



Spoofing in Brazilian Financial Market: Case Study of Paiffer Management

Spoofing no Mercado Financeiro Brasileiro: Estudo de Caso da Paiffer Management

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Keywords

Spoofing; Layering; Stock Market

Abstract

Due to the inclusion of new negotiation technologies into the Brazilian stock market, both the volume of trade and the financial products diversification have increased. Technology has improved market dynamics but has also facilitated the practice of financial fraud. As verified by Securities and Exchange Commission of Brazil (CVM), the brokerage firm Paiffer Management Ltda. - ME, an investment company that operates in the Brazilian market, started to send orders (bid or ask) with expressive lot, in the spoofing modality, for the purpose of manipulating share prices. Orders were canceled in a short period of time, with the objective of simulating buying or selling pressure and, therefore, attracting counterparties to carry out their artificial operations. The purpose of this article is to present a literature review on the spoofing topic, research case-study of Paiffer's administrative process, and verify how Paiffer's operator put into practice spoofing to outpace other market participants.

Palavras-chave

*Spoofing; Layering;
Mercado Financeiro*

Resumo

Devido à integração de novas tecnologias de negociação ao mercado de capitais brasileiro, tanto o volume transacionado quanto a diversificação dos produtos financeiros disponíveis aumentaram. Melhorou-se a dinâmica do mercado acionário e também, em contrapartida, as possíveis aplicações destas tecnologias à prática de fraudes. Como averiguado pela Comissão de Valores Mobiliários (CVM), a investidora Paiffer Management Ltda. – ME, que atua junto ao mercado brasileiro, passou a emitir sinais de compra e venda de ações com lote expressivo, na modalidade spoofing, com a intenção de manipular os preços dos ativos alvo. As ordens eram canceladas em curto intervalo de tempo, com o objetivo de simular pressão compradora ou vendedora e, por conseguinte, atrair contrapartes para efetivar suas operações artificializadas. O presente artigo tem a finalidade de apresentar uma revisão de literatura do tema spoofing e, mediante estudo de caso do processo administrativo em desfavor da Paiffer, averiguar quais foram os ativos objetos de fraude, como atuaram os operadores da Paiffer, na realização do spoofing, e quais os mecanismos de detecção utilizados pela CVM para deflagração da operação antifraude.

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1. INTRODUCTION

Electronic platforms have transformed the landscape of the domestic capital market and, as a result, have increased the volume of transactions and speed that financial assets are traded. The unprecedented ability to collect and exploit information to improve trading dynamics has become a key point for successful positions in the financial market. Wang and Wellman provide important considerations about the technological tools and their capability to stream and increase information in the stock exchange when they say that “whereas some of these developments may contribute to improved price discovery and efficiency, they may also introduce new possibilities of disruptive and manipulative practices in financial markets.” (Wang and Wellman, 2017, p.367).

After the Great Recession in United States (U.S.), which officially lasted from December 2007 to June 2009 (subprime mortgage crisis), the U.S. look for ways to regulate the transit of capital to provide greater security to financial operations. The Dodd-Frank Act (2010) was created to present several devices to avoid financial manipulation. The concept of “harmful behavior” was introduced to the capital market as a misbehavior due to acquired behavioral patterns in past negotiations. Kelly Anne Smith explain that “the financial crisis of 2007-2008 was one of the worst economic disasters in modern U.S. history, and it was in large part caused by bad behavior at banks. The Dodd-Frank Act was created in an attempt to keep anything similar from happening again.” (Smith, 2020).

“The term disruptive trading behavior is currently used to describe trading activities that create a false image of market liquidity, a low reliability of market depth, or an artificial condition price movement [...]” (Saldanha, 2019, p.01).

Barbosa (2018, p.11) makes a point that “the primary function of capital market is to enable the efficient allocation of resources in the economy”. By generating insecurity through fraud in the respective efficient resource allocation, the unfolding fraud weakens circulation of economic wealth, which promotes instability and loss of value. Barbosa (2018) also states that prices reflect relevant information about shares and impact on market liquidity, which increases its allocative functional capacity.

In Brazil, a peculiar illicit case practice in order flow was monitored and judged by the Securities and Exchange Commission of Brazil (CVM). In that case, the investor Paiffer Management Ltda. - ME, manipulated bid and ask prices for orders in expressive lots. Such actions occurred in the landmark Brazilian spoofing case in 2018.

This scientific article proposes to review literature on spoofing and answer the following research question: What data was identified by the CVM that supported the characterization of spoofing and whether there were other standards in the VALEK36 order book that showed manipulation and possible similar frauds. It seeks to identify abnormal bid and ask orders in the VALEK36 (Vale S/A company's option), in a certain period of time and investigate possible outliers in order book which may have influenced investors' decision.

One of the relevant hypotheses for fraud verification was the short period of time between a bid and offer, both in expressive lot, which would characterize artificial pressure on VALEK36's option. Furthermore, it is worth mentioning the hypothesis about lack of protection mechanisms, on the part of Brazilian stock market, that could guarantee reliability of securities transactions.

2. SPOOFING AND LAYERING

Lee et al. (2013, p.03) refers to spoofing "as an order submitted to a stock exchange, without execution intention, in order to mislead other investors by injecting misleading information regarding the demand or supply of a stock."

Saldanha and Omar (2019, p.01) define spoofing as "sending bid and ask orders with intention of cancelling offer before execution". According to the Brazilian newspaper O Globo (2018), "spoofing is a recent modality of market manipulation". Still in the words of O Globo (2018), the first indictment, in the United States, dates from 2014. On that occasion, the Department of Justice processed a market operator who was conducting high-frequency trades, using artificial orders, with the broker Panther Energy Trading. He was the first American processed on the basis of anti-spoofing legislation present in Dodd-Frank Act, a 2010 law that promoted a regulatory tightening in financial system after the subprime mortgage crisis.

On the other hand, Layering is defined as an "insertion of multiple limited bids on one side of the order book, in opposition to the real intention of negotiation, at various price levels better than those momentarily practiced by the market" (Barbosa, 2019, p. 25). Spoofing and layering seem similar, but spoofing is the operationalization of an order while layering is the strategy itself. The figure below illustrates the spoofing operational process.

3. CASE STUDY – ELEMENTS OF THE PAIFFER MANAGEMENT CASE

Paiffer Management case originated in the Brazilian capital market. Reporting Director Henrique Balduino Machado Moreira (2018, p.02) explains that “this process was originated by the CVM SEI No. 19957.002411/2016-34, which dealt with an accusation conducted by the Brazil Stock Exchange and Over-the-Counter Market (BM&FBovespa Market Supervision - BSM)”. Moreira (2018) also states that, in scope of the Ordinary Administrative Proceeding No. 05/2016, Planner Stockbroker (Planner Corretora de Valores S.A) was found liable. UM Investments S.A CTVM (UM) was found to be without fault because the operations were performed by its client Paiffer Management Ltda. - ME (Paiffer).

José Joaquim Paiffer acted as portfolio manager for Paiffer and was accused of non-compliance with item I, c/c item II, “b” of the CVM Instruction 8/79, “due to the practice of price manipulation through insertion of artificial bid and offer orders, in the spoofing mode, from March 6 to November 26, 2013” (CVM, 2018).

The opinion of the CVM (2018) states that the spoofing methodology employed by the accused had characteristic of bid or/and offers with significant lot of shares and options in the Bovespa (Brazil Stock Market) segment and future contracts in BM&F segment. Such orders were always cancelled in a short period of time, with the clear objective of attracting counterparties. At first, Paiffer’s broker made bids on one side of the order book and then, to accomplish the option purchase, it proceeded with offer of expressive lots on the other side of book, at a lower price than the one practiced on market at that moment, thus simulating an inexistent stock market condition.

Spoofing becomes evident by reducing price difference between best bid offer and best sale offer (spread) recorded in the option's order book at time the strategy is executed. (Moreira, 2018). Although legislation already contemplates fraud modalities such as those mentioned above, there is no specific characterization that defines spoofing in Brazil. Figure 2 illustrate technical report of CVM (2018) about spoofing:

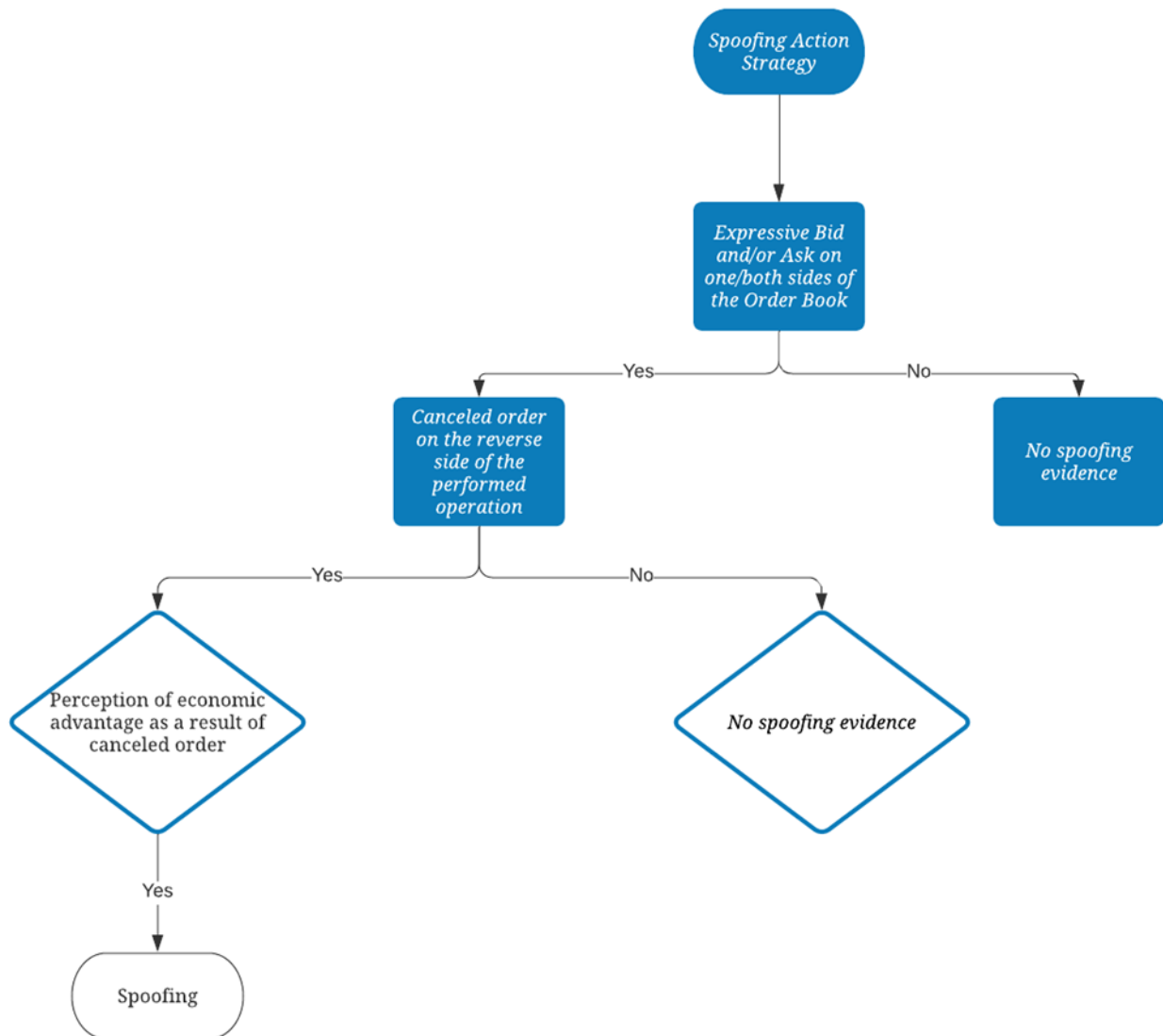


Figure 2 – Spoofing action strategy

According to the understanding of the CVM, “the offers that were on the opposite side of the book, up to the fifth price level at the time that the business was executed on behalf of the client, and that simultaneously met the following characteristics, were considered artificial: (i) offers that were at least 1.8 times larger than the sum of all the other offers on the same side of the book up to the third price level; (ii) offers that were six times larger than the average size practiced by the market in the three trading sessions that preceded the transaction; and (iii) that remained less than 10 seconds on the book of option/share”. (CVM, 2018, p.04).

4. METHODOLOGICAL PROCEDURES

The current research is characterized as exploratory, as it seeks to investigate the problem situation and raise hypotheses about the case study. The technical procedures were

bibliographic and documentary research, as well as the case study of Administrative Process Sanctioning CVM No. RJ2016/7192 (CVM, 2018). For Gil (2002, p. 54), “the case study consists of a deep and exhaustive analysis of one or a few objects, in a way that allows their broad and detailed understanding, a task practically impossible through other approaches already considered.”

As a statistical method, descriptive statistics were used with the application of mean and standard deviation that are “measures of central tendency which seek to characterize values of variables that occur more frequently (Dallabona, Nascimento, & Hein, 2010). The formulas listed below are for standard deviation and mean, respectively:

$$DP = \frac{\sqrt{\sum_{i=1}^n (x_i - M_A)^2}}{n}$$

$$M_e = \frac{x_1 + x_2 + x_3 + \dots + x_n}{n}$$

A spoofing sample was selected considering option VALEK36. The statistical analysis of data, provided by the administrative process, sought to observe some skewness in the order book, and whether the data found could characterize a purposeful artificial anomaly. “The asymmetry of a distribution can be characterized by skewness that this distribution presents in relation to average measurement. (Dallabona, Nascimento, & Hein, 2010).

5. ANALYSIS OF RESULTS

The information provided by BSM, CVM (2018, p. 09) states that “between October 1, 2013 and September 8, 2014, Paiffer performed 463 spoofing strategies in the trading segments of BM&FBOVESPA in operations intermediated by UM”. These strategies would have lead to 3,263 trades with a perceived gross profit spread of R\$ 179 thousand in the period. An example transcribed below of spoofing strategy observed by the Superintendence of Relations for Market and Intermediaries – SMI:

Order Book of VALEK36 on November 06, 2013 at 10h22m48s626ms									
Bid					Ask				
Time	Brokerage Firm	Broker	Count	Price R\$	Price R\$	Count	Brokerage Firm	Broker	Time
10:22:42	37		19,600	0.39	0.40	50,000	37		10:06:13
10:22:47	3		10,000	0.39	0.40	1,000	39		10:06:59
10:22:47	564		5,000	0.39	0.40	600	90		10:07:55

10:22:49	Um	Paiffer	50,000	0.39	0.40	8,600	21		10:09:56
10:21:28	98		3,500	0.38	0.40	25,000	39		10:14:34
10:21:40	564		5,000	0.38	0.40	2,000	3		10:18:36
10:21:43	227		12,000	0.38	0.40	13,000	98		10:20:19
10:21:51	227		5,000	0.38	0.40	1,000	114		10:20:57
10:21:58	86		30,000	0.38	0.40	15,000	3		10:21:23
10:22:05	37		2,000	0.38	0.40	15,000	3		10:22:25
10:22:16	3		10,000	0.38	0.40	5,000	3		10:22:25
10:22:22	39		10,000	0.38	0.40	15,000	3		10:22:25
10:22:28	98		4,400	0.38	0.40	50,000	45		10:22:47
S. Deviation			13,027.45			16,315.08			
Mean			12,808			15,477			

Table 1 - Order Book Valek36 – Bid of 50,000 options

At 10h:22m:49s, a bid of 50,000 was observed for VALEK36. The central trend, evidenced by the average, was surpassed approximately five times by Paiffer's purchase offer, contrary to what was being practiced for that option. As shown in table 2, the investor Paiffer registered 3 seconds after the purchase offer, a new offer in the opposite pole and with expressive lot.

Order book of VALEK36 on 11/06/2013, at 10h22m52s									
Bid					Ask				
Time	Brokerage Firm	Broker	Count	Price R\$	Price R\$	Count	Broker	Brokerage Firm	Time
10:22:42	37		19,600	0.39	0.40	50,000		37	10:06:13
10:22:47	3		10,000	0.39	0.40	1,000		39	10:07:00
10:22:47	564		5,000	0.39	0.40	600		90	10:07:56
10:22:49	Um	Paiffer	50,000	0.39	0.39	8,600		21	10:09:56
10:22:49	98		13,000	0.39	0.40	25,000		39	10:14:35
10:22:49	3		400	0.39	0.40	13,000		98	10:20:20
10:21:28	98		3,500	0.38	0.40	1,000		114	10:20:57
10:21:40	564		5,000	0.38	0.40	15,000		3	10:22:26
10:21:43	227		12,000	0.38	0.40	15,000		3	10:22:26
10:21:51	227		5,000	0.38	0.40	5,000		3	10:22:26
10:21:58	86		30,000	0.38	0.40	15,000		3	10:22:26
10:22:05	37		2,000	0.38	0.40	50,000		45	10:22:48
10:22:16	3		10,000	0.38	0.40	2,000,000	Paiffer	Um	10:22:52
Excluding Paiffer's bid (x)					Excluding Paiffer's bid (z)				
Standard Deviation			8,046.13		Standard Deviation			17,224.71	

Mean	9,625	Mean	16,600
With Paiffer's bid (y)		With Paiffer's ask (w)	
Standard Deviation	13,248.01	Standard Deviation	528,752.77
Mean	12,731	Mean	169,169
(y-x)		(w-z)	
Standard Deviation	5,201.88	Standard Deviation	511,528.06
Mean	3,106	Mean	152,569

Table 2 - Order Book Valek36 – Sell of 2,000,000 (CVM,2018)

According to Balduino Moreira (2018, p. 08) “the selling pressure of Paiffer, exercised through registration of 2,000,000 options in the VALEK36 offer book, caused Participant 8 to write down successive offers for sale.” This movement facilitated the bid of 50,000 options of accused investor, through 15 deals. It should be noted that presence of Paiffer's offers distorts central measurement trends, such as standard and average deviation, making the artificialization of orders more noticeable. Table 3 shows the effects of artificial orders on other participants.

Order Book of VALEK36 – Offer of 2.000.000 options									
Bid					Ask				
Time	Brokerage Firm	Broker	Count	Price R\$	Price R\$	Count	Broker	Brokerage Firm	Time
10:22:48	Um	Paiffer	50.000	0,39	0,39	10.400		8	10:22:52
					0,39	3.000		8	10:22:52
					0,39	3.000		8	10:22:52
					0,39	3.000		8	10:22:52
					0,39	3.000		8	10:22:52
					0,39	3.000		8	10:22:52
					0,39	3.000		8	10:22:52
					0,39	3.000		8	10:22:52
					0,39	3.000		8	10:22:53
					0,39	3.000		8	10:22:53
					0,39	3.000		8	10:22:53
					0,39	3.000		8	10:22:53
					0,39	3.000		8	10:22:53
					0,39	3.000		8	10:22:53
					0,39	600		8	10:22:53
10:22:48	3		400	0,39	0,39	400		8	10:22:53
10:21:28	98		3.500	0,38	0,40	50.000		37	10:06:13
10:21:40	564		5.000	0,38	0,40	1.000		39	10:06:59
10:21:43	227		12.000	0,38	0,40	600		90	10:07:55
10:21:50	227		5.000	0,38	0,40	8.600		21	10:09:56

10:21:58	86		30.000	0,38	0,40	25.000		39	10:14:34
10:22:05	37		2.000	0,38	0,40	13.000		98	10:20:19
10:22:16	3		10.000	0,38	0,40	1.000		114	10:20:57
10:22:22	8		24.000	0,38	0,40	15.000		3	10:21:23
10:22:32	3		13.000	0,38	0,40	15.000		3	10:22:25
10:22:37	27		5.000	0,38	0,40	5.000		3	10:22:25
10:22:39	86		5.000	0,38	0,40	15.000		3	10:22:25
10:22:45	386		10.000	0,38	0,40	50.000		45	10:22:47
10:22:45	386		3.200	0,38	0,40	2.000.000	Paiffer	Um	10:22:52

Table 3 – Economic Advantage (CVM, 2018)

According to the CVM report (2018), after the bid of 50,000 options of VALEK36, Paiffer cancelled the offer of 2,000,000 options, in a time interval of less than 10 seconds. The above strategy resulted in an economic benefit of R\$ 500.00 as shown below:

- Perceived economic advantage = Options amount × spread
- Perceived economic advantage = 50,000 × (R\$ 0.40 - R\$ 0.39)
- Perceived economic advantage = R\$ 500.00

As shown above, spoofing practice is difficult to detect. One striking aspect that can facilitate recognition of fraud patterns is checking for outliers or skewness, which are asymmetries of the trend. Campos (2015, p. 05) states that “the area of outlier detection (or anomaly detection) plays a key role in the discovery of patterns in data that can be considered exceptional from some perspective. The following figure illustrates the dispersal analysis of the number of bids compared to the trend line.

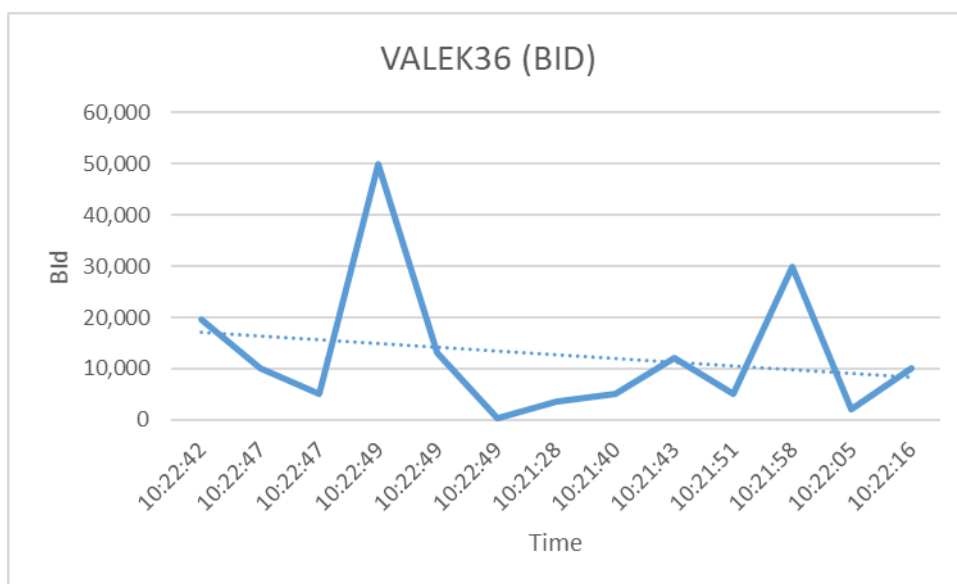


Figure 3 - Central tendency and measures of dispersion

The bid of 50,000 options is very asymmetrical in relation to the market trend observed. VALEK36 is just one more of several assets that perceived significant offer distortions in their order books. The CVM (2018) also questioned operations of Paiffer's administrator in relation to options VALED34 and OGXP3. According to the CVM, “the practice of spoofing by Paiffer was also identified, through another investment brokerage house (Planner Corretora de Valores S.A.), on 100 trades, from August 1, 2014 to March 31, 2015, 60% of the period under review, in the BM&F BOVESPA.”

These transactions would have generated for the investor the financial benefit in differential spread of R\$ 682.5 thousand. These strategies would have identified register of offers with expressive lots by Paiffer on the opposite side of client executed operations that presented 97.27% of full cancellation actions after a short period of time in the order book (four seconds, on average)”. (CVM, 2018, p.13). The advantage in spread differential of R\$ 682.5 thousand was verified after the operation. According to the CVM report (2018) approximately 97.27% of full cancellation actions occurred after four seconds of permanence in the order book of the respective options.

At the end of administrative process, José Joaquim Paiffer received a sanction of R\$ 684,000.00, “equivalent to twice the amount of economic advantage obtained and investor Paiffer Management Ltda. – ME, the penalty of a pecuniary fine of R\$ 1,710,000.00, which is equivalent to twice the economic advantage obtained by price manipulation” (CVM, 2018).

6. CONCLUSION

This article aimed to address the spoofing applied to the Brazilian financial market, using the case study of the CVM administrative process No. RJ2016/7192 as the object of analysis. Although the theme is already covered in international literature, especially in North America and Asia, in Brazil, the first case came to light only in mid-2016, when investor Paiffer was accused by the CVM of manipulating VALEK36 option prices, by artificial orders.

The spoofing characterization occurred by verification of bid and offer orders outside the trend line of the option and under specific conditions for time of purchase and sell offers. Paiffer Management presented arguments under justification of market strategy, contesting materiality of the crime. They reported fragility in the math models of the CVM and absence of specific Brazilian legislation on the subject and objective detection resources of the aforementioned modality of market operation.

For math models, the central tendency measures were used to investigate oscillations generated by Paiffer's bids and offer orders. Using a sample from the book of VALEK³⁶, mean and standard deviation were applied as a central parameter to investigate significant distortions in option prices (outliers), caused by Paiffer. Another feature is the short duration of orders, which supports argument by the CVM for evidence of fraud. However, further statistical tests are still needed to analyze the defendant's argument, which asserts that orders only changed according to correlation of indices and prices.

Brazilian legislation concerning the proposed theme is worth mentioning. The absence of legal mechanisms that favor good practices in the financial market, both in terms of security and freedom, is a fundamental point for the new dynamic that technology has brought to the stock market. Technologies have leveraged financial operations, including presence of automations (robots) in brokerage house operations. Therefore, legal gaps can generate delays in the way transactions happen and develop into legal disorders, damaging free flow of operations in the Brazilian market.

Finally, there is a fragile threshold between market freedom and state supervision. Free price fluctuation is an inherent aspect of securities trading, and any regulation, within the sphere of “fraud prevention”, could become detrimental to structuring the stock market as a business exchange. Spoofing should be treated as a risk to the health of Brazilian securities transactions; however, any legal disposition created to curb its practice should take into consideration the supremacy of market freedom.

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