It may be specified, for example, that the reference sight price for exercise will be the Mean Ibovespa of the start-up of the trading floor before 11 a.m. of the exercise date, or any other time of the exercise date or time of the prior date.

The parties can also determine barriers to call or extinguish the rights and obligations of the option. Such options assume the form of barrier prices to be compared to the sight price of the option, i.e. to the sight price of the financial asset comprising the option (in this case, Ibovespa index). The parties can choose among the following alternatives:

¹¹ This information is available through the following Internet address: <http://www.bmfbovespa.com.br/shared/iframe.aspx?altura=1100&idioma=pt-br&url=www.bmf.com.br/bmfbovespa/pages/contratos1/contratosProdutosbalcao1.asp>.



- **Knock-in:** if the sight price, at any time of the service life of the option, reaches the barrier price determined between the parties, the right to exercise the option by the purchaser and the obligation to comply with the exercise by the seller are then imposed. The option is also differentiated according to the relationship between the sight price and the barrier price on their entry date, as follows:

Up-and-in: the sight price, on the option entry date, is below the barrier price;

Down-and-in: the sight price, on the option entry date, is above the barrier price.

- **Knock-out:** if the sight price, at any time of the service life of the option, reaches the barrier price determined between the parties, the rights and obligations related to the option are ceased. The option is also differentiated according to the relationship between the sight price and the barrier price on their entry date, as follows:

Up-and-out: the sight price, on the option entry date, is below the barrier price;

Down-and-out: the sight price, on the option entry date, is above the barrier price.

Furthermore, such options can only accommodate combinations of, at most, two types of barriers, provided that neither is a *knock-in* or a *knock-out*. In addition, the *knock-out* barrier shall only be valid if the *knock-in* barrier has been previously called.

Another factor associated with the existence of *knock-in* and *knock-out* barriers is the trading of a rebate premium. Rebate is a value (expressed in points or as a percentage to be applied to the source premium) which is paid by the bidder to the holder, in the event the option expires with no value.

Another aspect related to the possible prices that can be negotiated is the existence of a "price cap" (referred to as PB). That is a cap value of the sight price for the purposes of option exercise, expressed in Ibovespa points. For the case of a call option, such cap characterizes a maximum value; for a put option, a minimum value.



In case of agreements with security, payment of the rebate should be made on the business day following that when the option ceases or on the business day following the due date if the knock-in barrier has not been called. In agreements with no security, the parties may determine the rebate premium payment date as:

- **Knock-out option:** the date when the option ceases or the first business day afterwards;
- **Knock-in option:** the agreement due date or the first business day afterwards.

For the purposes of financial settlements, the price for calculation of the exercise value (referred to as VL) may be selected by the contracting parties in accordance with the following possibilities:

- **Mean indices:** consist in the arithmetic mean of Ibovespa calculated in the period defined by the contracting parties¹²; and
- **Last index (U):** Ibovespa quotation, as agreed upon by the parties.

Another critical characteristic the investors may define is the type of option, if European or US.

One of the most important factors distinguishing the flexible options from the traditional ones is that the parties can negotiate guarantees to exist. While the traditional BM&FBovespa options require deposit of assets to serve as guarantee, if the bidder fails to settle the option terms in the event of the exercise thereof by the holder, the flexible option agreements can be executed without requiring such guarantee. If the parties choose for its existence, the guarantee shall be deposited to BM&FBovespa and will have to abide by the same rules as the guarantees of the traditional options. In particular, the stock exchange defines

¹² The arithmetic mean is given by the formula: $M = \frac{\sum_{k=1}^n IBV_{t-k}}{n}$, where: **M** is the Mean Ibovespa calculated to be the exercise value; **IBV** is Ibovespa quotation, defined by the parties; **n** is the number of notes considered in the mean calculation, which cannot exceed the term comprised between the listing date and the exercise date of the agreement; and **Last Index (U)**: Ibovespa quotation, as agreed upon by the parties.



that only the following assets can be used as a guarantee margin¹³:

- cash;
- national federal public bonds;
- national private bonds;
- financial asset gold;
- ETF shares¹⁴ and
- shares from companies listed with BM&FBovespa and custodied at the Depositary Center of BM&FBovespa.

If the option does not have a guarantee, BM&FBovespa will merely list the existence of this agreement in its systems.

Finally, bidder and holder also have flexibility to define the conditions related to the settlement of the option in the year, i.e., on the preset exercise date¹⁵.

In summary, the Ibovespa flexible call or put option agreements admit negotiation and adjustment, by the parties, of the key agreement characteristics, aimed at providing a financial instrument which meets their specific requirements. Such characteristics are related to:

- Agreement size;
- Exercise date;

¹³ This information is available through:

<http://www.bmfbovespa.com.br/garantias/garantias.aspx?Idioma=pt-br>.

¹⁴ Index Funds, known in Brazil as Exchange Traded Funds.

¹⁵ The option settlement in the year is calculated as follows: $MVL = (P - PE) \times Q_e$, where MVL is the exercise value in Brazilian Reais; P is the unit price for settlement, to be equal to the mean indices (M) or the last reported Ibovespa (U), according to the alternative of variables specified by the parties. For calculation purposes, P may be PB or IBV , whichever is lower, where: PB is the price cap, as defined above; IBV is the Ibovespa index, the intended option, as defined above; PE is the exercise price; M is the amount in Brazilian Reais of each index point, as determined by BM&F; Q_e is the number of agreements exercised, being the entire agreement or its balance, in case of automatic exercise on due date.



- Type of Option (European or US);
- Barrier clauses;
- Rebate clauses;
- Price Capping clauses;
- Sight Ibovespa calculation method as of the date for exercise of the settlement; and
- guarantees.

Any change to one of the characteristics above results, in general, into a change to the option premium. Thus, for an option to be properly assessed, the accurate specification of each is required. Reciprocally, given the premium contracted by an option, the respective implied volatility cannot be determined without each of the characteristics above being precisely specified.

Therefore, it is noticed, considering the specific characteristics of the Flexible Option Agreements, that an agreement listing, given the involved business arrangement, cannot change the transaction flows of the remaining agreements being concurrently listed with the OTC market, due to their 'handcraft' character, especially when defining the call or put option price.

5. Negotiation of Ibovespa Flexible Options and securities traded in the stock exchange

If BM&FBovespa listed Ibovespa Flexible Option Agreements are traded in the over-the-counter market, the stock exchange operates, in such case, as a mere registry of the businesses conducted. In practice, most trading operations occur either by phone or through some electronic communication means, without informing the remaining market players and, after the closing of each transaction, they are listed with BM&FBovespa.

A noticeable contrast is then noted between the Ibovespa Flexible Options, directly and privately traded between two counterparties, and the options traded on the trading floor. On the trading floor, the purchase and sale offers are



concurrently announced to all market players, by means of public outcries.

As seen above, Ibovespa Flexible Options may be specified from a huge variety of contractual clauses, which are freely selected by the contracting parties. Thus, it may be said that each Ibovespa Flexible Option traded has its unique characteristics and shall be hardly comparable to other options traded in the market. On the other hand, options traded on the trading floor have standard clauses, such that the whole market trades the same option.

Even if two BM&FBovespa Ibovespa Flexible Options, with identical characteristics, were being traded at the same time, nothing would prevent them from being contracted at different premiums, since there is no centralized market to trade such options. In this case, if the respective premiums, although different, were within the limits imposed by BM&FBovespa (as determined in item 7 of the Official Issue 078/96-SG), both options would be listed with the stock exchange system with no problem at all.

This is because such options are traded in the over-the-counter market. On the other hand, a BM&FBovespa trading floor counts on a central pricing mechanism, which ensures that, at each moment, a single price prevails for each asset traded therein.

All that enables to conclude that trading operations with Ibovespa Flexible Options, for they occur in the over-the-counter market, have no direct impact upon any transaction flow, either of Ibovespa Flexible Options, or of any other asset.

Therefore, the only way a given transaction with an Ibovespa Flexible Option could influence other trading operations and, accordingly, affect some transaction flow in the market would be indirectly, by disclosing information associated with the transaction conducted. In particular, such information should allow, as a minimum, for determining the volatility used when assessing that option (implied volatility).

However, not by these means the trading of BM&FBovespa Ibovespa Flexible Option Agreements would affect other markets or other trading operations. The reason is that the information on the businesses conducted with such type of



instrument is disclosed to the market by BM&FBovespa only on the business day following that of their listing with the stock exchange.

In addition, the stock exchange only reports: the exercise date, the size of the agreements, the mean exercise price and mean premium practiced. It means that the following items are not reported: (i) individual exercise prices; (ii) individual premiums; (iii) type of option (if European or US); (iv) barrier, rebate or premium capping clauses; etc.

Therefore, the information disclosed by the stock exchange regarding businesses with Ibovespa Flexible Options listed therein does not allow for estimating the implied volatility or any other significant parameter when it comes to decisions for the purchase and/or sale of assets by the investors.

Accordingly, any indirect impact of the operations with Flexible Options upon any transaction flow in the market is also discarded.

6. Findings

This analysis aimed at discussing how businesses in a market could affect the flow of orders in a different market, interfering with their demands, including or suppressing offers and, thus, possibly changing the prices of such market.

The reason is that the potential or effective change to the flow of orders is a critical element to characterize the artificial demand, offer or price conditions of securities, as provided for in item II, subitem "a" of Instruction no. 08/79.

We noticed that operations carried out in the over-the-counter market and, in particular, operations with Ibovespa Flexible Option Agreements, have no direct impact upon businesses with the same asset or with any other in the stock exchange market.

We also noticed that, for the information generated in the over-the-counter market to affect other markets, the stock exchange would have to report, for each separate agreement of Ibovespa Flexible Option listed therewith: (i) the exercise date; the exercise price; (iii) the type of option, if US or European; (iv) the barrier and rebate clauses; (v) the price



capping clauses; (vi) the method to calculate the Sight Ibovespa on the exercise date for settlement; and (vii) the option premium.

However, BM&FBovespa does not disclose, for the Ibovespa Flexible Option Agreements, the information above in real time, only afterwards, the exercise date, the mean exercise price and the mean premium practiced in operations with their due date on each date.

Since this information is sufficient to determine the volatility used when assessing the options, we conclude that such information is, in practice, useless for the decision-making process of the market brokers and, thus, it is not possible that operations with Ibovespa Flexible Options will indirectly affect, by merely disclosing the information, conditions in other markets and, accordingly, the accomplishment of operations or the prices determined in other markets.

In other terms, since trading operations with Ibovespa Flexible Option Agreements occur in the over-the-counter market and not on a centralized trading floor, there is no offering book for such options. Each business occurs in a handcraft process of bilateral negotiation, at private level, reinforcing the impossibility of a business in such market affecting both this and other markets. It is thus pointed out that the mere information of the occurrence of a business in an over-the-counter market does not affect, in any useful manner, the businesses of any market.

Thus, the only remaining manner for a transaction with Ibovespa Flexible Options to affect the conditions of other markets is if the purchaser and/or seller of the Flexible Options, due to such transaction, goes, on their own account, to other markets, encouraged by arbitrage, for requiring hedge or for any other reason, and conduct new operations there. In such case, however, it is evident that the impact upon this other market shall be due to these new operations carried out therein and not to the source transaction with the Ibovespa Flexible Options.

In summary, analyzing the characteristics of the over-the-counter markets associated with the economic characteristics of the operations with Ibovespa Flexible Options can make us draw the conclusion that listing such agreements with a stock exchange does not affect the trading operations of other



assets in the same market or in other markets and, therefore, cannot affect, neither directly nor indirectly, the transaction flows in the same market or in other markets.

Due to such evidence, there is no creation of artificial demand, offer or price conditions of securities by agreements listed with the over-the-counter market, although it is structured in an organized manner. Accordingly, item II, subitem "a" of CVM Instruction no. 08/79 shall not apply to these agreements.