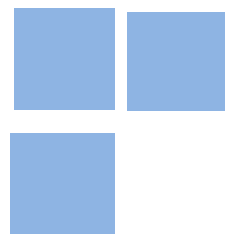


Day trading for a living?

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Abstract:

We show that it is virtually impossible for an individual to day trade for a living, contrary to what course providers claim. We observe all individuals who began to day trade between 2013 and 2015 in the Brazilian equity futures market, the third in terms of volume in the world, and persisted for at least 300 days: 97% of them lost money, only 0.4% earned more than a bank teller (US\$54 per day), and the top individual earned only US\$310 per day with great risk (a standard deviation of US\$2,560). Additionally, we find no evidence of learning by day trading.

Keywords: day trade, day trading for a living, retail investors, HFT, course providers, futures market

JEL Codes: C92, G02, G11, G12

Day trading for a living?*

Fernando Chague,[†] Rodrigo De-Losso,[‡] Bruno Giovannetti[§]

August 19, 2019

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We show that it is virtually impossible for an individual to day trade for a living, contrary to what course providers claim. We observe all individuals who began to day trade between 2013 and 2015 in the Brazilian equity futures market, the third in terms of volume in the world, and persisted for at least 300 days: 97% of them lost money, only 0.4% earned more than a bank teller (US\$54 per day), and the top individual earned only US\$310 per day with great risk (a standard deviation of US\$2,560). Additionally, we find no evidence of learning by day trading.

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1 Introduction

“[...] Our task is to use our research and teaching to curb the rent-seeking dimension of finance. We should use our research to challenge existing practices in finance and blow the whistle on what does not work. We should be watchdogs of the financial industry [...]”

2015 American Finance Association presidential address (Zingales, 2015).

Day trading is the activity of buying and selling the same financial asset on the same day in the same quantity. According to a 2017 article in Forbes, “day trading is the new sexy that gets an inordinate amount of hype.”¹ A web search for the term “day trading for a living” displays encouraging results. The overall message is that day trading for a living is hard but, with sufficient training, fairly possible. For instance, an article by Investopedia² with the title “Should you quit your job to trade stocks?” begins as follows: “Trading is often viewed as a high barrier-to-entry field, but this is simply not the case in today’s market. Now, anyone with ambition and patience can trade, and do it for a living, even with little to no money. Sounds fantastic? It is, and there are so many options available to people with the desire to put in the time to learn.”

Unfortunately, there is no quality information about the actual odds individuals face when they decide to day trade for a living. First, the few existing studies do not focus on individuals who day trade regularly, which largely overestimates the odds of day trading for a living, as we show below. Second, the few existing studies do not follow day traders since their first day trade, which makes it difficult to know whether learning by day trading is indeed possible. Third, the few existing studies use older sample periods that do not incorporate the fierce competition of algorithms and high-frequency traders (HFTs) that individuals now face.³

¹<https://www.forbes.com/sites/nealegodfrey/2017/07/16/day-trading-smart-or-stupid/#411e5d8a1007> (as of July 30, 2019).

²Investopedia is an American website based in New York City that focuses on investing and financial education and has nearly 100 million monthly page views. The article can be found at <https://www.investopedia.com/articles/trading/09/how-to-trade-for-a-living.asp> (as of July 30, 2019).

³Using trading records from all Finnish retail investors from November 1998 to May 2000, Linnainmaa

Our goal is to inform individuals who are considering day trading as a viable career. Using a dataset provided to us by the Brazilian SEC (Comissão de Valores Mobiliários), we follow all individuals who day traded “mini-Ibovespa” futures contracts⁴ for their first time from 2013 to 2015, a total of 19,646 individuals. Mini-Ibovespa futures are the preferred assets by day traders in Brazil, being the third most traded equity index futures and options contracts in the world—ahead of the E-mini S&P 500 Futures and S&P 500 Index Options, for example.⁵

We compute the total net profit⁶ obtained by each one of the 19,646 new day traders. Considering those who day traded for only one day (1,111 individuals), 29.8% obtained positive net profit. Considering those who day traded for 2 to 50 days (9,978), 51 to 100 days (3,100), 101 to 200 days (2,738), 201 to 300 days (1,168), and more than 300 days (1,551), 15.5%, 8.9%, 6.8%, 5.4%, and 3.0% obtained positive net profit, respectively. That is, contrary to what self-selection and learning would suggest, the proportion of successful day traders decreases monotonically with the number of days they trade. This peculiar pattern is similar to what we would find, for instance, in the casino roulette, where the proportion of successful players also monotonically decreases with the number of rounds played.

(2003; 2005) finds that about 30% of day traders profit after transaction costs. Using trading records of some clients from a brokerage firm in the US, Jordan and Diltz (2003) study the performance of 324 day traders from February 1998 to October 1999 and find that 36% of them profit net of fees. Choe and Eom (2009) look at the Korean stock index futures market from January 2003 to March 2005 and find that 25% of all retail day traders profit net of fees; Ryu (2012) also look at the Korean stock index futures market but from January 2003 to October 2006 and reach similar conclusions. Kuo and Lin (2013) study day trading by individuals in the Taiwanese futures market from October 2007 to September 2008 and find that 19% of the day traders profit net of fees; similarly, Barber, Lee, Liu, and Odean (2014) analyze the activity of all stock day traders in Taiwan from 1992 to 2006 and find that about 20% of the day traders profit net of fees. As we show, once we focus on individuals who day trade for long periods, the chances of profiting are actually much smaller than these.

⁴The underlying asset of the mini-Ibovespa future is the Ibovespa index, a portfolio with the 66 most liquid stocks listed in Brazil. The expiration dates of the futures contracts occur on every even month, on the Wednesday closest to the 15th calendar day of the contract month.

⁵According to the Futures Industry Association (FIA) 2018 report, the mini-Ibovespa futures totaled 706 million contracts, ahead of the E-mini S&P 500 Futures (445 million contracts), S&P 500 Index Options (371), Euro Stoxx 50 Index Futures (318), and Nikkei 225 Mini Futures (273). Also according to this report, the futures and options trading volume of the Brazilian Exchange ranked third in the world with 2.57 billion contracts closed.

⁶Net profit considers both exchange and brokerage fees, but does not include income taxes and other expenses such as the ones with courses and trading platforms.

To confirm that day traders do not learn with experience, we run panel regressions with all 1,551 individuals who day traded for more than 300 days. In the regressions, the dependent variable is the profit of each trading day, and the explanatory variables are a sequential number for the trading day of each day trader (1, 2, ...) along with day trader fixed-effects. Differently to what brokerage specialists and course providers claim,⁷ we find no learning by day trading, that is, the expected profit is always negative and does not improve with time.

We observe a large increase in the trading activity of HFTs during our sample period. The fraction of all deals closed by HFTs was 11.6% in 2012, 16.9% in 2013, 32.5% in 2014, 39.2% in 2015, 42.0% in 2016, and 41.9% in 2017. Given this increase in HFTs trading activity, our finding of no learning could simply reflect the tougher competition individuals had to face over time. However, even when we control the learning regressions for HFTs presence, we still find no evidence of learning by day trading.

The facts that (i) only 47 out of the 1,551 persistent day traders (3.0%) profited net of fees and that (ii) there is no evidence of learning, may not be sufficient to discard day trading as a possible career. If the few who profited were able to earn a lot, individuals could still be tempted to take their chances at day trading. However, this is not the case. Only 17 individuals (1.1% of 1,551) earned more than the Brazilian minimum wage (US\$ 16 per day), only eight individuals (0.5% of 1,551) earned more than the initial salary of a bank teller (US\$ 54 per day), and the individual who earned the most earned US\$ 310 per day on average. Moreover, the eight individuals who earned more than the initial salary of a bank teller did so with great volatility; the standard deviation of their daily profit ranged from US\$ 632 to US\$ 3,308.

We conclude by presenting suggestive evidence that the results in this paper may be informative to individuals. A draft of this paper first circulated in Brazil at the beginning

⁷For instance, according to Investopedia, “To achieve consistent income – where you have a solid trading plan and are able to implement it – it will likely take a year or more if you dedicate yourself to it full time. If you only practice part time, it may take a number of years to develop real consistency and attain satisfactory returns” (<https://www.investopedia.com/articles/active-trading/053115/average-rate-return-day-traders.asp>, as of July 24 2019). See also <https://www.investopedia.com/articles/active-trading/061214/best-daytrading-schools.asp>, as of July 24 2019.

of March 2019. On March 7th, the largest financial newspaper in Brazil, “Valor Econômico,” published an article highlighting our main findings. The article stayed on the front page of their on-line version of the newspaper during the afternoon of March 7th. On the next day, the article was published in the printed version of the newspaper with an abstract of the results on the front page. Following, other newspapers, radio broadcasts, financial websites, and social media also reverberated our findings. Given the widespread impact of our study on the community of day traders in Brazil, we obtained an extension of our dataset to test whether the reporting of our findings in the media had any impact on retail day trading. Notably, in the months after the publication of our study, April, May, and June 2019, we see a clear break in the upward trend of retail day trading. Naturally, we do not exclude the possibility that other unobserved factors may have also contributed to this.

2 The empirical analysis

Our dataset comes from the Comissão de Valores Mobiliários (CVM), the Brazilian equivalent to the Securities and Exchange Commission (SEC) in the US. As such, it is extremely reliable. We observe the daily trading records for the mini-Ibovespa futures contracts of all individuals and institutions in Brazil, uniquely and anonymously identified, from 2012 to 2017. For each investor-day, we observe the investor type (individual or institution), the number of contracts purchased, the volume purchased, the number of contracts sold, the volume sold, the number of buying deals, and the number of selling deals.

We use the first year of our dataset, 2012, to identify new retail day traders as follows. We say an individual began to day trade in 2013 if we see no day trading activity from him or her in 2012; analogously, we say an individual began to day trade in 2014 if we see no day trading activity from him or her in 2012 and 2013; and so on. We observe a total of 19,646 individuals beginning to day trade from 2013 to 2015. We do not consider the individuals who began to day trade in 2016 and 2017 (53,246 individuals) since we need to have at least

two years of data to evaluate performance.

We compute the performance of each day trader by taking the average across his or her daily profits (total volume sold minus total volume purchased in each day). We also compute their performance net of transaction costs by subtracting exchange and brokerage fees.⁸ We compute all values in US Dollars, using the average R\$/US\$ exchange rate of our sample period (2.91).

Importantly, day traders performance is likely to be over-estimated for two reasons. First, we do not consider income taxes and other relevant expenses such as costs of trading platforms and courses. Second, we only consider days in which the individual purchases and sells mini-Ibovespa contracts in exactly the same quantity—for instance, we do not consider a day in which an individual purchases 10 contracts and sells 5— and, according to Linnainmaa (2005), retail day traders are reluctant to close losing day trades due to the disposition effect. Because of these two reasons, retail day traders’ actual performance is likely to be even worse than what we report below.

Out of the 19,646 new day traders, 1,111 (5.7%) day traded only one day, 9,978 (50.8%) between 2 to 50 days, 3,100 (15.8%) between 51 to 100 days, 2,738 (13.9%) between 101 to 200 days, 1,168 (5.9%) between 201 to 300 days, and 1,551 (7.9%) for more than 300 days. Figure 1 shows the fraction of individuals with a positive net profit in each of these six groups. The probability of an individual exhibiting a positive profit monotonically decreases with the number of days he or she trades. This peculiar pattern is contrary to what “self-selection”—individuals who persist in an activity are generally those with better performance—and “learning by doing” would suggest. In turn, patterns like this are usually found in gambling activities, such as the casino roulette, where the proportion of successful players also monotonically decreases with the number of rounds played.

⁸The exchange fees are computed according the fee structure used by B3 (http://www.b3.com.br/en_us/products-and-services/fee-schedules/listed-equities-and-derivatives/equities/ibovespa-and-brazil-index-50-fees/futures-and-structured-operations/). Since we do not observe the investor’s broker, we estimate broker fees based on the best rates advertised by the major online brokerage firm in Brazil specialized in retail investors.

[Figure 1 about here]

To confirm there is no learning by day trading, we run individual-day panel regressions (with the 1,551 individuals who decided to persist for at least 300 trading days) of the day trade daily profit on *seq*, a variable that chronologically orders the trading day of each individual (it is 1 for the first day of day trading, 2 for the second day of day trading, and so on). Alternatively, we use as explanatory variables two dummy variables, *first third* and *last third*, that are one in the first third of the investor's trading days and in the last third of the investor's trading days, respectively. Regressions include day traders fixed-effects. If there is learning on average among these persistent day traders, we should observe a positive coefficient of *seq*, and a positive coefficient of *last third* along with a negative coefficient of *first third*. Columns 1 and 2 (gross profit) and columns 5 and 6 (net profit) of Table 1 show the results. We find no evidence of learning.

[Table 1 about here]

It may be important to control the learning regressions of Table 1 for the activity of algorithms and high-frequency traders (HFTs). Institutions have been investing heavily in technology to profit from high-frequency trading, what may negatively affect individual day traders' performance. Since the activity of HFTs increases during our sample period, this might produce a downward bias in the estimate of the learning parameter.

We define an HFT as an institution that closes more than one deal per second on average in a day on the mini-Ibovespa futures contract (i.e., more than 23,400 deals in a day). In terms of number of HFTs, we observe four HFTs in 2012 and 2013, six in 2014, five in 2015, and 11 in 2016 and 2017. In terms of daily fraction of number of deals, we observe an average of 11.6% in 2012, 16.9% in 2013, 32.5% in 2014, 39.2% in 2015, 42.0% in 2016, and 41.9% in 2017. Accordingly, in columns 3, 4, 7, and 8 of Table 1 we include as a control the variable *HFT*, which is the daily fraction of HFTs in the number of deals. As expected, we find a strong negative coefficient of *HFT*, indicating that the increasing presence of these investors

is related to greater losses by individuals. However, we still find no evidence of learning by day trading after controlling for HTFs.

We next evaluate the performance of the 1,551 individuals who day traded for at least 300 days in Table 2. Considering the performance net of exchange and brokerage fees (Panel C), we find that 97% of all investors who persisted for more than 300 days lost money. The average daily net profit is US\$ -48.81, the median is US\$ -23.21, the minimum is US\$ -2,715.88, and the maximum is US\$ 310.21. Consistent with the fact that there is no learning by day trading, the results are qualitatively the same if we compute the performance before and after the first 250 day trades by the investor. The average daily net profit after costs is US\$ -47.34 considering only the first 250 day trades; in turn, it is US\$ -51.65 considering only the latter deals.

[Table 2 about here]

The proportion of investors who obtained positive net profit (47 investors, 3.0% of 1,551) is arguably small. The picture, however, is even worse if we look at how much these individuals actually made. Only 17 individuals (1.1% of 1,551) earned more than the Brazilian minimum wage (US\$ 16 per day), only eight individuals (0.5% of 1,551) earned more than the initial salary of a bank teller (US\$ 54 per day), and the individual who earned the most earned US\$ 310 per day on average.⁹ Moreover, the eight individuals who earned more than the initial salary of a bank teller did so with great volatility: the standard deviation of the daily profit of these eight individuals ranged from US\$ 632 to US\$ 3,308. This can be seen in Figure 2, which displays a scatter-plot with the the daily net profit average (horizontal axis) and the daily net profit standard deviation (vertical axis) of each one of the 47 day traders who obtained positive net profit.

[Figure 2 about here]

⁹The average minimum wage in Brazil during the years 2013-2017 is US\$3,965.96 per year. Our reference for a bank teller wage is US\$13,648.86 per year, which is the minimum bank teller wage agreed between unions and banks for 2016 (we consider the bank workers' union with the largest number of members in Brazil, see http://spbancarios.com.br/sites/default/files/cct/arquivo/1181_cct_2016_2018.pdf). All legal benefits are included to compute yearly wages.

2.1 Possible effects of new information

A draft of this paper first circulated in Brazil at the beginning of March 2019. On March 7th, the largest financial newspaper in Brazil, “Valor Econômico,” published an article highlighting our main findings. The article stayed on the front page of their on-line version of the newspaper during the afternoon of March 7th. On the next day, the article was published in the printed version of the newspaper with an abstract of the results on the front page. Other newspapers, radio broadcasts, financial websites, and social media amplified the reporting of our findings.¹⁰ The reaction was particularly strong on YouTube, where many of the course providers who teach individuals how to day trade discussed the numbers presented by our study.¹¹

Given the widespread impact of our study on the community of day traders in Brazil, we asked CVM for an extension of the dataset to test whether the reporting of our findings in the media had an impact on the trading activity by retail day traders in the mini-Ibovespa futures.¹² Figure 3 shows the evolution of the daily number of day traders from January 2017 to June 2019. For each month, we show the maximum, median, and minimum number of daily retail day traders. Looking at the maximum, the number of daily day traders steadily increases every month—the only exceptions are April 2017 and July 2018 (a month with overall low trading activity because of vacations and the soccer world cup). At the end of 2018, we see a strong increase in the number of day traders explained in part by the fact that retail brokerage houses zeroed the fees for day traders to lure in new investors to their courses and other services such as trading platforms. After the publication of our study in March 2019, we see a clear break in the upward trend of retail day traders. If we look at

¹⁰To list a few with links: Valor (on-line version, print version), Folha de São Paulo, O Popular, Gazeta do Povo, and radio CBN.

¹¹Here are some YouTube links with the respective number of views as of April 24th 2019: Video 1 (93,621 views), Video 2 (57,592 views), Video 3 (28,570 views), Video 4 (23,350 views), Video 5 (18,350 views), Video 6 (10,650 views), Video 7 (10,447 views), Video 8 (9,463 views), Video 9 (8,850 views), Video 10 (6,241 views), Video 11 (5,698 views), Video 12 (5,322 views), Video 13 (4,468 views), Video 14 (4,084 views).

¹²For this additional recent sample period, we cannot track individuals over time as we do not have the anonymous identification. We only observe the number of different individuals day trading per day.

the minimum number of day traders, which should capture more closely the dynamics of persistent day traders, the break in the upward trend is even clearer. Naturally, we do not exclude the possibility that other unobserved factors may have also contributed to this.

[Figure 3 about here]

3 Final remarks

The number of people who seek to make a living from day trading has increased in recent years. It is now very easy for anyone to enroll in one of the many on-line courses about day-trading, or to join live trade rooms in YouTube where traders teach retail investors how to day trade in real time. Unfortunately, quality information about the odds individuals actually face when frequently day trading is notably absent. Our goal is to fill this gap.¹³ We find that it is virtually impossible for an individual to day trade for a living, contrary to what brokerage specialists and course providers often claim.

The strong repercussion that the first draft of this paper had on the day trader community in Brazil indicates that retail day traders are unaware of the odds they face. We believe the numbers in this paper are also informative for day traders in other countries. The structure of the Brazilian stock market is similar to other markets, and many of the major institutional players in Brazil are large foreign institutions who operate in most major financial markets in the world.

¹³Regulators, such as the SEC and the CVM, do provide important information about the risks of day trading for retail investors, but not the actual odds. See, for instance, <https://www.sec.gov/reportspubs/investorpublications/investorpubsdaytipshtm.html>.

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A Tables and Graphs

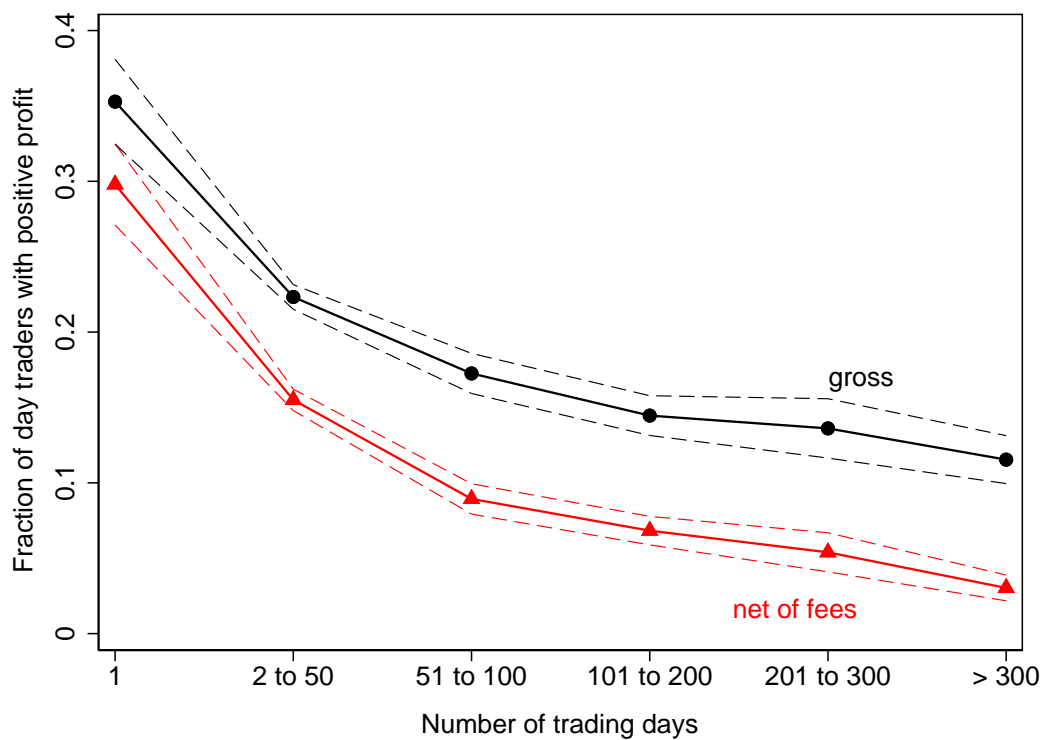


Figure 1: Fraction of day traders with positive profit

This figure shows the fraction of individuals with positive gross profit (black line with circles) and positive net profit (red line with triangles). Individuals are separated into six groups according to their total number of trading days. The dashed lines indicate the 95% confidence interval.

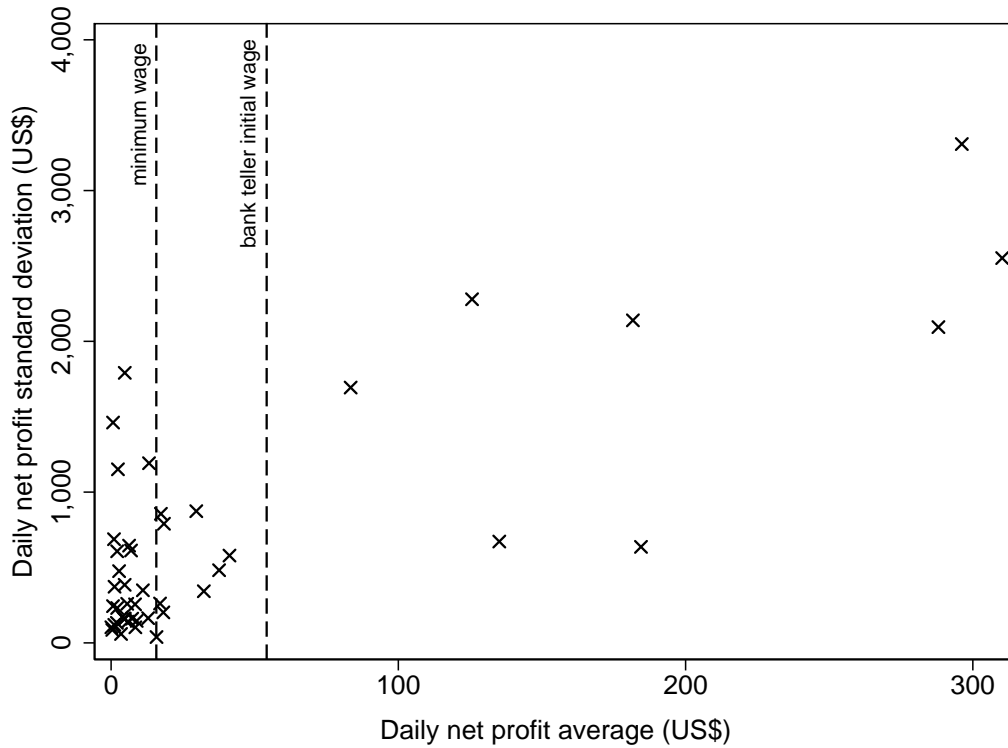


Figure 2: A closer look at the 47 day traders with positive net profit

This figure shows the daily net profit average (horizontal axis) and the daily net profit standard deviation (vertical axis) of each one of the 47 day traders (3.0% of the 1,551 persistent day traders) who obtained positive net profit. The first dashed vertical line indicates the Brazilian minimum wage (US\$ 16 per day) and the second, the initial salary of a bank teller (US\$ 54 per day).

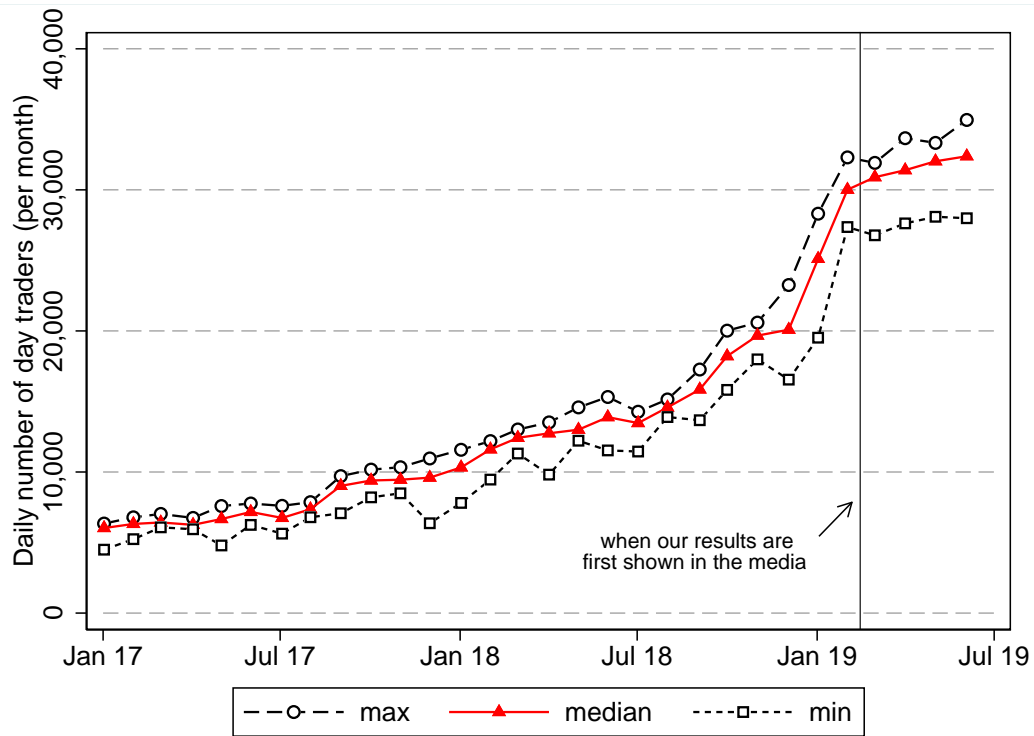


Figure 3: Daily number of day traders

This figure shows the evolution of the daily number of day traders from January 2017 to June 2019; for each month, we compute the maximum, the median, and the minimum daily number of different retail investors who day traded. The vertical line in March 2019 indicates when the numbers on this paper about the poor performance of retail day traders first appeared on the major financial media in Brazil.

Table 1: Learning by day trading

This table shows individual-day panel regressions with the 1,551 day traders who decided to persist for at least 300 trading days. We regress their daily profit (in US\$) on (i) *seq*, a variable that chronologically orders the investor's day trades (1 for the first day, 2 for the second day, and so on...), (ii) two dummy variables, "first third" and "last third," that are one in the first third of the investor's trading days and in the last third of the investor's trading days, respectively, and (iii) the daily fraction of the deals closed by a High-Frequency Traders (HFT). We define an HFT as an institution that closes more than one deal per second on average in a day, i.e., if it closes 23,400 deals in a day. Columns 1 to 4 consider day trade gross profits, and columns 5 to 8 consider day trade profits net of exchange and brokerage fees. All regressions include day trader fixed effects. Standard errors clustered at the investor level are in parenthesis. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	daily gross profit				daily net profit			
seq	0.005 (0.011)		0.016 (0.010)		-0.019 (0.011)		-0.003 (0.011)	
first third		-0.533 (2.490)		-3.007 (2.466)		1.742 (2.757)		-1.871 (2.694)
last third		-0.120 (3.396)		0.932 (3.373)		-5.769 (3.596)		-4.233 (3.578)
HFT			-47.99 (13.41)	-43.93 (14.14)			-64.41 (14.19)	-64.17 (14.91)
constant	-29.47 (2.72)	-28.07 (1.53)	-15.94 (5.23)	-12.47 (5.23)	-44.99 (2.85)	-48.45 (1.63)	-26.81 (5.59)	-25.67 (5.46)
R2	1.32%	1.32%	1.32%	1.32%	2.04%	2.04%	2.05%	2.05%
N	714,637	714,637	714,637	714,637	714,637	714,637	714,637	714,637

Table 2: Observed performance of retail day traders

This table shows the average daily performance of retail day traders. We consider only individuals who initiated their day trading activity from 2013 to 2015 and day traded for more than 300 days (a total of 1,551 investors). For each investor we compute his or her average daily performance considering: i) all days of day trading, ii) only the first 250 days of day trading, iii) only the days of day trading after the 250th one. We then report the mean, minimum, maximum, and the different percentiles of the average daily performance across all the 1,551 investors. The last three columns show the percentile of investors who earned more than US\$ 0, more than the Brazilian minimum wage (US\$ 16 per day), and more than the entry-level wage of a bank teller (US\$ 54 per year). Panel A considers only the profits from day trade (i.e., gross results), Panel B includes costs with exchange fees, and Panel C includes costs with both exchange fees and brokerage fees. All numbers are in U.S. Dollars considering the R\$/US\$ exchange rate of 2.91 (the average during our sample period).

<i>Panel A: gross daily profit (US\$)</i>													
	mean	min.	1 pct	10 pct	25 pct	50 pct	75 pct	90 pct	99 pct	max.	break-even		
											US\$ 0	min. wage	bank-teller
all days	-27.83	-2,131.90	-317.22	-69.24	-29.53	-10.44	-3.54	1.29	63.19	410.04	88.5 pct	96.9 pct	99.0 pct
until 250th day	-28.70	-3,150.11	-331.83	-69.58	-29.69	-9.97	-3.42	1.51	50.20	538.65	87.4 pct	96.1 pct	99.2 pct
after 250th day	-27.79	-1,873.31	-380.12	-73.97	-27.48	-9.83	-2.57	3.26	68.68	991.88	85.1 pct	95.4 pct	98.8 pct

<i>Panel B: net daily profit, considering expenses with exchange fees (US\$)</i>													
	mean	min.	1 pct	10 pct	25 pct	50 pct	75 pct	90 pct	99 pct	max.	break-even		
											US\$ 0	min. wage	bank-teller
all days	-32.07	-2,302.49	-346.77	-76.86	-33.29	-12.41	-4.80	-0.58	40.17	382.03	91.0 pct	97.5 pct	99.2 pct
until 250th day	-32.30	-3,308.77	-344.49	-76.70	-33.19	-11.68	-4.42	-0.09	44.99	526.90	90.1 pct	96.5 pct	99.3 pct
after 250th day	-32.80	-1,982.83	-402.74	-81.45	-32.07	-11.91	-3.49	1.21	55.34	967.29	87.9 pct	96.2 pct	99.0 pct

<i>Panel C: net daily profit, considering both expenses with exchange and brokerage fees (US\$)</i>													
	mean	min.	1 pct	10 pct	25 pct	50 pct	75 pct	90 pct	99 pct	max.	break-even		
											US\$ 0	min. wage	bank-teller
all days	-48.81	-2,715.88	-402.77	-109.52	-52.73	-23.21	-11.13	-5.27	17.05	310.21	97.0 pct	98.9 pct	99.5 pct
until 250th day	-47.34	-3,694.40	-385.05	-104.38	-51.90	-21.38	-9.66	-4.35	27.44	471.28	95.5 pct	98.5 pct	99.4 pct
after 250th day	-51.65	-2,249.07	-499.23	-118.92	-53.58	-22.84	-9.57	-3.66	28.41	907.41	95.0 pct	98.3 pct	99.4 pct