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Mispricing in the odd lots market in Brazil[☆]

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ABSTRACT

We study the case of mispricing in the odd lots equity market in Brazil. Contrary to expectation, odd lot investors are paying higher prices than round lot investors. The pricing difference between markets is affected by market returns, volatility and spreads. Our main hypothesis is that: once the assets traded in the odd lot market are more illiquid than their counterparts, the mispricing is driven by liquidity factors. Additionally, we show that the mispricing yields an arbitrage opportunity that is not being traded away in the Brazilian market. Therefore, we propose regulators to review the market design for odd lots in Brazil. We argue that reducing the minimal trading unit in the round lots market would benefit investors.

1. Introduction

An odd lot trade refers to a negotiation in which the traded quantity is smaller than the standard (round) lot.¹ Many exchanges define the standard lot as 100 stocks of the equity pool of a certain company. The possibility of odd lot trading facilitates retail investor's access to stock markets by reducing the minimum amount of cash necessary to trade. In the US market, these trades were not reported in the consolidated tape data until December 2013. A long-dated belief has considered odd lotters as uninformed retail investors (Ahn, Cai, Hamao, & Melvin, 2014; Dyl & Maberly, 1992; Foucault, Sraer, & Thesmar, 2011; Lakonishok & Maberly, 1990).

However, after reporting odd lot trades in TAQ (Trade and Quote) databases, research has shown that maybe odd lot investors were not so uninformed and maybe they are not even retail investors, but high-frequency traders (HFT) with relevant participation in the market. O'Hara, Yao, and Ye (2014) show that odd lot trades contribute 35% of price discovery, which is consistent with the hypothesis of informed traders using odd lots to gather information. Davis, Roseman, Van Ness, and Van Ness (2017) provide evidence that investors use 1-share trades to ping for hidden liquidity on NASDAQ. Other studies confirm the potential information contained in odd lots within the US market (Battalio, Corwin, & Jennings, 2017; Johnson, 2014; Johnson, Van Ness, & Van Ness, 2017; Roseman, Van Ness, & Van Ness, 2016).

Despite the recurring studies regarding odd lots in the US market, exchanges in many other countries such as Italy, Israel, South Korea, Canada, Taiwan, Philippines, Singapore, Mexico and Brazil allow this type of trading (Gozluklu, Perotti, Rindi, & Fredella, 2015). The microstructure of odd lots trading in these and other countries is, however, undocumented. Therefore, this study aims to shed light on a particular case of an emerging economy, namely Brazil. In the Brazilian equities market, odd lot trades have a completely separate platform. Symbols, order books and consequently traded prices differ from one market to another, though the financial contract is the same (i.e., a common share of a given company).²

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¹ Sometimes referred as a board lot.

² For example, a round lot of Petrobrás common share (symbol: PETR3) is traded at the odd lot market with a different ticker (PETR3F), in which every stock trading in the odd lot market has an additional *F* to its regular symbol. Additionally, an investor may buy cumulate odd lot shares and sell them as a round lot.

Even though prices in both markets are highly correlated, it is possible that they diverge during some periods. If traded prices at both markets are different, such an effect should be due to microstructure effects. Despite that, empirical data of our study clearly shows that odd lot traders are consistently paying higher prices than round lot investors for the same financial contract. We use an intraday dataset from the end of 2013 to the beginning of 2017 to construct average mispricing measures for the market as whole and for individual assets. Our main finding is that mispricing occurs and it is positive in the Brazilian market for most of the assets in our sample. Simulating real-world frictions such as transaction costs, we show that this mispricing is not being traded away, yielding an arbitrage opportunity. The detachment of prices is affected by implied volatility, spreads and market downturns. This is consistent with a large reported hypothesis in literature of liquidity being reduced after increases in volatility and decreasing in market returns (Brunnermeier & Pedersen, 2009; Chordia, Roll, & Subrahmanyam, 2001; Nagel, 2012). Such discrepancies in prices could be reduced with merging the markets or, reducing the minimum trading unit in Brazil. Additionally, as a characterization of odd lot trades, we show that they are concentrated in small shares such as 1 and 10 lot sizes. Although small-share trades should be expected by retail investors with capital constraints, recent literature shows that small trades may also indicate high-frequency traders ‘pinging’ for liquidity (Davis et al., 2017).

The Brazilian exchange, BM & FBovespa, is the largest exchange in Latin America and it is an interesting case to observe a pure effect of microstructure on prices. Assets with the same fundamental value may only differ in prices given frictions in the trading process. The main differences in the same stock negotiated at both odd lot and round lot markets are liquidity differences.³ In short, if there were no market frictions or differences in liquidity, there would be no reason for prices to be different. Moreover, the existence of a single exchange, BM & FBovespa, makes it easier to study the structure of the whole market, unlike other highly segmented markets such as the US. News and other factors affecting fundamentals of a company should be the same for the asset traded in the odd lot market and in the round lot market. Also, as pointed out by Bekaert and Harvey (2002), studies on emerging markets are put aside many times, although there is a wide opportunity for research and, consequently, improvements in these markets. The access to information and to databases in these economies are sometimes difficult to obtain, hampering the progress of such fields of study. Therefore, we intend to contribute to the literature in market microstructure and in emerging markets in two ways: firstly by exposing that the market design for odd lots in Brazil implies in a pricing error when compared the same assets traded in the round lot market. Knowing and exposing different market designs for odd lots is the first step for improvement, which may have an impact over themes considered important for emerging markets literature, such as market efficiency and risk premium (Kearney, 2012). Apparently, other exchanges such as the Taiwan Stock Exchange and the Singapore Stock Exchange use a market design similar for odd lots. Therefore, the conclusions here can be extended to other scenarios. To the best of our knowledge, there is no other research in the literature studying odd lot trades outside the US market other than the current study. Our second contribution is to show that an arbitrage opportunity is present in the Brazilian market. Based on a simple trading strategy, we show that for highly mispriced stocks, the difference in closing prices can reach 150% over approximately 3 years. When trading costs are included, the strategy may also generate profits. This result brings up the question: is the odd lots market good for the Brazilian investors? A suggestion for improvement of the Brazilian market discussed in the paper would be to reduce the minimum trading unit (MTU). For some countries, reducing MTU has improved the traded prices and volume, and spreads have become lower (Ahn et al., 2014; Amihud, Mendelson, & Uno, 1999; Hauser & Lauterbach, 2003; Isaka, 2014). Another suggestion for regulators is to merge both markets.

The paper proceeds as follows: Section 2 defines both data and methodology. In Section 3, we present the results. Section 4 includes suggestions for the odd lot market in Brazil and our concluding remarks.

2. Data and methodology

We gather data from BM & FBovespa’s public ftp website using the R package *GetHFData* (Perlin & Ramos, 2017), which allows easy and free access to trade data from the Brazilian equity market. Our dataset contains all trades in the equities cash market. The sample comprises data from 2013-10-01 to 2017-03-14. We include all stock tickers available in the ftp website, accounting for 231 stocks. Daily data was also collected in the BM & FBovespa website. Data from market capitalization was retrieved using *Economica*® software.

A simple methodology was employed to compare trade prices between markets: for each trade in the odd lot market of a given stock, a comparable trade was matched in the round lot market for the same asset. A trade is defined comparable if the absolute time difference between trades does not exceed one second. All trades with time differences larger than one second are removed from our sample, resulting in 3,956,837 observations. This approach assures that the possible price differences are not due to time effects.⁴ Our mispricing variable is defined by the following equation:

$$\text{Mispricing}_{i,t,d} = \frac{POdd_{i,t,d} - PRound_{i,t^*,d}}{PRound_{i,t^*,d}} \quad (1)$$

where:

³ For example, mean financial volume is much lower in the odd lot market (R\$ 19,325.58) than the same measure calculated at the round lot market (R\$ 24,655,600.00).

⁴ We also test all procedures presented in this paper using time differences of 2 and 5 s, which also reduces the impact of time. The results remain qualitatively the same.

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