

Instituto Cultural Minerva

Institute of Brazilian Issues

The George Washington University

Washington, DC

The São Paulo Commodities Exchange (BMSP)

By Emilio Carlos Dantas Costa

Minerva Program, Fall 1996

The São Paulo Commodities Exchange (BMSP) was founded on October 26, 1917. Its statute had been approved in the same year, on November 8, and its building was inaugurated on the following year, on April 3.

In 1917, a group of traders decided to organize a stock exchange to negotiate commodities in São Paulo. By that time, the Brazilian economy was terribly damaged by the exportation policy crisis demanding an urgent update and diversification on the domestic market. The Exchange would be a fundamental element to speed up this process. The founders aimed to foster the commodities production and trade, the products classification, the balance between demand and supply, the arbitrage of pending matters and a protection against price variation.

The planned structure already demanded an association of members to support the Exchange and to guarantee clear dealings, as well as a solid financial position. The founder group started searching for businesspersons that could offer those conditions in São Paulo. On July 1917, there were 200 adhesions to the project and, on October, the Exchange was founded, starting its activities on March, with 259 members.

The Coffee Economy had been declining since 1909, with an overproduction that required a policy that would hold the coffee price high. This policy was based in the finance of storage through explosive currency emissions. The capital had started to move towards industry and, 10 years after the Exchange foundation, the industry income was greater than the rural one. That is one reason that made cotton one of the first commodities to stand out in the trading floor since the beginning of trades. In 1920, 31% of the Brazilian industries were located in São Paulo, with a great highlight to the textile ones.

The textile industry requires standardization and classified raw material, known price levels, basic conditions to future market growth. By the end of the First World War, the cotton supply was increasing. Coffee plantations had been dismissed due to the terrible frosts of 1918 and the cotton cultivation was taking over those areas. The economy was facing great changes among which the Exchange tried to emerge. In 1916 the official Coffee Stock Exchange, placed in Santos, broke down, discouraging institutions of the same nature. However, forming a real solid Stock Exchange with the

support of local businesspersons, the São Paulo Clearinghouse was created, presenting a similar structure to our current compensation houses.

As the stocks were sold for its constitution, the Exchange became very successful, with a return equivalent to 12 times the capital invested. The business with cotton and sugar increased rapidly, representing the main income source. The trading floor negotiated around 60 thousand tons of cotton per year. The BMSP gradually created a structure of classification, standardization and information about this product that gave it the title of *the best world organization specialized in cotton*, awarded by the United States Agriculture Secretariat. In 1914, the Exchange was declared *technical and consultative organ of the public power* by Vargas Government, due to the relevant role it played in the industry and agriculture development. The 1929 coffee market crisis brought great loss to the BMSP dealings. The crack on the New York Stock Exchange, representing the top of the process, caused misfortune to a large number of traders, damaging the textile industry at that time. The pessimism took over the market and the economic crisis terribly reached the business. A lot of factories closed down and the weakening of the BMSP was impossible to avoid. Between 1930 and 1932, the amount of cotton negotiated in the Exchange fell 90% compared to the average of the previous 3 years. The Exchange still tried to bring up some markets and open others, but the atmosphere was not favorable. The consequence was a great reduction in business and the drop of expansion projects.

The coffee decadence worked as a tremendous stimulus to diversify the agriculture in Sao Paulo. Cotton appeared with double power in the 30's. At the end of this decade, it took over areas previously designated to coffee cultivation. The Exchange was organized with the optimistic perspectives of the product exportation, with samples of the Brazilian product being forwarded to the international market, including the Osaka Exchange, in Japan. The cotton exportation, which represented more than 30 thousand tons in 1930, reached the number of 323 thousand tons at the end of decade. The BMSP recovered negotiating 15.7 thousand tons in 1935, 35.3 in 1936, 53 in 1939 and more than 150 thousand tons in 1940!

At this period, new rules were set to negotiate the available and also for the exportation organization. The Exchange played an active part in the fantastic Brazilian growth outbreak. In the trading floor, the brokers dealt with products such as cotton, garlic, peanut, bean, corn, etc. The headquarters, located in Sao Bento Street, downtown Sao Paulo, were no longer able to hold such amount of business and, in 1936, BMSP shifts to Líbero Badaro Street, also downtown. In that year, BMSP became the pioneer in spreading economic news by radio, creating a special program to inform better the market about the trades and quotations. The radio program called "Exchange Time" was widely spread out and coordinated by a specific sector of BMSP.

The year of 1937 brought an internal crisis, with the implementation of a new and repressive political system, called *New State*, and an external one caused by the tension strengthening in Europe, which ended up in the Second World War. At this time the situation was pretty different for the Brazilian Exchange though. The country had been through several changes, no longer depending exclusively on the coffee cultivation, or having the internal market tightened up to importation policies. The war worked out as a terrific catalyst of the potential development accumulated during the thirties.

The world depended of imported raw material and Brazil easily sold its whole production. The textile industry recovered and supplied the market with more than one million meters of material per year, the double than the amount of the twenties, and the cotton contracts multiplied in the BMSP. Its floors worked with more than 1.5 million tons between 1944 and 1946.

The importance of the Exchange was recognized by the Government and it was declared technical and consultative organ of the public power. The responsibility of the members started to cover transports, product storage, its benefits and the technology development in agriculture. BMSP became renowned and the future businesses started to attract more and more people. Even in that time, despite the contribution to the economy given by the BMSP, the public still used to consider it a *game*

house. Pieces of writing were published about the activities held by the Exchange, such as hedge price formation and investments.

The end of the war brought a new cycle of deep changes to the world economy, with inflationary and rate exchange pressures. The Exchange offered tools for the capital protection and profitability, becoming a price maker, classifying and standardizing commodities, specially cotton. At that time, the BMSP requested governmental encouragement to enlarge the future market and intensify the contracts with the Exchanges of Liverpool, Rotterdam, New York and Chicago, swapping information and updating its managing sector.

In 1952 the Sao Paulo Term Compensation System was created, based on the American *clearing* models, and assuming the role of a master-key in the BMSP updating.

On the second half of the fifties, the staff of the Stock Exchange had more than 150 people. The government of Juscelino Kubitscheck implemented the *Goals Plan*, encouraging investments in transports, energy, production factors and civil building. The financial national system, which was used to the previous economy, was not prepared to face the emerging challenge. The Exchange studied the creation of a future market of cocoa, castor bean and coffee, but those prices were declining in the international market, inhibiting the businesses.

The year of 1964 came and the military government was set. At that time, the Exchange was satisfactorily set and three years later it would be 50 years old. The financial reform, initiated by the *Bank Act* in 1964, and the capital market updating, with the introduction of the monetary correction, enabled investments through installment plans in Brazil. These new instruments imposed to the future market new standards of competitiveness, whose observation was fundamental to its consolidation and growth. The country was even more vulnerable to the supplement of production factors and the external debt increased significantly due to the adoption of importation policies. This way, it was created conditions for the development of a future market that could serve as a protection against both exchange rate and inflationary turbulence.

The creation of a Term National Compensation System in 1977 fostered these activities pretty much. Its system was made of financial market institutions. Initially, 10 brokerage companies, differing from the previous system, basically constituted by private initiative. This new outline guaranteed the definitive bridge between the commodities and the financial markets. In 1985, the 1977 association was replaced by the Term and Spot National System with the participation of 150 financial institutions.

In 1978 the Coffee contract was inaugurated; in 1981 the Oil and Bran, as well as the Gold one. On May 1986, in the middle of a long exchange rate crisis that dominated the country, the Cruzado exchange rate was launched, offering *hedge* opportunities in Dollar, Yen, DM and Pound for importers, exporters and other market segments. Still in 1986, the contract of calf and cocoa was established and in 1987 the chicken one.

On July 1985, the Mercantile & Future Exchange (BM&F) was set. Its floor trades started to work on January 31, 1986. On May 9, 1991, BM&F and BMSP joined up their activities, connecting one's tradition to other's dynamism and forming the Commodities and Futures Exchange (BM&F), which aims to develop future markets of financial, farming and agriculture actives, among others. Today BM&F has already reached a privileged position among the main Exchanges of the world, being the 3rd one in negotiated contracts. For the perfect understanding of the whole BM&F structure, as well as the rights and obligations of whom trades on it, it is recommend to read its Social Statutes.

The BM&F activities happen in a self-regulation sphere, but there is a competent legislation of the Central Bank of Brazil (BACEN) that rules them. Following there are the Rules and General Arrangements found in the Manual of Rules and Instructions (MNI) of BACEN.

1. The Commodities and Futures Exchanges must foresee instruments that prevent and correct those abnormal situations in the market such as legal or rules infringements, non-fair actions, fraud or manipulation.
1. It is of the Commodities and Future Exchange responsibility, if detected any of the facts mentioned in the item above, to reestablish the regular activities of the market. The Central Bank and the Securities and Exchange Commissions (CVM) - this last one when the trade refers to any securities under the Act nº 6385 - must be immediately informed of the irregularities and of the correct actions taken (Res. 1645-II)
1. To reach its objectives, the Commodities and Futures Exchange must direct supervise its members, analyzing accounting books and records, maintaining at disposal of the Central Bank of and CVM the inspection reports prepared by supervisors and auditors.
1. The Commodities and Futures Exchange, its members and the participants of the markets, are obligated to provide all information needed to enable the practice of all activities allowed by the Act nº 2286, of 07/23/86, including those secret ones required to control the markets. The Central Bank, the CVM and the competent authorities can request those information.
1. Before implemented, the models of contracts of the Commodities and Futures Exchange must be approved by the Central Bank and the CVM, this last one in case of the respective object refers to any of the securities under the Act nº 6.385/76 (Res. 1.190-II)
1. The non-manifestation from the Central Bank or CVM, after 30 (thirty) business-days of the request presentation, represents the model of contract has been approved. This period may be interrupted only once, for the same period of time, before the request of additional documents or information.
1. Aiming to prevent and correct abnormal market situations, specially those able to create artificial demand and supply, price manipulations, fraud and non-fair activities, the Central Bank and the CVM, on their respective sphere, may determine: (Res. 1.190 - I.a, b)
 - the cancellation, for an undetermined period of time, the negotiation and liquidation of contracts admitted at the Commodities and Futures Exchange quotation, including those referent to the same commodity as a dealing object. (Res. 1.190 - II.a)
 - the cancellation or liquidation of financial business made and still not liquidated in the Commodities and Future Exchanges (Res. 1.190 - II.b).
1. the fiscal year of the Commodities and Futures Exchange must coincide with the civil year, being compulsory the occurrence of monthly balances and financial statements, these in every December 31st, including the balance sheet, the changes Equities, the income statements results and the respective explaining notes, observing the following:(Res. 1.645 - IV.a, c)
 - the financial statements must be certified by the independent auditor registered in the CVM; (Res. 1645-IV-a)
 - the independent auditor, based in the examinations of accounting books, documents and records, must present to the Exchange auditor : (Res. 1.645 - IV.b):

I - auditor statement related to the financial position and the income statement (Res. 1.645 - IV.b);

II - contextualized report about the observations related to the defective or inefficient internal accounting control;(Res. 1645-IV-b)

III -contextualized report about the non-compliance of the legal or regulation rules;(Res. 1645-IV-b).

- the financial statements and reports of the independent auditors must be forwarded to the Central Bank of Brazil and CVM within 15 (fifteen) days after the end of each month, of 25 (twenty five) days and 90 (ninety) days after the end of each term, respectively. (Res. 1645-IV-a/d)
1. Independently of the items 2 and 7, the Central Bank of Brazil and CVM, in their competent spheres, are able to (Res. 1.645 - V.a, d)
 - suspend the rules imposed by the Commodities and Futures Exchanges considered inappropriate to its regular working and determine those considered necessary; (Res. 1.645 - V.a)
 - suspend the enforcement of the decisions taken by the Commodities and Futures Exchange, totally or partly; (Res. 1.645 - V.b)
 - adopt the Commodities and Futures Exchange recess, to prevent and correct abnormal market situations, according to the valid regulations; (Res. 1.645 - V.c)
 - adopt other methods considered necessary to the market efficiency (Res. 1.645 - V.d)

It is observed that the operations, even placed in a self-regulated environment, are under the Central Bank of Brazil and the CVM supervision, each of them acting according to what is allowed by the legislation.

THE IBOVESPA

1. Introduction

After introducing the basic concepts and characteristics of the environment where the Future operations happen in Brazil, it will be presented a historic and concept of the financial instrument used on this task. It is the Sao Paulo Stock Exchange index - Ibovespa.

Ibovespa is classified, in the Future Markets, as a financial future. Tools of this sort succeed only on unstable macroeconomic environments, that is, its existence depends on the price variations and relevant perspective changes from the economical factors. The greater the instability, the bigger the probability to appear these instruments.

Historically the appearance and evolution of financial tools traded in the Future Markets has emerged since the seventies. The first markets were the exchange rate and interest rate, both in the United States. Researchers claim that the explosions which occurred in these markets are consequence, specially, of the economical instability of those years. In fact, the United States suffered a strict inflationary process that time, which caused sudden and great increase in the interests rate. Additionally, with the end of a fixed equivalence between dollar and gold, there were great variations in the North-American currency price.

Events such the ones mentioned above create favorable conditions to the appearance and fast evolution of Future Markets. In fact, three conditions are fundamental for this:

1. the increase of macroeconomics price risk;
2. demand for protection against price variations;

3. speculators inclination to assume risks.

The factors were present in the creation of Future Markets with Stock Indexes in the United States.

2. The Stock Index

The index market differs from the commodities ones and even in the financial instruments, such as the interest rate. This difference means that the index is not traded in the market in cash while other markets are. In the specific case of the stock index, the assets are negotiated in cash, that is, the component stocks, but the index is a combination of these prices and is based on dates chosen arbitrarily by their makers. So the stocks indexes are pondered averages of stock prices from an specific theoretical combination. This market is the most important innovation in the Future Exchange in the last years.

2.1. The value of the Stock Index Future Contract

The index is a number which represents a certain portfolio combination. The future market negotiates this number , in a certain date. Each index point values a certain price, previously established by the Future Exchange and, this way, the contract price becomes known. Algebraically this means:

$$P_{t n} = K \times F_{t n}$$

$P_{t n}$ = future contract price due on the date t, negotiated on the date n;

K = constant that transforms each index point on currency;

$F_{t n}$ = future index greatness on the date n, due on the date t

The stock index future contract can be understood as the commitment of purchase/sale of an stock index, expressed in current currency. The conversion from index to currency is made through the constant K , previously presented, and the investor must liquidate his or her position until the purchase/sale operation deadline. There is no stock deliver, the liquidation is made only in cash what means that all positions are closed by opposite operations.

2.2 The Contract

The Ibovespa Future Contract will be written bellow as it appears nowadays. Additional explanations, if necessary, will be developed after the transcription.

Ibovespa Future Contract Description

1. Negotiated Object

The Sao Paulo Stock Exchange Index (Bovespa Index - Ibovespa).©đ.

kj ygih

k

2. Quotation

Index points, each one equivalent to the currency value established by the BM&F.

3. Minimum bid

5 points

4. Daily maximum variation

5% over the third open interest, calculated over the previous mark to market price. The first two open interests are not under the variation limits. At any moment, the Exchange can change the variation limits, as well as its application to the several other settlement dates, including those usually unlimited.

5. Negotiation Unit

Ibovespa Future Index times the currency value for each index point established by the BM&F

6. Expire Months

Even months

7. Number of Open interest settlement dates

Maximum of four, besides the current month, if it is even.

8. Expire Date and the last negotiation date

Closest Wednesday to the 15th of each expire month. On this day afternoon, there is no contract negotiation for this expire date.

9. Day Trade

Day trade operations are allowed, if made on the same trade period, by the same client (or special operator), through the same broker and registered by the same compensation member. The losses and profits of such operations are dealt on its following business-day.

10. Daily mark to market

The open interests at the end of each trade day are mark to market based on the previous day price, determined by the weighted averages of the values of the future index trades in the last 30 minutes of the morning and afternoon, according to the Exchange rules, with payment on D+1 (next business day)

11. Condition of payment on settlement date

Through delivery or cash, at the seller criteria.

- By delivery

The physical delivery is admitted for covered seller only. The covering of short position is accepted only fifteen days before the settlement date. The covering does not exempt the seller of the normal margin deposits.

- Financial

The financial liquidation is made on the following business-day right after the previous negotiation day, by the opposite operation (purchase or sale) made by the Exchange, of the same number of contracts, and the liquidation value is defined by the following formula:

$$V = P \times R\$ \text{ (point),}$$

where,

V= contract liquidation value;

P= Ibovespa average of the last 30 minutes of negotiations at the trading floor of the Sao Paulo Stock Exchange, in the last negotiation day;

R\$= current currency value of each index point established by the BM&F

12. Hedgers

Insurance companies, mutual stock funds, stock investment clubs and other institutional investors.

13. Guarantee margin

Fixed Value by contract based on the reference index volatility, according to the methodology defined by the Exchange and approved by the CVM. The guarantee margin is due to D+1, reduced in 20% for hedgers, being the Exchange, at its own criteria, able to change this margin.

14. Assets accepted as margin

Money, gold and, at the Exchange criteria, private and public securities, bail letters, insurance policies and participation in closed stock investment funds.

15. Operative Costs

- Basic Operative Fee

Normal operative: 0.25%; day trade: 0.15%

The basic operative fee, submitted to a minimum value established by the Exchange, is calculated over the previous mark to market price of the first open interest date.

- Exchange Fees and contributions to the Guarantee Fund

6.32% of the basic operative fee

- Register Fee

Fixed value stated by the BM&F

- Settlement day Fee

2% over the delivery liquidation value or 0.25% over the financial liquidation. The operative costs are due on the following business-day after the actual operation day. The effective members will pay the maximum of 75% over the basic operative fee and the settlement day fee, and 75% over the other operative costs (register and Exchange fees).

16. Complementary rules

The current legislation and the BM&F rules and procedures are part of this contract, defined by its Social Statutes, Operational Regulations and official memoranda, as well as by the Agreement of

Intentions between both the Stock and the Commodities and Future exchanges, of 05/25/88, and additional CVM rules.

17. Observations

Considering that the IBOVESPA theoretical portfolio is updated each four months by the Sao Paulo Stock Exchange, the BM&F emphasizes the possibility of changes in the index composition while a future contract referred to it is still valid.

2.3 The users

The number of users of index future contracts is very large. The investors can make the operations to hedge their stock portfolio, the speculators may get relevant results from price variations and, finally, the arbitrage profiteers, that use momentaneous market inefficiencies to get advantages. The users may be individuals, non-financial companies, institutional investors such as insurance agencies and investment funds.

2.4 A closer look

The Ibovespa has been published since 1968, without interruption. It is widely accepted by the financial community as a trustful indicator of the day-by-day operations of the Sao Paulo Stock Exchange.

The Ibovespa means the average profits of a theoretical portfolio, compounded by the stocks negotiated on a representative basis in the Sao Paulo Stock Exchange - Bovespa.

Usually the indexes are used to evaluate stocks individually as well as in group. It must reflect, at the most accurate degree, the behavior of the Stock Exchange in a period of time. The index composition can include all stocks negotiated in the exchange or part of them. The average used to relate the stock price variations and the index points are also pretty relevant. Finally, it is necessary to find out the best ponderation to form the index, considering its peculiarities.

The Ibovespa is an index composed by the most representative stocks negotiated in Sao Paulo, nowadays about 50 stocks, and its composition changes every four months. The index will be build with the most frequent stocks negotiated in each of those periods, with requirement of a minimum number of trades in the last 12 months. The ponderation criterion relates the amount of each stock dealt during those 12 months to the price of the stock. So the index gives a greater importance to the stocks that are, at the same time, most negotiated and most frequent in the trading floor. This methodology is appropriate to the Brazilian market, that is very concentrate, and has been kept equal since the beginning of the index publication.

The Ibovespa theoretical portfolio is formed by stocks that, in the last 12 months, represent 80% of the amount negotiated in the spot market, are present in at least 80% of the trades, and have an individual participation over 0.1% on the total amount negotiated. Its initial date is January, 2nd, 1968. All dividends received, as well as the total amount obtained through the sale of subscription rights, are reinvested in stocks and the stocks received as bonus are maintained in the portfolio. Every four months, the index composition is reviewed. This means that some stocks may be dropped while others may join the index. In the last day of each period (four months), the portfolio is entirely sold and the total amount received is reinvested in the new portfolio. This is the way the Ibovespa theoretical portfolio has been compounded since its first publication.

2.5 The Ibovespa methodology

The Ibovespa index is the current value of a theoretical stock portfolio built in January 2, 1968. Since then up to now, there has not been any additional investment, but only reinvestment of the dividends

as well as the amount received through sale of subscription rights. Stocks received as bonus were maintained in the portfolio.

The negotiability index of each stock is calculated according to the following formula:

$$(n/N \times v/V)^{1/2}$$

where:

n= number of trades with the stock in the spot market during the last 12 months;

N= total number of trades in the spot market during the last 12 months;

v= total \$ used to negotiate the stock in the spot market during the last 12 months;

V= total \$ negotiated in the spot market during the last 12 months.

The following table is an example of a hypothetical index, calculated under the same criterion of Ibovespa, using the negotiability index (verdi rosa monteiro)

(1) Stocks	(2) Participation of the negotiability index in the total sum	(3) Adjusted relative participation (2)x(100/80)	(4) Adjusted invested value (3) x 10,000*	(5) Price of each stock (\$) ti	(6) Theoretical quantity (4) , (5)
A	24	30.00%	3,000.00	20.00	150.00
B	20	25.00%	2,500.00	2.50	1,000.00
C	18	22.50%	2,250.00	7.50	300.00
D	10	12.50%	1,250.00	0.41	3,048.00
E	4	5.00%	500.00	25.00	20.00
F	4	5.00%	500.00	0.50	1,000.00
	80	100.00%	10,000.00		5,518.00

* total amount invested

The steps to calculate the values above are the following:

(1) Select the stocks traded in the Stock Exchange which are under the criterion of minimum presence of at least 80% in the bids on the period, as well as individual participation on the amount over 0.1%. On this example, the stocks A, B, C, D, E and F are under this criterion.

(2) Calculate, for each stock, the negotiability index through the formula presented above and add up these values until the accumulated value required by the index is reached, that is, 80%.

(3) As the accumulated 80% will represent 100% of the index, the adjustment must be made by a mathematical rule. This value represents which percentage of the index will be invested in each stock.

(4) The value obtained on (3), times the index closed value of the previous four months period will give the value, in currency, to be invested in each stock that will form the index.

(5) Those are the closing prices for each one of those stocks on the new portfolio .

(6) The theoretical quantity of each stock is reached dividing the amount that will be invested in each stock by its price on the evaluation day. This amount will be hold constant through the four months period while this portfolio is valid, changing only if there is a dividend distribution, bonus or subscription.

The price of the stock which distribute or pays rights changes at the moment that this phenomenon occurs. Once received the right, the result (stock price x theoretical stock weight) must be the same one before the distribution. As this price changes, an adjustment on the theoretical amount has to be done, so that the amount invested in the stock is hold constant. To do so, we have to sell the stock with rights and invest the total earned on the same stocks , but ex-right. This equivalent to:

$$(Ex\ price \times ex\ stock\ theoretical\ quantity = with\ price \times with\ stock\ theoretical\ quantity)$$

The adjustment on the stock quantity is done by using the following formula:

$$Q' = (Q \times P_{with}) / P_{ex}$$

where:

Q' = theoretical quantity after the event;

Q = theoretical quantity before the event;

P_{with} = stock price before the rights distribution;

P_{ex} = theoretical price of the ex-right stock.

The ex-right price is given by the following formula:

$$P_{ex} = \{P_{with} \times (S \times V_S) - D\} / (1 + B + S)$$

where:

P_{ex} = ex-right stock price;

$P_{with} \times$ =with right stock price;

S = subscription percentage

V_S = subscription emission price

B = bonus percentage;

D = received value, on currency, by each stock, as dividend.

Continuing on our example, it will be shown the index methodology on the moments 1 and 2, on the same four months period, and, finally, on the moment 3, when the period changes and the index is evaluated. To do so, let's consider the previous A, B, C, D, E and F stocks and the new G and H stocks, which will form the index on the evaluation moment.

Moment 1	Moment 2	Moment 3
-----------------	-----------------	-----------------

(1) stock	(2) Relat. Partc.%	(3) Inves. value= index value	(4) Price $t_i = 1$	(5) Theor qntity (3/4)	(6) Price $t_i = 2$	(7) varia- tion %	(8) port. value= indexvalue (5x6)	(9) New relat. partc. %	(10) New relat. partc. %	(11) inves. value	(12) price $t_i = 3$	(13) new theor. qntity (10/12) *
A	30	3,000	20.00	150	22	+10	3,300	29.11	25	5,000	25.00	200
B	25	2,500	2.50	1,000	3.13	+25	3,130	27.61	25	5,000	2.80	1,786
C	22.50	2,250	7.50	300	7.35	-2	2,205	19.45	20	4,000	4.70	851
D	12.50	1,250	0.41	3,048	0.41	-	1,250	11.02	15	3,000	0.30	10,000
E	5	500	25.00	20	22.52	-11	450	3.97	-	-	-	-
F	5	500	0.50	1,000	1.00	+100	1,000	8.82	10	2,000	1.80	1,111
G	-	-	-	-	-	-	-	-	3	600	20.00	30
H	-	-	-	-	-	-	-	-	2	400	10.00	40
	100	10,000	-	5,518	-	-	11,335	100	100	20,000	-	14,018

* rounded values

Moment 1

(1) The A, B, C, D E and F stocks form the index on moment 1 and 2, while the G and H stocks are also part of the index in the evaluation moment. The G and H stocks will form the portfolio by the time of the evaluation only. On the moments 1 and 2 they were not considered yet.

(2) Points the relative participation of each stock. Note that the values are the same ones of the previous table.

(3) Points the index value. Also the same of the previous table.

(4) Prices on moment 1

(5) Theoretical quantities obtained by dividing column 3 by 4.

In fact, moment 1 is the initial situation presented on the previous table.

Moment 2

This moment may be, the day right after moment 1, but still in the same four months period of the initial portfolio.

(6) Prices on the second day which changed due to market .

(7) The variation shows how much the prices changed, in percentage, from moment 1 to 2.

(8) As the four months period is still the same one, the theoretical quantity remains constant. So the portfolio value is the theoretical quantity of each stock in moment 1, which is identical to the theoretical amount on moment 2, times each respective new price.

(9) The relative participation changed. The index value changed to 11,335. As each value, per stock, changed also, the relative participation of each stock changed as well. To get those new relative participation, each value on (8) is divided by 11,335.

Moment 3

This day a new four-months period starts, and the stocks will be reevaluated. They are again separated according to the criterion of minimum participation. To obtain the representation of 80% of the traded volume over the last 12 months, the stocks G and H were included.

(10) The new relative participation was calculated using the same considerations and formulas previously presented. At this moment, to obtain 80% of the traded volume on the spot market over the last 12 months, the stocks G and H had to be included. Notice that stock A was dropped out because it could no longer reach the new requirements.

(11) The value invested in each stock was reached by multiplying the relative participation of each stock per the closing index value of the previous four months period, that is, 20,000.

(12) The price is given by the market, regardless any formula.

(13) The new theoretical quantity was obtained by dividing the value to be invested in each stock by its price on the first day of the new four months period. This theoretical quantity will remain constant for the next 4 months.

2.6 Ibovespa determination

The Ibovespa weights prices with fixed quantities in a four-months period. It reflects the stocks relative participation on the total traded volume. The Ibovespa can be obtained, at any time, by the following formula:

$$Ibovespa = \sum_{i=1}^n P_{i,t} \times Q_{i,t}$$

$i=1$

where:

Ibovespa = Bovespa index at time t;

n= total number of stocks in the portfolio;

$P_{i,t}$ = price of stock "i", at time t;

$Q_{i,t}$ = theoretical quantity of stock "i" at time t.

At each four months, the total number of stocks on the portfolio and the theoretical quantity of each stock is evaluated. So the variations the index undergoes reflect the stock prices changes only. Adjustments are made when a stock is excluded. It can happen, for example, if a company bankruptcies, the CVM prohibits trades with the stock for any reason or dividend are distributed.

2.6 The importance of the relative participation in the Ibovespa Index

The relative participation concept is the essence of the Ibovespa model. Through its calculation the relation between the theoretical quantity of the stocks which constitute the portfolio, stated for each four months period, and their variable prices are considered. The changes on the relative participation may be due to price variations or to the index changes made each four months period.

The Ibovespa portfolio is constituted by a variable number of stocks each four months. Among these stocks, there are the ones of more and less liquidity. The relative participation has a stronger impact

over the stocks of more liquidity due to the use of negotiation prices over the last 12 months on the revaluation. The most traded stocks may undergo a great price variation over the last four months, which will change, significantly, their relative participation in the index, by the moment the portfolio is rebuilt.

As the spot market will be followed by the future market, not on the same dimension, but at least on the same trend, it ends to be very important for the investor on the future Ibovespa to follow the changes on the index composition. Relevant changes on the index will affect future prices. It is even more important when the portfolio revaluation happens between the future contract opening day and the settlement date.

The Ibovespa methodology and tradition enabled it to be chosen as the object of the index future contract in the BM&F. The number of stocks that constitute the index and the greater relative weight given to the most traded stocks came up appropriated to the Brazilian market conditions. The Ibovespa future contract is an excellent tool to be used on hedge operations as far as it reflects, as close as possible, the expectations of the Brazilian stock market. For both academic and market purposes it is essential that the index structure be knowledge.