Retail Investors and Corporate Governance: Evidence from Zero-Commission Trading

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Abstract

We examine the effects of the sudden abolition of trading commissions by major brokerages in 2019 and subsequent increase in retail-investor base on corporate governance. Firms with greater retail ownership experienced greater positive abnormal returns around the abolition of commissions. Firms with positive abnormal returns in response to the abolition of commissions subsequently saw decreases in institutional ownership, shareholder voting, and corporate governance scores. These firms also reduced the percentage of shares needed for a quorum at shareholder meetings. Our results show that entry costs influence retail ownership and influence on corporate governance.

JEL classification: G11, G14, G24, G41, K22

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1. Introduction

What influence do retail shareholders have on corporate governance? Finance and legal scholars have long debated and analyzed the impact of changes in shareholder base (from retail to institutional or vice versa) on corporate governance and performance. The primary empirical challenge has been the problem of endogeneity: while a change in shareholder base can have an effect on firm governance and performance, better or worse performance or governance can also attract certain types of investors. The existing scholarship has attempted to disentangle the effects by trying to identify an exogenous shock to the system (such as a firm's inclusion in a stock market index) (Appel, Gormley, and Keim 2016).

In this paper, we attempt to shed light on this important issue by using the sudden abolition of trading commissions by major brokerages in 2019 as a potential natural experiment. The introduction of zero-commission trading by major brokerages (Charles Schwab, E-Trade, and TD Ameritrade) substantially reduced retail investors' cost of entering the stock market and can be linked to an unexpected increase in retail ownership at certain firms. This research design allows us to analyze the impact on corporate governance of change in shareholder base from the other side: given that the wide introduction of zero-commission trading was not influenced by firm characteristics, by examining the effect of zero-commission trading and subsequent changes at firms, this experiment can shed light on the impact of having more retail shareholders on firm governance.

First, we find evidence consistent with the reduced entry cost translating to a significant increase in retail ownership (and a concomitant decrease in institutional stockholding). The effect of increased retail ownership, however, was not uniform across all firms. Rather, it was more pronounced at firms that were already "popular" with retail investors, as measured by lower institutional ownership before the wide introduction of zero-commission trading. In an event study analysis, we find that firms with higher existing non-institutional ownership experienced greater abnormal returns on October 1, 2019, when the major brokerages unexpectedly announced the introduction of zero commission trading platforms.

For the remainder of our empirical analysis, we define our "treatment group" to consist of firms that experienced larger (more positive) abnormal returns around the introduction of zero commission trading on October 1, 2019.[1] We define this group as being "treated" because the wide introduction of zero-commission trading would likely make them experience a greater influx of retail shareholders—thus causing their stock prices to rise on October 1, 2019.[2] Put differently, we suspect that firms with the highest abnormal returns around the wide introduction of zero-commission trading were most likely to experience the effect of retail investors on their ownership and corporate governance. Consistent with this intuition, we show that companies with higher abnormal returns on that day saw a steady rise in non-institutional ownership—compared to their counterparts—in the years immediately after the wide introduction of zero-commission trading.

[1] Specifically, we capture "larger" abnormal returns using two proxies: a continuous difference-in-differences approach (Atanasov and Black 2016) and an indicator variable for whether the firm's abnormal return ranked in the top quartile in the sample.

[2] This definition follows Kumar and Lee (2006), who find that stocks experience positive excess returns when retail investors are bullish toward them. The sudden influx of retail investors would provide those companies popular among retail investors with higher liquidity (Barot, Kaniel, and Sraer 2016), which would in turn reduce the cost of capital (Amihud and Mendelson 2000, Diamond and Verrecchia 1991) and increase firm value (Jagannathan et al. 2017).

Second, turning to the impact of retail investors on corporate governance, we first show theoretically that if retail shareholders are not as active in participating in corporate governance as institutional shareholders, an influx of retail investors (and exit of institutional investors) will not necessarily translate to a decline in influence by the remaining (including passive) institutional investors.[3] The theoretical ambiguity, therefore, leaves it open for an empirical assessment. On the empirical side, we find that retail investor entry led to a significant decline in shareholder participation in governance, as measured by shareholder voting. Studying proposal-level voting data, we find that these firms saw a significant jump in non-voting after the wide introduction of zero-commission trading.

Treated firms also experienced a decrease in environmental, social, and corporate governance (ESG) metrics, as measured by the MSCI database, after 2019. Disaggregating ESG performance into the sub-scores for environmental ("E"), social ("S"), and corporate governance ("G") issues, we find that the post-2019 decline for the treatment group is pronounced in the governance ("G") component. We find no significant change in these companies' performance on "E" or "S" issues after the wide introduction of zero-commission trading. The best reading of the decrease in treated firms' ESG scores could be that the quality of their corporate governance, as measured by the methodology of data providers like MSCI, declined after 2019. In other words, it is less clear that retail investor influence caused them to become less "prosocial."

Third, to further investigate the determinants of the decrease in "G," we analyze changes in several corporate governance indicators: staggered boards, poison pills, majority voting standard, board independence, and board gender diversity. We find that treated firms become significantly less likely to adopt a majority shareholder voting standard for director elections after the wide introduction of zero-commission trading. We do not find any evidence, however, that treated firms perform any differently when we look at staggered boards, poison pills, board independence, or gender diversity. Given our prior finding regarding retail investors' non-participation in voting, we believe it is significant that the only weakened corporate governance outcome we observe is directly related to the process of shareholder voting. The results also suggest that the influx of retail investors (and their concomitant apathy in terms of voting) did not necessarily lead to institutional investors exercising a greater influence on corporate governance measures.

Fourth, if retail shareholders do not participate as much in shareholder meetings and do not exercise their voting rights, this could also have an implication for the companies in terms of their ability to satisfy the quorum requirement to elect directors and pass proposals.[4] To examine what impact the increase in retail ownership may have in making it more difficult for companies to hold shareholder meetings, we hand-code corporate changes to quorum requirements in the years around the abolition of commissions. Consistent with the prediction, we find that firms have become

[3] This is in contrast to a situation where passive institutional investors increase their holdings—including in such scenarios involving a firm's inclusion in a stock market index. In such a case, passive institutional shareholders' influence over management will always increase. The reason for the ambiguity, as demonstrated in more detail in the theory section, has to do with retail investors' lack of participation and other (active) institutional shareholders' vote (or exert influence) in line with passive institutional shareholders. For instance, if retail investors never vote and active institutions do not vote in line with passive institutions, an increase in retail ownership and a concurrent decrease in active institutions' ownership can actually increase the relative power of passive institutions.

[4] Lawyers and other corporate governance practitioners to whom we spoke confirmed that the influx of retail traders in recent years has led to concrete changes in corporate governance, due to these investors being less likely to vote than institutional shareholders.

substantially more likely to amend bylaws to reduce the percentage of shares required for a quorum at shareholder meetings in recent years.[5] The treatment group of firms were especially likely to decrease quorum requirements. In other words, companies most affected by zero-commission trading were more likely to have changed their bylaws to account for the rise in retail ownership and the consequent decrease in shareholder voting.

Our main specifications include firm- and year-fixed effects, allowing the regression estimates to account for within-firm and within-year variation in the dependent variables. Furthermore, pre-trend analyses suggest that the results are not driven by preexisting differences between firms that experienced the highest abnormal returns around October 1, 2019 and other companies (treated versus non-treated firms). The relationship between preexisting retail ownership and abnormal returns on October 1, 2019 persists when we re-run the analysis on matched and entropy-balanced samples. We run an alternative event study showing that firms with higher retail ownership continue to have higher abnormal returns when we expand the event window to include the announcement of zero-commission trading at a smaller online brokerage, Interactive Brokers, on September 26, 2019. Finally, we find that our results are unlikely to be explained by the introduction of fractional trading.

One concern with the paper's findings could be that our choice of treatment group—firms that experienced larger abnormal returns around Schwab's announcement—suffers from a potential selection effect. This is perhaps reflected in our first result, showing that firms with the highest abnormal returns already had greater retail ownership. The rise in non-voting and decrease in corporate governance scores after 2019, therefore, may not reflect the causal effect of zero-commission trading, but instead be due to the pre-existing high retail ownership (and other differences in unobservable characteristics) of our treatment group. However, we do not believe such a selection effect impeaches our results for three reasons. First, zero-commission trading represented a significant reduction in entry costs for retail investors, with recent studies indicating that transaction costs for retail investors decreased by an order of magnitude after 2019 (Adams, Kasten, and Kelly 2023). The ease with which our treated firms could raise capital from the market with more retail investors changed after October 1, 2019. Second, and relatedly, the fact that these companies experienced statistically significant abnormal returns around Schwab's announcement indicates that the market anticipated that zero-commission would boost their firm value immediately after the announcement. Third, the lack of any pre-trends in retail ownership, shareholder non-voting, or corporate governance scores reinforces our argument that the treated groups saw their corporate governance change *because* of the wide introduction of zero-commission trading.

Overall, this paper makes two principal contributions to the literature. First, the paper advances the literature on the role of entry costs in determining whether individuals enter the stock market. Previous experimental work looking at Scandinavian lottery winners and the inheritors of large bequests has shown that a modest fixed entry cost can explain why many retail investors choose not to invest in the stock market (Andersen and Nielsen 2011; Briggs et al. 2021; Vissing-Jorgensen 2002). Our study is broadly consistent with these papers: the removal of the relatively modest trading commissions led to a significant systematic increase in retail ownership at affected firms. Unlike previous studies, however, our finding does not rely on experimental data and instead documents a

[5] Under state corporate law, including most importantly Delaware corporate law, when a company's charter grants the rights to unilaterally amend its bylaws to the directors, directors can exercise that right to change the quorum. See Choi and Min (2018).

relationship between entry costs and retail investor entry into a broad swathe of publicly-traded U.S. companies.

Second, the paper adds to the literature on the distinctive role of retail investors in corporate governance, while relying on a previously unexplored research design. As individuals with small stakes in firms run by professionals and lacking the ability to monitor managers, retail investors can be seen as rationally apathetic toward corporate affairs (Black 1990). Existing empirical evidence suggests that retail shareholders are far less likely to vote than other stockholders and are less concerned with pushing management to better its ESG performance (Brav, Cain, and Zytnick 2022). Earlier scholars have also documented how an (exogenous) increase in institutional ownership leads to better corporate governance and performance (Aghion, Reenen, and Zingales 2013; Appel, Gormley, and Keim 2016). Our results, showing a decrease in shareholder voting and ESG scores at firms exposed to zero-commission trading, are consistent with this literature on retail investor influence in corporate governance. It also is consistent with the earlier results of the impact of institutional ownership on better corporate governance. This paper's contribution lies in establishing a causal/predictive relationship between the 2019 abolition of entry costs for retail investors and the subsequent corporate governance changes consistent with retail shareholders' apathy toward corporate governance.[6]

The paper is organized as follows. In Section 2, we describe the background literature on the role of entry costs in individuals' decisions to enter the stock market. Section 2 also surveys the evidence on retail or institutional investor behavior. Section 3 presents a simple, stylized model exploring the effects of changing the composition of investor base on voting outcomes. The model illustrates that the overall effect of the replacement of institutional investors by retail investors on the (remaining) institutional investors' influence on corporate affairs is ambiguous. Section 4 describes the different sources of data used in our empirical analysis and presents summary statistics. Section 5 details the events surrounding the October 1, 2019 abolition of trading commissions by major brokerages, and shows how stocks that were already "popular" with non-institutional investors exhibited the highest abnormal returns that day. Section 5 also shows that the wide introduction of zero-commission trading was followed by a persistent increase in non-institutional ownership at firms that had the highest abnormal returns on October 1, 2019.

Section 6 documents the corporate governance effects of zero-commission trading. We find that treated firms saw an increase in shareholder non-participation, as measured by the percentage of votes that were neither cast for or against a proposal, nor marked as abstentions. We also show that the treated group saw a decrease in its ESG scores, consistent with pro-ESG institutional players being replaced by retail investors who are relatively apathetic about these topics. We find that treated firms specifically experienced a decrease in scores on corporate governance, rather than environmental or social, issues. Analyzing specific corporate governance outcomes, we find that treated companies, as compared to their counterparts, were less likely to have adopted a majority voting standard for director elections—after the advent of zero-commission trading. Nevertheless, we find that these firms did not experience a significant change in staggered boards, poison pills, board independence, or gender diversity. Section 6 also finds that firms with high abnormal returns on October 1, 2019 were more likely to subsequently decrease quorum requirements, consistent with practitioner reports that retail

[6] In earlier work, we found similar stock return reactions to zero-commission trading, as well as subsequent changes in corporate governance, for a handful of companies popular among retail investors and known as "meme stocks" (Aggarwal, Choi, and Lee 2023). This paper broadens the earlier work by generalizing it to the broad array of firms popular with retail investors.

investor non-voting has made it harder for companies to conduct their meetings. Section 7, which contains various robustness tests described earlier, reiterates the relationship between zero-commission trading and retail influence on corporate governance. The last section concludes the paper with possible implications and issues for future research.

2. Background and Relevant Literature

The impact of shareholder base on corporate behavior has been one of the most important questions that finance and legal scholars have examined in recent years. While a sweeping generalization is not possible, the existing research suggests that as the share of institutional ownership (even passive institutional ownership) rises, firms tend to be better governed and to perform better. One of the biggest challenges in this area has been dealing with endogeneity: shareholder base can affect firm governance and performance, but the latter will presumably also affect what types of investors would decide to become shareholders.

A number studies has examined the relationship between shareholder base and corporate behavior. Aghion, Reenen, and Zingales (2013), for instance, showed that greater institutional ownership is associated with more and better innovation, as measured by R&D spending. The study, however, is based on long-term panel dataset of over 800 public companies in the US and it is difficult to draw a more concrete causal claim. Later studies attempt to deal with the reverse causality issue more directly by identifying certain exogenous changes in the ownership structure. By far the most popular change the scholars have utilized is the reconstitution of certain stock market indexes, such as Russell 1000 and 2000. The underlying story is that when a company's stock gets included (or excluded) from an index, this leads to an increase (or decrease) in institutional ownership particularly by (mostly) passive funds that rely on an index-based investment strategy. Utilizing such technique, Boone and White (2015) find that an inclusion in Russell 1000 and 2000 indexes leads to greater management disclosure, more analyst coverage, and higher liquidity. Using the similar technique and examining the impact on corporate governance more directly, Appel, Gormley, and Keim (2016) show that an inclusion in the indexes also lead to better governance structures, such as more independent directors, removal of antitakeover devices, and more equal voting rights.[7] Chen, Dong, and Lin (2020) similarly find that the index inclusion leads to better CSR ratings, arguing that institutional shareholders can generate positive social impact.

Other scholars have examined the behavior of institutional and retail shareholders more directly. With respect to retail shareholders, earlier research has shown that, while institutional shareholders actively participate in voting, retail investors generally show limited interest in voting their shares. According to Kastiel and Nili (2016), retail investors make up approximately 25% of the average public company's shareholder base, but their votes amount to only about 10% of votes at annual meetings. This lack of retail voting has been consistent over the past two decades, with retail investors voting for only 29% of their shares, compared to the substantial 90% vote rate of institutional investors (Broadridge 2015). Research suggests that retail voter participation varies based on factors such as ownership stake, the company's return on assets, and the presence of ISS-opposed proposals on the ballot (Brav, Cain, and Zytnick 2022). Smaller firms, for example, tend to experience higher retail voter participation. From 2012 to 2015, the retail participation rate decreased by 1 percentage point annually, reaching 28% in 2016 and then increasing by 1 percentage point to 29% in

[7] Wei and Young (forthcoming) question the validity of using index reconstitution as an identification strategy, claiming this reflects a selection rather than treatment effect.

2017. In addition to being disinclined to vote in annual corporate meetings, retail investors also tend to exhibit different preferences from institutional investors in how they vote. Brav, Cain, and Zytnick (2022) document that ESG shareholder proposals tend to receive weaker support from retail investors as compared to the overall sample. Nevertheless, the low turnout of retail investors underscores the dominance of institutional investors in election results.

We address the endogeneity concern by relying on the intuition that the extent of retail shareholding should depend on the entry costs faced by retail investors. Prior work has shown that individuals become more likely to enter the stock market after receiving a bequest or winning a lottery (Andersen and Nielsen 2011; Briggs et al. 2021; Vissing-Jorgensen 2002). These authors suggest that even modest fixed entry costs play a significant role in determining retail investor participation in the financial system. We focus on the 2019 abolition of trading commissions by major online brokerages as a sudden decrease in entry costs for retail investors. Unlike the work on bequests and lotteries, this shock to entry costs is relevant to the U.S. markets and applies to a broad swathe of companies and investors. The abolition of trading commissions was unexpected and represents a true shock to entry costs and does not suffer from the potential selection effect displayed by the Russell index classification strategy described earlier.

As a brief background on the events, on October 1, 2019, the major online brokerage Charles Schwab eliminated commissions for all its customers. They were quickly followed by the remaining major online brokerages, TD-Ameritrade and E-Trade. Collectively, these three entities had dominated the online brokerage business. The significance of the wide introduction of zero-commission trading cannot be overstated. Adams, Kasten, and Kelley (2023) find that transaction costs for retail investors became an order of a magnitude smaller after the abolition of commissions in 2019 and represented a "wealth transfer from brokers to retail clients." This significant decrease in entry costs for retail investors is consistent with contemporaneous reports that Schwab's announcement "sent shock waves across Wall Street" (Gittelsohn and Massa 2019).[8]

The announcement of zero-commission trading on October 1, 2019 is a suitable setting for testing the effects of a sudden decrease in entry costs for retail investors for two reasons. First, it was unexpected. Multiple industry sources characterized the abolition of commissions as "unexpected" or a "surprise," given that Schwab and its competitors had based their business model on trading commissions for decades (Karim 2019; "Schwab Launches Commission-Free Trades" 2019). Second, Schwab's announcement almost immediately led to the market concluding that zero-commission trading was the long-term reality. Charles Schwab, E-Trade, and TD Ameritrade shares dropped 10, 16, and 25 percent on October 1, 2019 (Bernard 2019) and industry experts concluded the same day that trading commissions were likely to systematically converge to zero (Gittelsohn and Massa 2019). Figure 1 plots stock prices and trading volumes for these four brokerages around the abolition of trading commissions. All three stocks show a dramatic decrease in price and upsurge in trading volume on October 1, 2019, the day Schwab announced the introduction of zero-commission trading.

Given the significant effects of even modest changes in entry costs on stock market participation from the prior literature, the abolition of trading commissions arguably should have increased retail investor participation in the capital markets and in turn increased the influence of retail

[8] Although Robinhood Markets was already in operation then, their size was relatively small. Robinhood user base, in fact, increases significantly after the fourth quarter of 2019. See Robinhood's Prospectus, available at: https://www.sec.gov/Archives/edgar/data/1783879/000162828021015076/robinhood424.htm.

investors in U.S. corporate governance. This paper first investigates whether zero-commission trading did lead to increased retail ownership at firms most affected by Schwab's announcement on October 1, 2019. It then examines what effects the rise in retail ownership had on corporate governance at these firms.

We define our treatment group of firms most affected by Schwab's announcement as companies that experienced the highest abnormal returns on October 1, 2019. These are the companies we expect to gain the most from retail investors' lower barriers of entry. Firms that expect to experience a significant influx of retail shareholders would experience excess returns around Schwab's announcement because the market would reasonably anticipate that these companies would subsequently face lower costs of capital. The clearest link between retail investor influence and firm value would be through these investors' provision of higher liquidity (Barot, Kaniel, and Sraer 2016). The higher liquidity provided by retail investors could in turn reduce our treated group's cost of capital going forward (Amihud and Mendelson 2000, Diamond and Verrecchia 1991). Therefore, higher abnormal returns on October 1, 2019 are a proxy for a firm's exposure to retail investor interest after the introduction of zero-commission trading.

3. Theoretical Model and Hypothesis Development

What are the implications of increased retail ownership on corporate governance and the agenda promoted by institutional investors? A priori, there is no clear answer. On the one hand, the decrease of non-institutional ownership might suggest that institutional investors' voting power will be reduced; thus, one might suspect that their preferred corporate policies may be less likely to be implemented. On the other hand, as the literature review illustrates, retail investors are in general much less likely to vote (or to attempt to indirectly influence management) compared to institutional investors. This pattern might indicate that, with more passive retail investors, institutional investors—despite their reduced overall ownership—may wield *comparatively* greater voting power within the universe of the shares voted. For this reason, the critical inquiry is which investor group is being replaced by the incoming retail investors, and how their respective voting patterns differ. In this section, we consider a simple model to analyze these dynamics.

Suppose there are three groups of shareholders: (1) passive institutional shareholders; (2) active institutional shareholders; and (3) retail shareholders.[9] Consistent with the findings from Appel, Gormley, and Keim (2016), we assume that passive institutional shareholders (such as index mutual funds and pension funds with diversified holdings) do not exit the company and always vote and exercise their franchise rights as shareholders. At the same time, both active institutional shareholders (such as hedge funds or actively managed mutual funds) and retail shareholders are more likely to engage in entry and exit and are comparatively less likely to exercise their shareholder franchise rights. From this perspective, we note that the setting for the influx of retail investors in a firm's stocks does not exactly mirror the setting in which a firm' stock gets included in a stock market index. The latter setting will tend to increase passive institutional investors' holding, while the current setting is assumed to affect active institutional investors' holding.

[9] It is important to distinguish between active institutional investors (who trade according to information) and passive institutional investors (who consistently hold on to their shares). Although retail investors can also actively trade based on the news of October 1, 2019, the eventual increased retail ownership suggests that some institutional investors sold their shares in respond to the news, and these were in turn purchased by newly-entered retail investors.

Suppose, initially, the fractions of respective types of shareholders are given by: α for the passive institutional shareholders, β for the active institutional shareholders, and γ for the retail shareholders, where $\alpha + \beta + \gamma = 1$. As already mentioned, while passive institutional shareholders always vote, the probability that the active institutional shareholders vote on any given corporate governance matters is $\lambda \in [0,1]$ and the corresponding probability for the retail shareholders is $\mu \in [0,1]$. Given the generally low level of participation by retail shareholders, we assume $\lambda > \mu$. Furthermore, conditional on voting, the probability that the active institutional shareholders' votes are consistent with those of passive institutional shareholders is $\rho \in [0,1]$ and the corresponding probability for the retail shareholders is $\sigma \in [0,1]$. While it may be natural to assume that $\lambda > \mu$, whether active institutional shareholders vote more like passive institutional shareholders, compared to retail shareholders, may likely depend on the issue. Hence, we assume that $\rho \lesseqgtr \sigma$.

When there is an issue to be voted on, the fraction of shares that cast votes will be equal to $\alpha + \beta\lambda + \gamma\mu < 1$. The fraction of votes that endorse the passive institutional shareholders' preferences are given by: $\alpha + \beta\lambda\rho + \gamma\mu\sigma < 1$. The fraction of non-votes is given by $\beta(1-\lambda) + \gamma(1-\mu)$ and the fraction of shares that vote against the passive institutional shareholders' preferences is given by: $\beta\lambda(1-\rho) + \gamma\mu(1-\sigma)$.[10]

One straightforward way of measuring the passive institutional shareholders' influence on voting matters is to take the difference between the fraction of votes that align with the passive institutional shareholders' preferences and the fraction of votes that are against. When we do so, we get:

$$\alpha + \beta\lambda\rho + \gamma\mu\sigma - \big(\beta\lambda(1-\rho) + \gamma\mu(1-\sigma)\big) = \alpha + \beta\lambda(2\rho - 1) + \gamma\mu(2\sigma - 1).$$

Note that, conditional on $\rho > 1/2$ and $\sigma > 1/2$, as $\beta\lambda$ or $\gamma\mu$ increases, the passive institutional shareholders' degree of influence over corporate policies will increase. The opposite will be true when $\rho < 1/2$ or $\sigma < 1/2$. In other words, the expressions $(2\rho - 1)$ and $(2\sigma - 1)$ tell us how closely active institutional shareholders' and retail shareholders' preferences are aligned with those of the passive institutional shareholders. All of this is prior to the new influx of retail investors.

Now suppose there is a change in shareholder base in such a way that the three respective types of shareholders' ownership fractions changes to $\alpha + \delta_1$, $\beta + \delta_2$, and $\gamma + \delta_3$, where $\delta_i \gtreqless 0$ and $\delta_1 + \delta_2 + \delta_3 = 0$. If we are thinking of a scenario where passive institutional shareholders are increasing their ownership interest while the other two types are exiting, we would have $\delta_1 > 0$ while $\delta_2 < 0$ and $\delta_3 < 0$. Similarly, if retail shareholders are entering the shareholder base while the institutional shareholders are exiting, we would have $\delta_3 > 0$ while $\delta_1 < 0$ and $\delta_2 < 0$. When the shareholder composition changes, given the different propensities of voting, the overall participation rate will also change. After the change, the fraction of votes becomes:

[10] We can allow for all three ways of casting one's vote on a proposal: vote yes, vote no, or abstain. To the extent that other shareholders' votes do not align with the passive institutional shareholders' vote, we can treat them as being against the passive institutional shareholders' expressed preferences.

$$(\alpha + \delta_1) + (\beta + \delta_2)\lambda + (\gamma + \delta_3)\mu = \alpha + \beta\lambda + \gamma\mu + (\delta_1 + \delta_2\lambda + \delta_3\mu).$$[11]

With the identity of $\delta_1 = -\delta_2 - \delta_3$, the last expression in the parenthesis becomes $-\delta_2(1-\lambda) - \delta_3(1-\mu)$. Not surprisingly, when $\delta_1 > 0$, $\delta_2 < 0$, and $\delta_3 < 0$, we see that $-\delta_2(1-\lambda) - \delta_3(1-\mu) > 0$ and the fraction of shares that vote increases. By contrast, when $\delta_3 > 0$, $\delta_1 < 0$, and $\delta_2 < 0$, assuming that $\lambda > \mu$, $\delta_1 + \delta_2\lambda + \delta_3\mu = \delta_1(1-\mu) + \delta_2(\lambda - \mu) < 0$ and the fraction of shares that vote decreases.

From the fraction of votes expression, we see that when the new shareholders are (much) less likely to exercise their franchise rights, this can create a problem of satisfying the quorum for the companies. For instance, when $\delta_1 \approx 0$, and $\delta_2 < 0$, and $\delta_3 > 0$, i.e., retail investors enter while active institutional investors exit, given our assumption that $\lambda > \mu$, we have $\alpha + \beta\lambda + \gamma\mu + (\delta_1 + \delta_2\lambda + \delta_3\mu) < \alpha + \beta\lambda + \gamma\mu$. In such a case, a corporation may feel pressured to reduce the percentage of shares needed for a quorum at shareholder meetings, in order to be able to elect directors and pass necessary resolutions.

What about the influence of the passive institutional shareholders? With the change in shareholder base, the measure of the passive institutional shareholders' influence becomes:

$$\begin{aligned}&(\alpha + \delta_1) + (\beta + \delta_2)\lambda(2\rho - 1) + (\gamma + \delta_3)\mu(2\sigma - 1)\\ &= \alpha + \beta\lambda(2\rho - 1) + \gamma\mu(2\sigma - 1) + \{\delta_1 + \delta_2\big(\lambda(2\rho - 1)\big) + \delta_3\mu(2\sigma - 1)\},\end{aligned}$$

where the last expression in the curly brackets measures the change in the passive institutional shareholders' influence. As earlier, with the identity of $\delta_1 = -\delta_2 - \delta_3$, we get: $\delta_1 + \delta_2\big(\lambda(2\rho - 1)\big) + \delta_3\mu(2\sigma - 1) = \delta_2(\lambda(2\rho - 1) - 1) + \delta_3(\mu(2\sigma - 1) - 1)$. Given the assumptions on $\{\lambda, \mu, \rho, \sigma\}$, we have: $\lambda(2\rho - 1) - 1 < 0$ and $\mu(2\sigma - 1) - 1 < 0$.

Two special cases of interest are: (1) when passive institutional shareholders increase their ownership interest while the other two types of shareholders exit, and (2) when retail shareholders increase their ownership while the (active) institutional shareholders exit. First,

$$\text{when } \delta_1 > 0, \delta_2 < 0, \text{ and } \delta_3 < 0, \delta_2(\lambda(2\rho - 1) - 1) + \delta_3(\mu(2\sigma - 1) - 1) > 0.$$

That is, when the passive institutional shareholders increase their holdings, their influence over corporate policies grows. The converse is not true, however. As for the second case,

$$\text{when } \delta_3 > 0, \delta_1 < 0, \text{ and } \delta_2 < 0, \delta_2(\lambda(2\rho - 1) - 1) + \delta_3(\mu(2\sigma - 1) - 1) \gtreqless 0.$$

This is because while $\delta_3(\mu(2\sigma - 1) - 1) < 0$, when $\delta_2 < 0$, we get $\delta_2(\lambda(2\rho - 1) - 1) > 0$. When retail shareholders increase their holdings while the institutional shareholders exit, the passive institutional shareholders' influence can either increase or decrease. The answer depends on, among

[11] The model assumes that the incumbent retail investors and the newly entered retail investors have the same probability of voting their shares. But this overlooks the fact that these are different groups of retail investors: the former group was already invested in the capital markets, while the latter group was deterred from entering the market due to small trading commission fees. In practice, there may be a reason to believe that the latter may be even less likely to vote (than the former), given their sensitivity to transaction costs.

others, relative alignment of passive institutional shareholders' preferences with those of active institutional shareholders (ρ) and the retail shareholders (σ). For instance, when active institutional shareholders' preferences are not aligned with those of passive institutional shareholders, i.e., $\rho \approx 0$, we are more likely to have $\delta_2(\lambda(2\rho - 1) - 1) + \delta_3(\mu(2\sigma - 1) - 1) > 0$ and the passive institutional shareholders' influence will in fact *grow* as retail shareholders increase their ownership.

More generally, whether the large passive institutional shareholders' influence will increase or decrease will depend on, among others, two important factors: (1) probability of each shareholder type exercising their franchise rights (λ and μ) and (2) the propensity of each shareholder type voting in line with the passive institutional shareholders ($2\rho - 1$ and $2\sigma - 1$). If we were to assume that the retail shareholders' participation rate is lower than that of small institutional shareholders, $\lambda > \mu$, when the degrees of preference alignment are positive but about the same, i.e., $2\rho - 1 \approx 2\sigma - 1 > 0$, the shift of shareholder base towards retail shareholders will decrease the influence of the passive institutional shareholders. Presumably, the propensity for each shareholder type to exhibit voting behavior that is aligned with the passive institutional shareholders will depend on the issue. One would assume that the retail shareholders' preference alignment is different between environmental and social issues compared to governance issues. More specifically, Chen, Dong, and Lin (2020) and Brav, Cain, and Zytnick (2022) suggest that (passive) institutional investors are more likely (than retail investors) to vote in favor of adopting pro-ESG measures. There is also evidence that active institutional investors, such as hedge funds or index funds, are actively supporting ESG measures (Barzuza, Curtis, and Webber 2020; Nathan 2018). In terms of our model, this would suggest that $\rho > \sigma$, and thus, when $\delta_3 > 0$, $\delta_1 \approx 0$, and $\delta_2 < 0$, the overall effect would tend to be diluting passive institutional investors' voting power.

4. Data and Summary Statistics

This paper's empirical analysis is based on a mix of subscription and hand-collected data. In this section, we explain the different sources for the data used in our various empirical tests. We collect information for the period from three years before to three years after the abolition of trading commissions (i.e., between October 1, 2016 and October 1, 2022). Table 1 collects the definitions of the different variables used in the paper's empirical analysis. Table 2 presents summary statistics for the different tables used in the empirical analysis in Panel A.

One of the outcome variables of the paper is the fraction of a company's shares owned by non-institutional holders. While the institutional background and theoretical model detailed in Sections 2 and 3, respectively, outline a link between the advent of zero-commission trading and retail ownership, we lack firm-level data about the percentage of shares held by retail participants. Instead, following the literature, we proxy retail ownership by the fraction of shares not held by institutional investors. The data for institutional ownership comes from the Thomson Reuters 13-F institutional holdings dataset. This dataset contains information about the fraction of a company's shares held by relatively large institutional investors.[12] Following Backus, Conlon, and Sinkinson (2021), we construct a continuous variable *Non-Institutional Ownership* to equal 1 minus the fraction of total institutional ownership reported in 13-F filings, winsorized at the 2.5% level. When we compare firms with above- and below-median levels of non-institutional ownership (for either the full sample or solely the pre-

[12] Institutions with assets under management below $100 million are not obligated to file 13-F reports. See https://www.sec.gov/divisions/investment/13ffaq.

zero-commission period), retail investors seem to "prefer" companies that are smaller, have lower return on assets, have higher cash ratios, are less leveraged, and have lower stock prices. If the wide introduction of zero-commission trading incentivized retail investors to participate in the stock market, we should expect stocks that were already "popular" with retail investors (and thus experienced positive abnormal returns on October 1, 2019) to see a subsequent increase in non-institutional ownership.

We use standard sources for firm stock prices and time-varying financial controls. Stock price data comes from the Center for Research in Security Prices (CRSP). We use Compustat to get information for firm size, as proxied by the natural logarithm of firm assets, profitability as measured by return on assets (net income divided by assets, as in Heese, Pérez-Cavazos, and Peter 2022), and cash and debt ratios. There could be some concern that these time-varying controls are endogenously affected by the introduction of zero-commission trading: for instance, the profitability of firms popular with retail investors could change after new retail investors purchase their stock after 2019 (Gormley and Matsa 2016). However, none of the paper's main results are sensitive to whether we include these financial controls.

We collect information on firm ESG performance using the ESG scores reported in the MSCI ESG Ratings data. The MSCI data is the standard measure for ESG in the corporate finance literature, and is used by banks, insurers, and institutional investors when incorporating ESG considerations into their investment decisions (Chen, Dong, and Lin 2020; Pástor, Stambaugh, and Taylor 2022). We collect information about firms' overall industry-adjusted ESG scores, as well as their sub-scores on the environmental ("E"), social ("S"), and corporate governance ("G") "pillars," as reported by the MSCI.

We obtain information on shareholder voting at the proposal level from the Institutional Shareholder Services (ISS) database. Following Geoffroy (2018), we define shareholder non-participation as the percentage of outstanding votes that were not cast for or against the proposal or marked as abstentions. We winsorize the shareholder non-voting rate at the 2.5% level. We use BoardEx to collect information about board composition for the firms in the Compustat dataset at the firm-year level. Specifically, we collect summary information about the percentage of the board that is classified as independent directors and the percentage of directors who are women. We also use the ISS database to collect information on other corporate governance characteristics. Specifically, we create indicator variables for whether the company has a staggered board, has a poison pill, and has a majority voting standard for electing directors. Previous research suggests that the presence of staggered boards or poison pills is associated with worse corporate governance (Bebchuk, Cohen, and Ferrell 2009), while the adoption of a majority standard for director election increases firm value (Ertimur, Ferri, and Oesch 2015).

Finally, we hand-collected information on changes in quorum requirements from Bloomberg Law's tool for searching within the SEC's Electronic Data Gathering, Analysis, and Retrieval system (EDGAR). Specifically, we searched for "quorum" within Item 5.03 of corporate 8-K filings, which is the section in which firms disclose amendments to their charters or bylaws. We restricted the search to filings between October 1, 2016, and October 1, 2022, i.e., three years before and after the introduction of zero-commission trading. We included any change in quorum requirements, including

both increases and decreases in the percentage of outstanding shares required to comprise a quorum at shareholder meetings.[13]

5. Zero-Commission Trading and Retail Ownership

In this section, we establish two central results that inform our argument on the effect of retail investors' entry costs and their influence on corporate governance. First, we show that firms that were already "popular" with retail investors—as proxied by a high share of non-institutional ownership just before October 1, 2019—experienced positive abnormal stock returns when the major brokerages announced that they were introducing zero commission platforms. The result indicates that there seems to have been a clear relationship between a company's appeal to retail investors and the effect of zero-commission trading on its firm value. Second, we find that stocks experiencing higher abnormal returns on October 1, 2019 subsequently saw a significant increase in non-institutional ownership (based on the 13-F data), compared to stocks that did not experience high abnormal returns. This uptick in non-institutional ownership is consistent with retail investors finding it easier to invest in stocks that already appealed to them before 2019 once the online brokerages had eliminated trading commissions and thus reduced entry costs.

We first conduct an event study using the standard Fama-French three-factor model to estimate the abnormal return for stocks in the Compustat database. We use a 100-trading-day estimation window to measure the expected returns for each stock, as in Takaoka (2006). All our results are robust to instead estimating abnormal returns using a longer 255-day estimation window. We define the event window as October 1, 2019, the day the brokerages announced that they will introduce zero commission platforms. There is strong reason to believe that the market priced in the effect of zero-commission trading on the day of the brokerages' announcement itself. Charles Schwab, E-Trade, and TD Ameritrade shares dropped 10, 16, and 25 percent on October 1, 2019 itself (Bernard 2019). According to one source, Schwab's announcement on October 1 "sent shock waves across Wall Street," and industry experts concluded the same day that zero-commission trading was the inevitable market equilibrium (Gittelsohn and Massa 2019). Figure 1 visually shows how these brokerage stocks saw dramatic decreases in price and increases in trading volume on October 1, 2019. We only keep firms for which we have at least 70 trading days of return information during the estimation window. Our results persist if, instead of the Fama-French model, we use the four-factor model of Carhart (1997).

To assess whether the abolition of trading commissions differentially impacted firms that are popular with retail investors, we regress the abnormal return on October 1, 2019 against non-institutional ownership as measured just before the Schwab announcement. Institutional ownership in the 13-F data is reported on a quarterly basis. Coincidentally, September 30 of every year is one of the reporting dates. We fortuitously have the non-institutional ownership for each firm for the day just before Schwab's announcement. Panel B of Table 2 compares the non-institutional ownership from September 30, 2019 as well as basic financial variables for firms with above- and below-median abnormal returns on the day of Schwab's announcement. Panel B shows that firms with above-median abnormal return had 12.63% higher non-institutional ownership just before the wide introduction of zero-commissions (0.469 versus 0.416), and this difference was statistically significant (p<0.01). Firms

[13] This Bloomberg law search was over-inclusive because it included many irrelevant references to the quorum for meetings of the board of directors. Since we are only interested in the quorum for shareholder meetings, we removed such search results from our hand-coded sample.

with above-median abnormal returns were not significantly larger or smaller than other companies, but were more profitable. We also compared these firms' cash ratio and debt ratio. Firms with above-median abnormal returns were more leveraged and had lower cash ratios than other companies, with each of these differences being statistically significant.

Table 3 presents the results of the event study regression, in which we use robust standard errors and display both the baseline results as well as with controls for firm size (as measured by ln(assets)), return on assets, and cash and debt ratios from the 2019 fiscal year. As is standard in event studies, we include industry (as measured by two-digit SIC code) fixed effects and cluster standard errors at the industry level. Non-institutional ownership has a positive and highly significant coefficient whether or not we control for firm financials. The baseline results in column (1) imply that a one-standard deviation increase in non-institutional ownership as of September 30, 2019 corresponds to an abnormal return on October 1, 2019 that is 0.071 percentage points higher. In other words, firms that were already had a higher non-institutional ownership (which we take as a proxy for higher retail ownership) experienced greater positive abnormal returns the day Schwab abolished commissions.

We next examine whether the firms that experienced positive and significant abnormal returns on October 1, 2019 subsequently also saw their ownership base become less institutional-dominated. If certain companies are already "popular" with retail investors and the elimination of trading commissions reduces entry costs for these market participants, it might be reasonable to expect that the retail ownership share at these companies will increase, and the institutional stake decrease, after 2019. We create two different proxies to capture the companies that had the largest stock price reaction to zero-commission trading. First, we set a continuous variable $Treat_1$, equal to the abnormal return the company experienced on October 1, 2019. Second, we construct a dummy variable $Treat_2$, which equals 1 if the firm's abnormal return on October 1, 2019 was in the sample's top quartile.

We estimate the following regression model for firm *i* in quarter *q* and year *y*:

$$\begin{aligned} Non-Institutional\ Ownership_{iq} \\ &= \alpha Post_q + \gamma Treat_i + \beta Post_q \times Treat_i + \pi X_{iy} + \delta_i + \theta_q \\ &+ \varepsilon_{iq} \end{aligned} \quad (1)$$

The dependent variable, $Non-Institutional\ Ownership_{iq}$, is the ownership stake of non-institutional investors. Following Backus, Conlon, and Sinkinson (2021), we use this quantity as a proxy for retail holders' ownership stake in the firm. Equation (1) uses data between October 1, 2016 and October 1, 2022—three years before and after the abolition of commissions. $Post_q$ is a dummy equaling 1 for the period after October 1, 2019, while $Treat_i$ captures the firm's abnormal return calculated using the Fama-French model the day commissions were abolished (through either the $Treat_1$ or $Treat_2$ proxies). X_{iy} is a vector of the time-varying firm financials, namely size and profitability. δ_i and θ_q are firm and quarter fixed effects, whose inclusion allows us to control for firm-specific idiosyncratic factors as well as secular time trends. We cluster the standard errors at the firm level.

Table 4 presents the results from estimating equation (1). Columns (1) and (3) use $Treat_1$ as the proxy for the reaction to the abolition of commissions, while columns (2) and (4) use $Treat_2$. In

all four specifications, regardless of which proxy for abnormal return we use or whether we control for financials, the interaction between $Post_q$ and the treatment term has a positive and statistically significant coefficient. The baseline result in column (1) implies that a one-standard deviation increase in abnormal returns on October 1 corresponds to a subsequent rise in non-institutional ownership of 0.33 percentage points. This rise equals 0.73% (0.77%) of the mean (median) non-institutional ownership in the sample. The baseline result in column (2) implies that a firm's abnormal return on October 1, 2019 being in the top quartile leads to a 1.53 percentage point increase in non-institutional ownership. This rise equals 3.3% (3.51%) of the sample mean (median) non-institutional ownership. The abolition of trading commissions is associated with a statistically and economically significant rise in non-institutional ownership in firms most affected by Schwab's announcement on October 1, 2019, relative to other firms and controlling for firm fixed effects and time trends.[14]

A central contention of this paper is that the reduction in retail investors' entry costs due to the introduction of zero-commission trading (likely) led to an increase in non-institutional ownership for firms that saw the largest abnormal returns in response to Schwab's October 1, 2019 announcement. However, one potential concern with this claim is that these firms may have been gaining retail owners in preceding years as well, with the observed change having little to do with zero-commission trading. This concern is somewhat reinforced by the results in Table 3, which showed that the firms exhibiting the greatest abnormal returns on October 1, 2019 already had larger non-institutional ownership.

To address this concern, we estimate a dynamic version of equation (1)—which examines changes in non-institutional changes—replacing $Post_q$ with a series of dummy variables for the individual years around the abolition of trading commissions. We denote *T* as the period between October 1, 2019 and October 1, 2020; i.e., the year immediately after the introduction of zero-commission trading. Following Gopalan, Gormley, and Kalda (2021), we set the year preceding the treatment (*T*–1) as the base year. Figure 2 presents the results of this dynamic model, displaying the 95% coefficients for the interaction between abnormal returns and the year dummies and using $Treat_1$ as the proxy for abnormal returns. We find no evidence of a pretrend in non-institutional ownership for the treatment group in the years preceding the introduction of zero-commission trading.

6. The Governance Effects of Retail Investor Entry

The influx of retail investors into certain companies after the sudden elimination of the trading commission had concrete corporate governance implications. In this section, we examine four possible ways in which the rise in retail ownership changed the governance of companies most affected by the 2019 abolition of trading commissions. We look at the change in shareholder non-voting, firm ESG scores, corporate governance measures, and quorum requirements.

6.1 Shareholder Non-Voting

[14] It should be noted that, while the announcement was made on October 1, 2019, the commissions were not actually abolished until a week later. Accordingly, the influx of retail investors would not have occurred until sometime after October 1, 2019. To this extent, our first result suggests expectations by early responders as to how companies that were already popular among retail investors would face an increased demand for their stocks from the expected influx of retail investors, and our second result confirms such expectations.

An important corporate governance outcome variable we study is shareholder non-voting. As explained earlier, we measure non-voting at the proposal level, and define it as the percentage of outstanding shares not cast for or against a proposal or marked as abstentions. We estimate the following regression model to assess changes in shareholder-nonvoting for proposal *p* voted on by shareholders of firm *i* in year *y*:

$$Non - Voting_{piy} = \alpha Post_p + \gamma Treat_i + \beta Post_p \times Treat_i + \pi X_{iy} + \delta_i + \theta_y + \varepsilon_{piy} \quad (2)$$

The variables on the right-hand side of the equation have the same definitions as explained earlier in equation (1). Once again, we cluster standard errors at the firm level. Our conjecture is that the coefficient for the interaction term $Post_p \times Treat_i$ will be positive and significantly different from zero. This is because most non-participation in shareholder voting is typically attributed to retail investors. If the firms that experienced the highest abnormal returns on October 1, 2019—i.e., those with the largest values of $Treat_i$—saw the greatest subsequent increase in retail ownership, as shown in Table 4, we should expect them to also see an increase in shareholder non-participation.

Table 5 presents the results from estimating equation (2). Note that the inclusion of year fixed effects does not wash away the main effect of $Post_p$, since proposals in the year 2019 may have $Post_p$ equal to 0 or 1 depending on whether the relevant meeting was before or after October 1, 2019. Across all four specifications in Table 5, using either measure of abnormal return and regardless of controlling for firm financials, the coefficient for the interaction between *Post* and abnormal return on October 1, 2019 is positive and significant. This strongly indicates that shareholder non-voting went up for companies that exhibited high abnormal returns in response to the abolition of trading commissions. The baseline specification in column (1) shows that a one standard deviation increase in abnormal returns in response to the Schwab announcement is associated with a subsequent rise in non-voting by 0.27 percentage points, which equals 1.17% (1.39%) of the mean (median) level of non-voting in the regression sample. Column (2) finds that a stock belonging to the top quartile of abnormal returns saw a 0.87 percentage point rise in non-voting. This equals 3.79% (4.52%) of mean (median) shareholder non-voting in the regression sample.

This finding is consistent with the literature on retail investor voting discussed in Section 2. Because retail investors are much less likely to vote their shares than institutional investors, the influx of retail shareholders (replacing certain institutional investors) had the effect of reducing the overall votes cast. However, it is notable that elimination of relatively small trading costs by the online brokerages translated to a sustained increase in shareholder non-participation at affected companies. Figure 3 presents the results of a dynamic version of equation (2), where we look at possible pretrends in the level of shareholder non-voting. We do not find any evidence that the treatment group (firms with greater abnormal returns on October 1, 2019) were already seeing greater non-voting in the period before major online brokerages eliminated trading commissions.

6.2 ESG Scores

While shareholders traditionally exert influence in corporate governance by voting on director elections and proposals initiated by management or shareholders (Easterbrook and Fischel 1983), they

may also affect other dimensions of governance. For instance, Brav, Cain, and Zytnick (2022) find that retail investors are less likely than institutional investors to support ESG proposals. The entry of retail investors after 2019 may have led to a decrease in ESG metrics at the firms most affected by zero-commission trading. We estimate the following regression model for the ESG scores of company *i* whose ESG score is reported in the MSCI data on date *t* in year *y*:

$$ESG_{ity} = \alpha Post_t + \gamma Treat_i + \beta Post_t \times Treat_i + \pi X_{iy} + \delta_i + \theta_y + \varepsilon_{ity} \quad (3)$$

Table 6 presents the results from estimating equation (3). The results are consistent with ESG scores decreasing at firms affected by Schwab's announcement, with the interaction between *Post* and both proxies for abnormal returns bearing a negative and significant coefficient. Column (1) entails that a one-standard deviation increase in abnormal returns is associated with a later decrease in ESG score equal to 1.22% (1.26%) of the mean (median) ESG rating in the regression sample. In column (2), firms with abnormal returns in the top quartile saw a subsequent fall in ESG equal to 2.87% (2.97%) of the mean (median) sample value. This is consistent with Brav, Cain, and Zytnick's (2022) contention that retail investors are less likely to support ESG proposals.

To investigate further which aspect of the treated firms' ESG scores decreased after the wide introduction of zero-commission trading, we re-estimate equation (3) separately using the three "pillar" scores for environmental ("E"), social ("S"), and corporate governance ("G") issues as the dependent variable. Table 7 presents the results of these empirical specifications. In Panels A and B of Table 7, we find no statistically significant change in treated companies' MSCI environmental or social scores after the abolition of trading commissions. In Panel C, we find that treated firms saw a statistically significant decrease in their MSCI corporate governance scores after October 1, 2019. A one-standard deviation increase in abnormal returns in response to the Schwab announcement is associated with a later decrease in corporate governance score equal to 1.51% (1.50%) of the mean (median) governance pillar score in the regression sample. Similarly, firms with abnormal returns in the top quartile saw a subsequent fall in ESG equal to 2% (1.97%) of the mean (median) sample value.

Overall, our finding of the decrease in ESG scores in Table 6 is consistent with an increase in the (relative) influence of retail investors, who typically exert less pressure on corporations to prioritize ESG than institutional players (Brav, Cain, and Zytnick 2022, Chen, Dong, and Lin 2020). As the ownership stake of ESG-conscious institutional investors decreased for firms most affected by the 2019 abolition of commissions, these companies may have faced less pressure to pay attention to these metrics. Consistent with this theory, the ESG scores of treated firms decreased by approximately same proportion that their retail ownership rose. However, when we separately analyze the "E," "S," and "G" factors that comprise the widely-used ESG acronym, we find that this decrease is concentrated in the corporate governance of treated firms. There is no significant change in these companies' performance on environmental or social fronts. This, too, is somewhat consistent with Brav, Cain, and Zytnick (2022), whose results also indicate that the greatest gulf between retail and other shareholders is on "G" rather than "E" or "S" issues. Thus, zero-commission trading and the resultant influx of retail investors seems to have led to increased shareholder apathy at the most affected firms, but does not seem to have made them more or less "prosocial."

Finally, Figure 4 presents a dynamic version of equation (3), with the dependent variable equaling firms' score on the governance pillar as reported by MSCI. Since our results indicate that the

decrease in ESG is concentrated in corporate governance, we focus on pre-trend analysis for the "G" element of ESG. Figure 4 finds no evidence of a pre-trend, with treated firms only experiencing a statistically significant decrease in the governance pillar score after the advent of zero-commission trading.

6.3 Corporate Governance Outcomes

MSCI describes its corporate governance "pillar score" as "an absolute assessment of a company's overall governance." [15] While MSCI provides some information about the "key metrics" that go into the creation of the governance pillar score (such as ownership and control, board characteristics, accounting, business ethics, and tax transparency), the computation of its governance scores is something of a black box.[16] To get a better understanding of why treated firms saw their governance ratings decrease after 2019, we analyze changes in specific corporate governance outcomes.

Here, we examine several specific corporate governance attributes. First, we look at changes in board director independence and gender diversity. In recent years, institutional investors have made board independence and diversity an important part of their engagements with portfolio companies (Aggarwal, Litov, and Rajgopal 2023). Institutional ownership is associated with a higher share of both independent and female directors (Appel, Gormley, and Keim 2016; Gormley et al. 2023). Therefore, if firms that were most affected by the abolition of trading commissions saw a rise in retail ownership and decrease in institutional holdings, one might expect their board of directors to become less independent or gender-diverse. At the same time, however, as we showed in Section 3, whether the rise in retail ownership would, in fact, lead to a decrease in the influence of institutional investors is, at least in theory, unclear.

We estimate the following regression model to assess changes in the firm-year level of board independence and gender diversity:

$$DirectorOutcome_{iy} = \alpha Post_y + \gamma Treat_i + \beta Post_y \times Treat_i + \pi X_{iy} + \delta_i + \theta_y + \varepsilon_{iy} \quad (4)$$

The outcome variable, $DirectorOutcome_{iy}$, equals the percentage of firm *i*'s directors in year *y* who are independent or female, depending on the empirical model.

Panels A and B of Table 8 present the results from estimating equation (4). Panel A uses the percentage of independent directors as the outcome variable, while Panel B studies the percentage of female directors. The coefficient for the interaction between *Post* and the proxies for abnormal return is not significant for any of the specifications in either panel. We do not find evidence suggesting that companies that reacted most positively to Schwab's announcement on October 1, 2019 later significantly changed their approach to board independence or gender-diversity. This null finding contrasts with the finance literature documenting a positive relationship between institutional

[15] See https://www.msci.com/documents/1296102/34424357/MSCI+ESG+Ratings+Methodology.pdf.
[16] The finance literature has questioned the methodologies and replicability of the scores and ratings produced by MSCI and other prominent ESG platforms (Berg, Kölbel, and Rigobon 2022).

ownership and the proportions of independent and female directors (Appel, Gormley, and Keim 2016; Gormley et al. 2023).

Second, we look at other changes in corporate governance that do not relate to board composition. We re-run equation (4), replacing $DirectorOutcome_{iy}$ as the dependent variable with indicators for whether the firm has a staggered board, has a poison pill, or has adopted a majority voting standard for director elections. Bebchuk, Cohen, and Ferrell (2009) contend that the presence of staggered boards or poison pills correlates with weaker corporate governance. In Panels C and D, we do not find strong evidence that treated companies became significantly more or less likely to have staggered boards or poison pills. The coefficient for the interaction between $Treat_1$ and the *Post* variable has a positive and significant (p<0.1) coefficient in column (1) of Panel D, providing some support that treated firms became more likely to have a poison pill. However, this interaction does not have a significant coefficient in any other specification in Panel D, or in any of the specifications in Panel C, where the dependent variable is the existence of a staggered board.

Finally, we look at whether treated firms behaved differently with respect to adopting a majority voting standard for director elections. The default mode for electing directors in U.S. corporate law is the plurality voting standard: the candidate who obtains the most votes for a directorship wins, even if she receives less than a majority of votes cast.[17] However, this is only a default standard, and companies can require that candidates receive a majority of votes cast in their bylaws or charters. Many shareholder activists and institutional investors have pressured management to adopt such majority voting standards, to ensure directors enjoy the support of shareholders (Brownstein and Kirman 2004). In Panel E, the coefficient for the interaction between $Treat_1$ and *Post* is negative and significant in both the baseline and full models. The coefficient for the interaction between the dummy for the firm belonging to the top quartile of abnormal returns and *Post* is marginally significant (*t*-statistic: –1.63) in the baseline but is significant at the 5% level once we control for financials.

Overall, our analysis shows that the rise in retail ownership did not bring about significant changes in most corporate governance outcomes, with the exception of the majority voting standard for director election, the only corporate governance outcome we measure that is directly linked to shareholder voting. For this attribute, we see that treated firms become less likely to adopt corporate governance "best practices" after the advent of zero-commission trading.[18]

6.4 Quorum Requirements

If retail shareholders' participation in voting is low, companies that have experienced a significant influx of retail investors could face difficulties in conducting shareholder meetings, such as satisfying quorum to elect directors and to vote on proposals. In our discussion of the recent impact of retail investors on corporate governance, several practitioners had alerted us to isolated examples of firms that had faced challenges meeting the quorum in shareholder meetings due to retail holders' non-participation in voting. Accordingly, these companies decided to amend their bylaws and decrease

[17] See Delaware General Corporation Law section 216.

[18] In an unreported result, we also create a governance aggregate index score, constructed as an addition of indicators for staggered board, poison pill, and plurality voting standard. There is some evidence that the treated firms have a worse index than non-treated firms, but the results are not robust (while the signs are in the predicted direction) across all specifications.

the percentage of outstanding votes that would constitute a meeting quorum. State corporate laws (most importantly Delaware corporate law) allow directors to unilaterally amend bylaws (subject to a small number of exceptions) when such a right is granted to them in the charter. As far as we are aware, all public companies have such a grant in the charter,[19] thereby allowing the directors to unilaterally change the quorum through a bylaw amendment.

Because the data on quorum requirements isn't readily available, we hand-collected information about both increases and decreases in the quorum requirements from the SEC's EDGAR system. Figure 5 depicts the number of such changes in quorum requirements from October 1, 2016 to October 1, 2022. Panel A shows there has been a dramatic increase in the number of firms making their quorum requirements laxer by decreasing the percentage of outstanding shares that constitute a quorum. While the number of quorum decreases was fewer than ten in the years before the abolition of trading commissions, it significantly rose after 2019. For instance, almost eighty firms decreased their quorum requirement in the period between October 1, 2021 and October 1, 2022. A 2022 report by a shareholder engagement advisory group concluded that the recent upsurge in retail investing meant that the proportion of retail shareholders and their level of engagement could determine whether management was able to secure a quorum at shareholder meetings.[20]

By far the most typical change companies made to quorum requirements during the sample period was to decrease the quorum requirement from 50% of the outstanding shares to 33.33% (i.e., a third) of the outstanding shares.[21] Panel B looks at the number of firms that increased their quorum requirements, making it harder for firms to meet the requirement by raising the required percentage of outstanding shares in attendance at meetings. Overall, there is no similar jump in the number of companies increasing their quorum requirements. While there is a slight increase in the number of firms making such amendments between October 1, 2020 and October 1, 2021, this number decreased the next year and never exceeds 20 during the sample period. Therefore, overall, the advent of zero-commission trading has led to firms decreasing their quorum requirements.

To more formally analyze a firm's decision to change its quorum requirements, we estimate the following linear probability model for firm *i*'s decision, in industry *j*, to enact a relevant bylaw amendment in year *y*:

$$QuorumChange_{ijy} = \alpha Post_y + \gamma Treat_i + \beta Post_y \times Treat_i + \pi X_{iy} + \delta_j + \theta_y + \varepsilon_{ijy} \quad (5)$$

$QuorumChange_{ijy}$ is a dummy that equals 1 if the firm increased or decreased quorum requirements in a given year, depending on the model. Note that we now include fixed effects at the *industry* level (as defined by the two-digit SIC code), rather than firm level, because the outcome is the decision to amend corporate bylaws—a decision a firm is only likely to make once in the sample period. We cluster the standard errors at the industry level.

[19] See Delaware General Corporation Law section 109. See Choi and Min (2018).
[20] See https://allianceadvisors.com/best-practices-retail-investor-voter-engagement/.
[21] See U.S. Securities and Exchange Commission, Form 8-K (Nov. 2, 2018) for example, where company changed the bylaws to "reduce the quorum requirement for shareholder meetings from shareholders representing a majority of the shares entitled to vote to the minimum required by Nasdaq Stock Market Rule 5620(c) of one-third (33-1/3%) of the issued shares of the Corporation's common voting stock".

Table 9 shows the results from estimating equation (5). Panel A uses decreases in quorum requirements as the outcome variable, while Panel B uses increases. The interaction between *Post* and $Treat_i$ in Panel A has a positive and significant coefficient in all specifications. Therefore, firms that showed larger abnormal returns in response to Schwab's 2019 announcement are more likely to loosen quorum requirements, presumably to counteract the problem of retail non-participation in meetings. The results in Panel B are consistent with this story. Here, other than column (1)'s baseline using $Treat_1$ (where it is insignificant), the interaction between *Post* and abnormal return has a *negative* and significant coefficient. Thus, firms that were most affected by the advent of zero-commission trading are less likely to make their quorum requirements more stringent in the years after October 1, 2019.

Overall, the findings in Table 9 are consistent with practitioner accounts stating that firms to which retail investors were attracted faced difficulties in subsequently getting meeting quorum requirements at shareholder meetings. This is consistent with our model's finding from Section 3. In response, it seems these firms became more likely to pass bylaw amendments decreasing the percentage of outstanding shares that would constitute a quorum.

7 Robustness Tests

In this section, we present the results of various robustness tests. We first re-run the analysis on matched and entropy-balanced samples. Next, we show that the event study result persists when we extend the event window to include the earlier introduction of zero-commission trading by Interactive Brokers on September 26, 2019. Finally, we show that the results are unlikely to be explained by the introduction of fractional trading.

7.1 Matched and Entropy-Balanced Regressions

We examine the concern that firms that experienced positive abnormal returns may be fundamentally different from other companies. Under such a theory, these companies may have gained non-institutional owners after 2019 not because of zero-commission trading, but because of other observable factors such as greater profitability. To account for this possibility, we re-run equation (1) on matched and entropy-balanced samples. For the former method, we match every firm whose abnormal returns on October 1, 2019 to another firm based on size (ln(assets)) and return on assets. As for the latter, we re-run equation (1) using the entropy balancing matching methodology introduced by Hainmueller (2012). Entropy-balancing, which has subsequently been used by papers such as Heimer and Simsek (2019) and Jacob, Michaely, Müller (2019), involves balancing the first three moments of the covariates for treated companies (those in the top quartile of abnormal returns, i.e., with $Treat_2$ equal to 1) and others. Table 10 presents the results for this matched and entropy-balanced sample analysis, comparing firms inside and outside the top quartile of abnormal returns. Once again, the interaction between *Post* and the dummy for the firm's abnormal returns belonging to the top quartile are positive and significant, irrespective of whether we control for financials. Therefore, the results are unlikely to be driven by fundamental differences between firms based on whether they were in the top quartile of abnormal returns on October 1, 2019.

7.2 Expanding the Event Window: IBKR Lite

The online brokerage market is highly concentrated, with Schwab, E*Trade, and Ameritrade being the dominant players. This is why Schwab's October 1, 2019 announcement was an important shock signaling the new importance of zero-commission trading. This is also evident from stock price and trading volume changes shown in Figure 1. However, a smaller online brokerage, Interactive Brokers, had previously announced the rollout of its own zero-commission platform, "IBKR Lite," on September 26, 2019 (Osipovich and Beilfuss 2019). Contemporaneous press reports stated that Interactive Brokers had "launched a no fee 'trade war' that promises to save investors money."

We do not think the September 26, 2019, IBKR Lite announcement invalidates the paper's focus on the Schwab announcement of October 1. First, Interactive Brokers is a relatively small brokerage, with assets under management about 4% of Schwab's. Therefore, the IBKR Lite rollout would not have had a market-wide impact the way Schwab's announcement would have. Second, even after the Interactive Brokers announcement, analysts did not expect much larger online brokers like Schwab, Ameritrade, or E-Trade to follow suit. Indeed, it "surprised the market when…Schwab announced that it too would eliminate trading commissions." [22] As we can see from Figure 1, stock price reactions to the IBKR Lite announcement was much more muted compared to those to the Schwab announcement.

Nevertheless, we re-run the event study analysis, expanding the event study to include September 26, 2019, the date of the IBKR Lite announcement. Table 11 presents the results of this analysis. As in Table 3, we include industry fixed effects and cluster standard errors at the industry level. Non-institutional ownership continues to have a positive and statistically significant coefficient. The baseline model implies that a one-standard-deviation increase in non-institutional ownership is associated with a 0.178 percentage point increase in cumulative abnormal returns. Therefore, we continue to find that retail-friendly stocks saw their prices respond positively to the introduction of zero-commission trading.

7.3 Placebo Event Studies: Fractional Trading

Finally, we address the possibility that the driving force behind the entry of retail investors was not the October 1, 2019 abolition of trading commissions, but instead was the introduction of fractional trading. Fractional trading allows investors to purchase a fraction of a company's shares, rather than having to purchase stock in whole units. Previous research has shown that fractional trading has led to an upsurge in interest in "meme stocks" popular with retail investors as well as companies that are household names, such as Apple and Disney (Bartlett, McCrary, and O'Hara 2022). Therefore, an alternative explanation for our results is that the recent rise in retail ownership is driven by fractional trading rather than the elimination of trading commission.

We do not find this explanation very plausible, in part because of the timing of the major online brokerages introducing fractional trading. Charles Schwab became the first major online brokerage to introduce fractional trading, announcing that it would let customers purchase a fraction of shares on October 17, 2019. However, even when Schwab announced the introduction of fractional trading, media coverage linked this development to its elimination of trading commissions a few weeks earlier on October 1, 2019. An investment manager told the media that he viewed Schwab's introduction of fractional trading as being "complementary with the commission cut as it removes

[22] See https://intrinsicinvesting.com/2019/10/28/schwab-effectively-killed-the-business-that-birthed-it-over-40-years-ago-by-announcing-commission-free-trading/.

any remaining friction around single stock trading" (Fitzgerald 2019). Thus, the introduction of fractional trading more likely to be seen as a continuation of the reduction in entry costs for retail investors that began on October 1 with zero-commission trading rather than an independent source of the corporate governance changes documented in this paper.

Nevertheless, we re-run the event study analysis in Table 3, alternately using as dependent variable the Fama-French abnormal returns for the introduction of fractional trading by Schwab (on October 17, 2019), and by the next broker to allow fractional share purchases (Interactive Brokers, on November 25, 2019) (Martin 2019). Table 12 presents the results of these placebo event studies, where we again regress the abnormal return against non-institutional ownership as of September 30, 2019. In none of the specifications is the coefficient for non-institutional ownership positive and significant. In fact, in the baseline model in column (1), where the dependent variable is the abnormal return the day Schwab announced it was introducing fractional trading, non-institutional ownership has a negative and marginally significant coefficient ($p<0.1$). The institutional background of fractional trading being an adjunct or follow-on development to the elimination of trading commissions and the null results from Table 12's placebo event study indicate that our results are unlikely to be driven by investors' newfound ability to purchase fractions of shares.

8. Conclusion

How sensitive is retail ownership to trading costs, and what is the impact of a shareholder base on corporate governance? This paper's contribution is to first demonstrate a causal link between lowered entry costs and an increase in retail investor stock market participation and, second, to show how retail shareholder apathy affected corporate governance at firms most affected by their influx. We find that firms with high pre-existing levels of retail ownership experienced positive abnormal stock returns in response to the announcement of zero-commission trading. Firms with positive stock reactions to the announcement subsequently experienced a sustained increase in non-institutional ownership.

In theory, if retail shareholders' participation rate (on governance issues) is relatively small, it is unclear whether the remaining (passive) institutional owners' influence over governance gets stronger when other (more active) institutional shareholders exit. This is in contrast to a situation where (passive) institutional shareholders increase their ownership, in which case, their influence will increase. This paper has tried to gauge retail investor impact by looking several different governance measures, including vote participation rates, ESG scores, and specific corporate governance outcomes such as board composition and director election procedures. We show that over various metrics, corporate governance at affected firms reflects the apathy of the new retail shareholders. Specifically, this paper has shown that an increase in retail investor participation in the capital markets may have brought about less ESG-friendly corporate behavior among those firms popular with retail investors. This decrease in ESG performance is concentrated in firms' corporate governance (or "G") scores, rather than their environmental or social ratings. This is likely due to retail shareholders' lack of interest and participation in the mechanics of governance. We also show that, firms, aware of retail investors' low participation, directly respond by lowering their quorums in holding shareholder meetings.

While the research on the impact of shareholder base on corporate governance remains active, several challenges and questions remain. The first is to examine investors' behavior more directly. Like earlier research, we have relied on outcome and indirect measures, due largely to data limitations. But, more work regarding how different types of investors actually participate in shareholder franchise

remains on the research agenda. The question invokes not only the difference between institutional and retail shareholders but also distinguishing among various institutional investors, such as passive mutual funds, active hedge funds, pension funds, and retail investors. Furthermore, due to the popularity of the zero-commission trading platform, we have seen an increase in stock market participation by retail investors, but we are yet to observe any increase in participation in shareholder franchise. Given that the seeming popularity of zero commission trading through mobile phone apps has been relatively recent and more innovation is taking place, allowing, for instance, retail investors to access proxy materials and cast their votes on mobile phones, it may be likely that the retail investors' behavior regarding casting votes can change in the near future.

Finally, we refrain from making normative judgments about whether the shareholder apathy associated with the influx of retail investors is "bad" for corporate governance. While many corporate commentators, and proxy advisors such as ISS, equate more shareholder participation with "better" governance, the empirical evidence for such an association is mixed at best (Yermack 2010). What our empirical work does show is that entry costs significantly affect retail investors' stock market participation, and that lowering these costs causes an influx of apathetic retail holders who bring down average shareholder participation in public companies.

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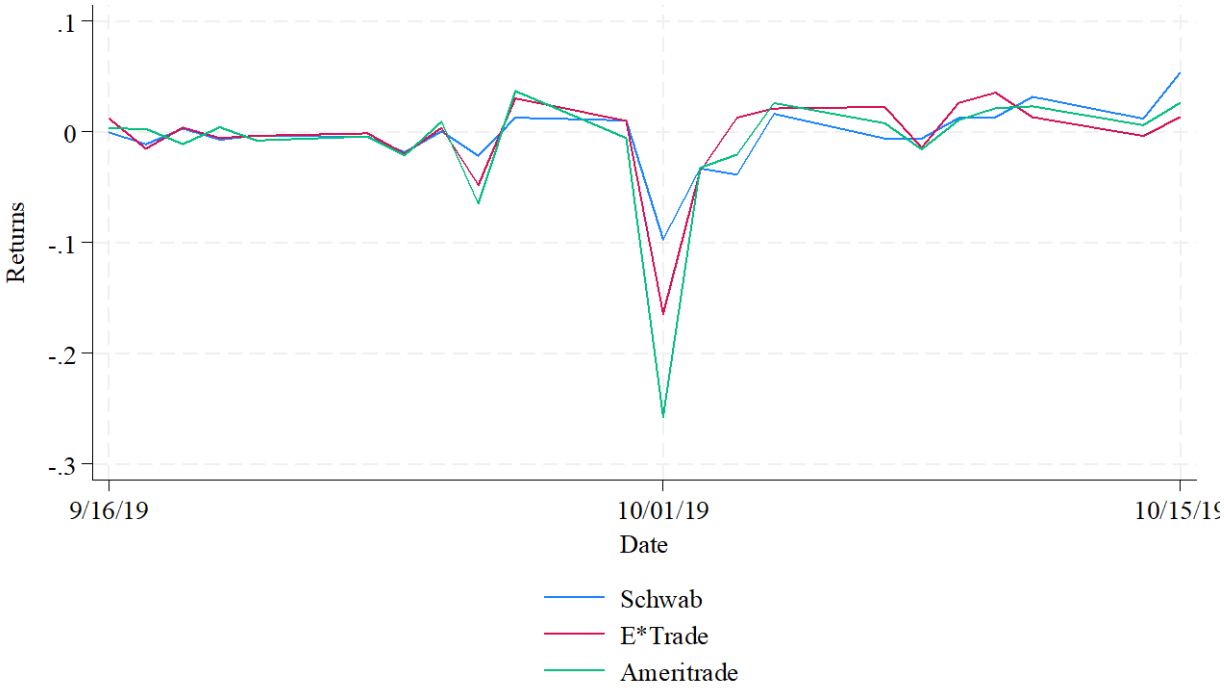
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Figure 1

Returns and Volumes for Online Brokerages around Zero-Commission Announcements

Panel A plots stock returns for four major online brokerages: Charles Schwab, E*Trade, and Ameritrade, around the announcement of zero-commission trading by Charles Schwab on October 1, 2019. Panel B plots their trading volumes around the same dates.

Panel A. Stock Returns



Panel B. Trading Volumes

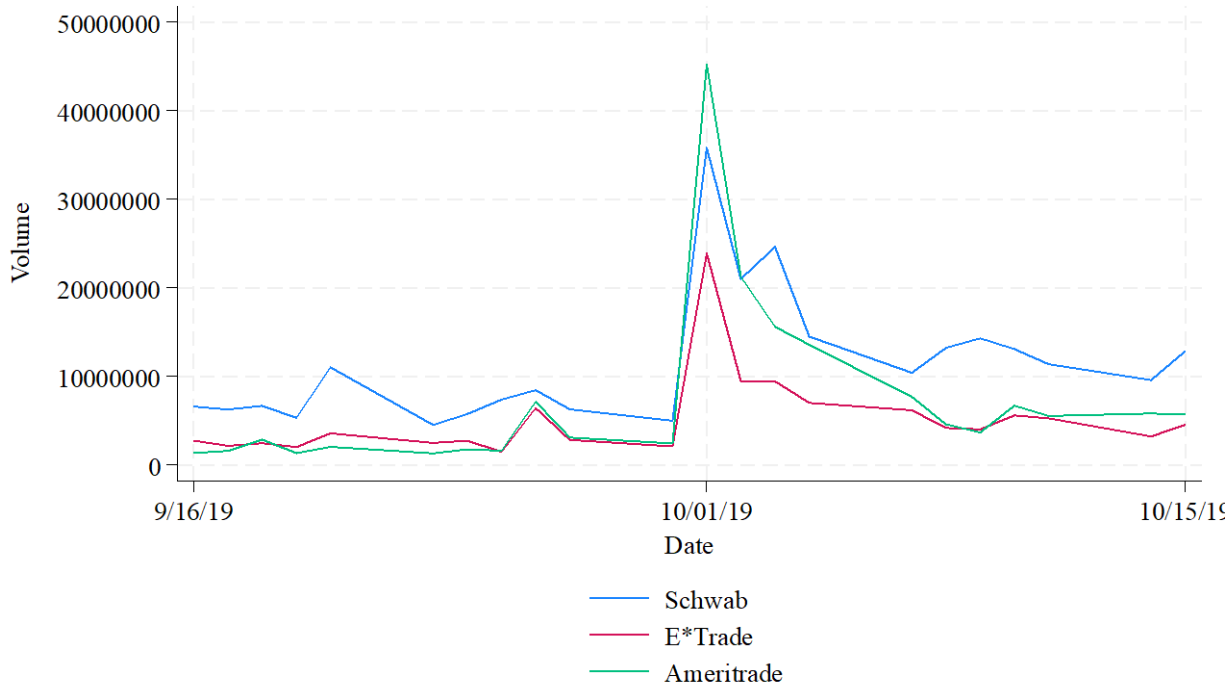


Figure 2

Testing for Pretrends: Changes in Non-Institutional Ownership

This figure shows the 95% coefficients for the interaction between year dummies and firm abnormal returns on October 1, 2019, in a fully saturated model where the dependent variable is the fraction of non-institutional ownership, as derived from 13-F filings. We use year T-1 as the baseline. Year T represents the period between October 1, 2019 and October 1, 2020.

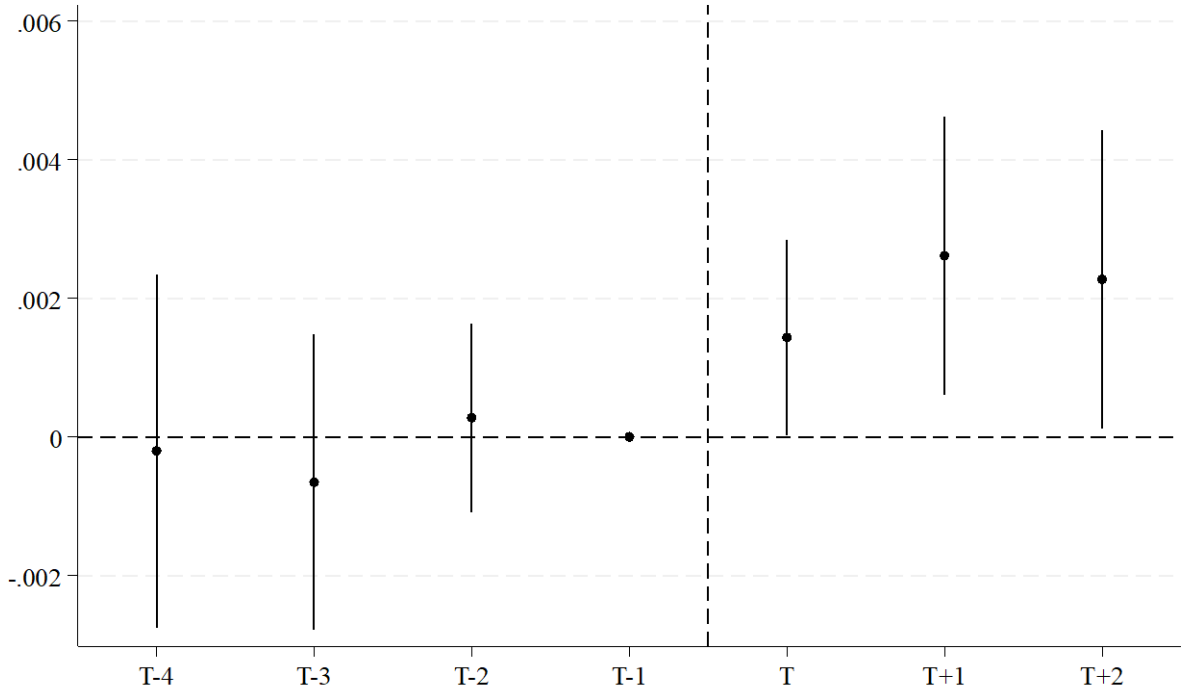


Figure 3

Testing for Pretrends: Changes in Shareholder Non-Voting

This figure shows the 95% coefficients for the interaction between year dummies and firm abnormal returns on October 1, 2019, in a fully saturated model where the dependent variable is the percentage of shareholder non-votes, at the proposal level. We use year T-1 as the baseline. Year T represents the period between October 1, 2019 and October 1, 2020.

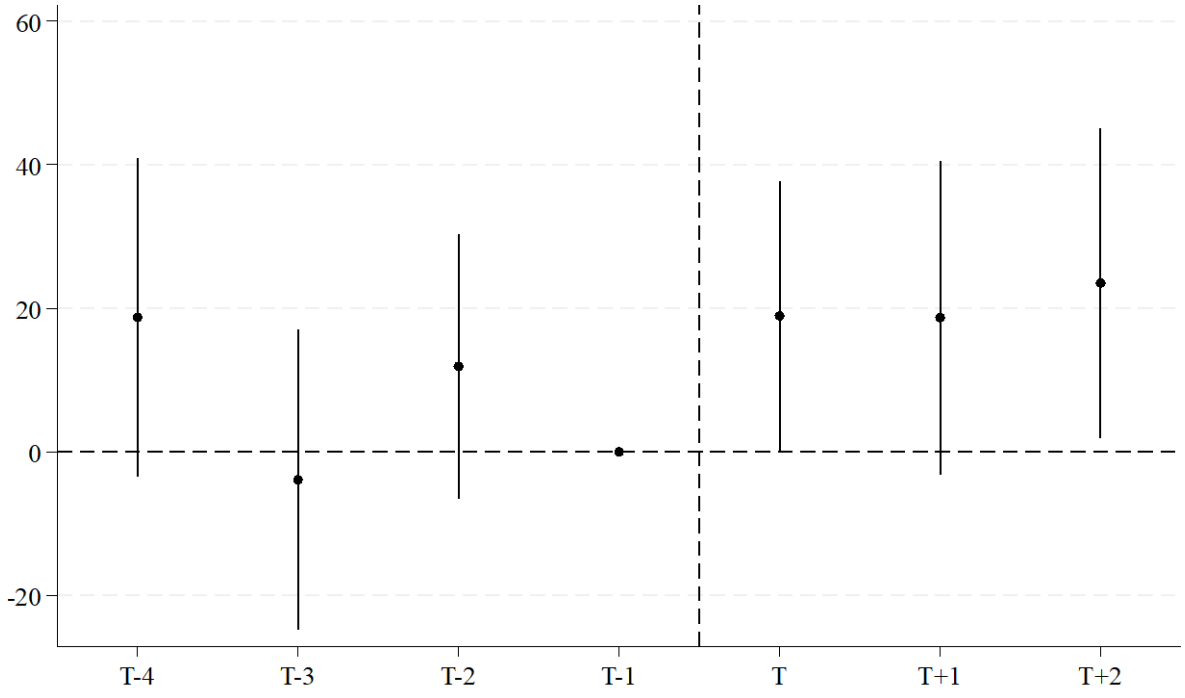


Figure 4

Testing for Pretrends: Changes in MSCI Governance Pillar Score

This figure shows the 95% coefficients for the interaction between year dummies and firm abnormal returns on October 1, 2019, in a fully saturated model where the dependent variable is the corporate governance pillar score, at the year level. We use year T-1 as the baseline. Year T represents the period between October 1, 2019 and October 1, 2020.

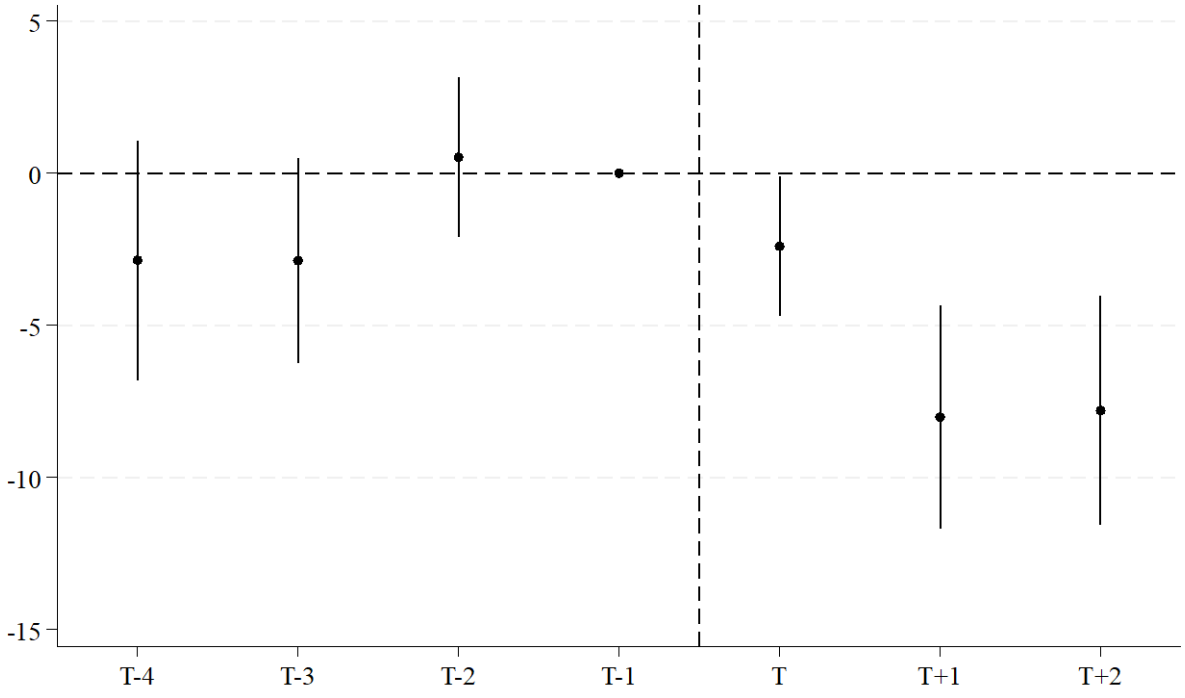
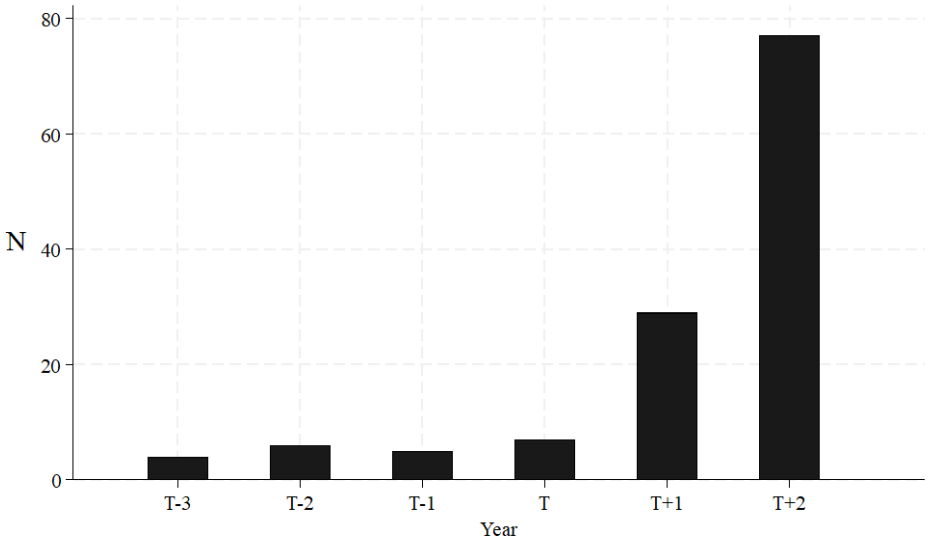


Figure 5

Changes in Quorum Requirements, 2016-2022

Panel A graphs the number of firms decreasing the percentage of shares comprising a quorum for shareholder meetings, while Panel B depicts the number of companies increasing the percentage of shares required for a quorum. "T" refers to the period 10/1/2019–10/1/2020; "T+1" refers to 10/1/2020–10/1/2021, and so on.

Panel A. Decreases in Quorum Requirements



Panel B. Increases in Quorum Requirements

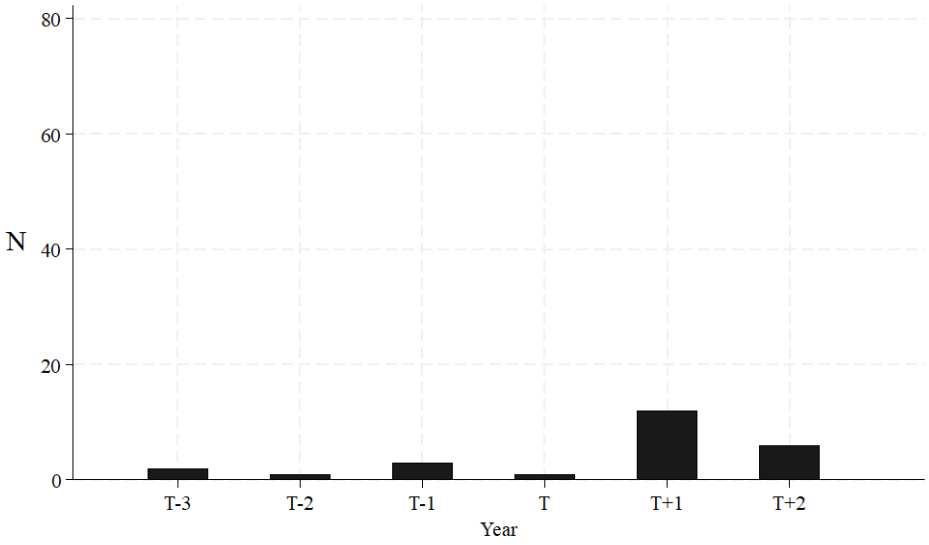


Table 1

Variable Definitions

Variable	Definition	Source
Cash Ratio	The ratio of the firm's cash holdings to its total assets, winsorized at the 2.5% level.	Compustat
Debt Ratio	The ratio of the firm's total debt (both current and long-term) to its total assets, winsorized at the 2.5% level.	Compustat
Decrease in Quorum Requirement	An indicator equaling 1 if the company reduced the percentage of outstanding shares that comprise a quorum for stockholder meetings.	Hand coding
ESG Score	A firm's industry-adjusted composite ESG score.	MSCI
Increase in Quorum Requirement	An indicator equaling 1 if the company increased the percentage of outstanding shares that comprise a quorum for stockholder meetings.	Hand coding
Ln(Assets)	The natural logarithm of the firm's total assets, winsorized at the 2.5% level.	Compustat
Majority Voting Standard	An indicator equal to 1 if the firm elects its directors using the majority voting standard.	BoardEx
Non-Institutional Ownership	One minus the fraction of total institutional ownership reported in 13-F filings, winsorized at the 2.5% level.	Thomson Reuters
Percentage of Female Directors	Percentage of directors, at the firm-year level, classified as female.	BoardEx
Percentage of Independent Directors	Percentage of directors, at the firm-year level, classified as independent.	BoardEx
Poison Pill	An indicator equal to 1 if the firm has a poison pill (shareholder rights plan) outstanding.	BoardEx
Post-Abolition	An indicator equal to 1 after the October 1, 2019 abolition of trading commissions by major online brokerages.	Manual checks
Return on Assets	A firm's net income divided by total assets, winsorized at the 2.5% level.	Compustat
Shareholder Non-Voting	The percentage of outstanding shares, at the proposal level, that were not cast for or against a proposal, or abstained, winsorized at the 2.5% level.	ISS
Staggered Board	An indicator equal to 1 if the firm's board is staggered (classified).	BoardEx
$Treat_1$	The abnormal return experienced by the firm on October 1, 2019, using the Fama-French three factor model, winsorized at the 2.5% level.	WRDS; Manual checks
$Treat_2$	An indicator equaling 1 if the firm's abnormal return (computed using the Fama-French three-factor model) on October 1, 2019 was in the top quartile of the given sample.	WRDS

Table 2

Summary Statistics

Panel A presents summary statistics for different samples used in the empirical analysis. Panel B compares the means for non-institutional ownership and financial variables for firms with above- and below-median abnormal returns on October 1, 2019 in the event study sample. The ***, **, and * denote significance at the 1%, 5%, and 10% levels.

Panel A. Overall Summary Statistics

Event Study Sample

	N	Mean	SD
Non-Institutional Ownership	6824	.443	.313
Abnormal Return	6826	-.099	1.571
Ln(Assets)	6826	.25	.433
Return on Assets	4545	7.551	2.123
Cash Ratio	3838	-.034	.187
Debt Ratio	4470	.116	.161

13-F Sample

	N	Mean	SD
Non-Institutional Ownership	170401	.46	.295
$Treat_1$	170401	-.093	1.519
$Treat_2$	170401	.25	.433
Ln(Assets)	118278	7.623	2.165
Return on Assets	98351	-.015	.166
Cash Ratio	116304	.118	.158
Debt Ratio	85023	.262	.223

Proposal-Level Sample

	N	Mean	SD
Percentage Non-Votes	254822	23.095	14.397
$Treat_1$	254822	-.001	.016
$Treat_2$	254822	.25	.433
Ln(Assets)	247481	8.092	2.102
Return on Assets	200504	0	.143
Cash Ratio	243986	.099	.133
Debt Ratio	171043	.284	.219

Panel B. Differences between Firms based on Abnormal Return on October 1, 2019

	Above-Median $Treat_1$ (1)	Below-Median $Treat_1$ (2)	Difference (1)–(2)
Non-Institutional Ownership	0.469	0.416	6.968***
Ln(Assets)	7.535	7.566	–0.494
Return on Assets	–0.023	–0.440	3.556***
Cash Ratio	0.111	0.121	–2.017**
Debt Ratio	0.299	0.280	2.504**

Table 3

Event Study Analysis

This table presents the results of a linear regression model where the dependent variable is the abnormal return for each firm on October 1, 2019, when major brokerages announced they would abolish trading commissions. We use the Fama-French three-factor asset pricing model to compute abnormal returns. Non-Institutional ownership is measured as 1 minus the fraction of institutional ownership as reported in 13-F data as of September 30, 2019. All models include industry fixed effects. All standard errors are robust and clustered at the industry level, and t-statistics are presented in parentheses. All variables are described in Table 1. The ***, **, and * denote significance at the 1%, 5%, and 10% levels.

	(1)	(2)
Non-Institutional	0.227***	0.237**
Ownership	(2.933)	(2.056)
Ln(Assets)		-0.00722
		(-0.243)
Return on Assets		0.930***
		(2.906)
Cash Ratio		-0.279
		(-0.605)
Debt Ratio		0.247
		(1.146)
Observations	6,819	3,289
R-squared	0.068	0.078
Industry Fixed Effects	Yes	Yes

Table 4

Changes in Non-Institutional Ownership

This table presents the results of a linear regression model where the dependent variable is the share of non-institutional ownership, based on 13-F data. All models use data from fiscal years 2016 to 2022, and *Post-Abolition* equals 1 for reporting dates after October 1, 2019. All models include firm and quarter fixed effects. All standard errors are robust and clustered at the firm level, and t-statistics are presented in parentheses. All variables are described in Table 1. The ***, **, and * denote significance at the 1%, 5%, and 10% levels.

	(1)	(2)	(3)	(4)
$Treat_1$ *x* Post-Abolition	0.00220**		0.00252**	
	(1.989)		(2.330)	
$Treat_2$ *x* Post-Abolition		0.0152***		0.0120***
		(4.451)		(3.066)
Ln(Assets)			-0.0861***	-0.0860***
			(-18.98)	(-18.99)
Return on Assets			-0.00146	-0.00235
			(-0.140)	(-0.224)
Cash Ratio			-0.0172	-0.0178
			(-1.458)	(-1.509)
Debt Ratio			0.0452***	0.0444***
			(3.564)	(3.503)
Observations	134,618	134,618	64,652	64,652
R-squared	0.898	0.899	0.938	0.938
Firm Fixed Effects	Yes	Yes	Yes	Yes
Quarter Fixed Effects	Yes	Yes	Yes	Yes

Table 5

Changes in Shareholder Non-Voting

This table presents the results of a linear regression model where the dependent variable is the percentage of shareholder votes not cast for or against a proposal or marked as abstentions. All models use proposal-level data from fiscal years 2016 to 2022, and *Post-Abolition* equals 1 for reporting dates after October 1, 2019. All models include firm and year fixed effects. All standard errors are robust and clustered at the firm level, and t-statistics are presented in parentheses. All variables are described in Table 1. The ***, **, and * denote significance at the 1%, 5%, and 10% levels.

	(1)	(2)	(3)	(4)
Post-Abolition	0.424	0.162	1.156**	0.816
	(0.820)	(0.314)	(2.061)	(1.458)
$Treat_1$ *x* Post-Abolition	16.37*		16.36*	
	(1.731)		(1.744)	
$Treat_2$ *x* Post-Abolition		0.875***		1.034***
		(2.781)		(3.041)
Ln(Assets)			-2.475***	-2.466***
			(-6.362)	(-6.367)
Return on Assets			-0.159	-0.253
			(-0.157)	(-0.249)
Cash Ratio			2.823**	2.761**
			(2.485)	(2.434)
Debt Ratio			6.220***	6.112***
			(6.562)	(6.453)
Observations	198,017	198,017	130,241	130,241
R-squared	0.688	0.688	0.713	0.713
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes

Table 6

Changes in ESG Scores

This table presents the results of a linear regression model where the dependent variable is the firm's industry-adjusted ESG score as reported by MSCI. All models use data between October 1st, 2016 and October 1st, 2022, and *Post-Abolition* equals 1 for the period after October 1st, 2019. All models include firm and year fixed effects. All standard errors are robust and clustered at the firm level, and t-statistics are presented in parentheses. All variables are described in Table 1. The ***, **, and * denote significance at the 1%, 5%, and 10% levels.

	(1)	(2)	(3)	(4)
Post-Abolition	-0.0336	0.00437	-0.0364	0.00271
	(-0.904)	(0.111)	(-0.832)	(0.0586)
$Treat_1 x$ Post-Abolition	-3.349**		-2.951*	
	(-2.199)		(-1.830)	
$Treat_2 x$ Post-Abolition		-0.131**		-0.121*
		(-2.195)		(-1.857)
Ln(Assets)			0.165***	0.167***
			(2.622)	(2.651)
Return on Assets			-0.205	-0.194
			(-0.998)	(-0.943)
Cash Ratio			-0.186	-0.182
			(-0.939)	(-0.921)
Debt Ratio			-0.618***	-0.611***
			(-3.586)	(-3.539)
Observations	10,240	10,240	8,374	8,374
R-squared	0.847	0.847	0.845	0.845
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes

Table 7

Is it E, S, or G?

This table presents the results of a linear regression model where the dependent variable is the firm's MSCI "pillar" score for environmental, social, and corporate governance performance in Panels A, B, and C, respectively. All models use data between October 1st, 2016 and October 1st, 2022, and *Post-Abolition* equals 1 for the period after October 1st, 2019. All models include firm and year fixed effects. All standard errors are robust and clustered at the firm level, and t-statistics are presented in parentheses. All variables are described in Table 1. The ***, **, and * denote significance at the 1%, 5%, and 10% levels.

Panel A. Environmental Pillar Score

	(1)	(2)	(3)	(4)
Post-Abolition	0.0372	0.0538	-0.000405	0.0134
	(1.124)	(1.569)	(-0.0104)	(0.338)
$Treat_1$ *x* Post-Abolition	-0.522		-0.372	
	(-0.391)		(-0.262)	
$Treat_2$ *x* Post-Abolition		-0.0627		-0.0471
		(-1.164)		(-0.803)
Ln(Assets)			0.0823	0.0824
			(1.334)	(1.337)
Return on Assets			-0.480***	-0.480***
			(-2.869)	(-2.890)
Cash Ratio			0.0464	0.0500
			(0.229)	(0.247)
Debt Ratio			-0.260	-0.256
			0.0823	0.0824
Observations	10,240	10,240	8,374	8,374
R-squared	0.910	0.910	0.900	0.900
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes

Panel B. Social Pillar Score

	(1)	(2)	(3)	(4)
Post-Abolition	0.0481	0.0522	0.0596*	0.0541
	(1.597)	(1.609)	(1.691)	(1.414)
$Treat_1 x$ Post-Abolition	-0.197		0.533	
	(-0.168)		(0.432)	
$Treat_2 x$ Post-Abolition		-0.0152		0.0165
		(-0.343)		(0.337)
Ln(Assets)			0.0938*	0.0935*
			(1.927)	(1.922)
Return on Assets			-0.106	-0.108
			(-0.758)	(-0.774)
Cash Ratio			-0.173	-0.174
			(-1.199)	(-1.199)
Debt Ratio			-0.211*	-0.212*
			(-1.710)	(-1.716)
Observations	10,239	10,239	8,373	8,373
R-squared	0.823	0.823	0.818	0.818
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes

Panel C. Corporate Governance Pillar Score

	(1)	(2)	(3)	(4)
Post-Abolition	0.0417	0.0757**	-0.00596	0.0377
	(1.193)	(2.072)	(-0.146)	(0.876)
$Treat_1 x$ Post-Abolition	-4.903***		-4.683***	
	(-3.925)		(-3.559)	
$Treat_2 x$ Post-Abolition		-0.107**		-0.127**
		(-2.271)		(-2.466)
Ln(Assets)			-0.0357	-0.0329
			(-0.702)	(-0.643)
Return on Assets			0.479***	0.499***
			(3.117)	(3.235)
Cash Ratio			-0.0535	-0.0543
			(-0.319)	(-0.323)
Debt Ratio			-0.163	-0.160
			(-1.176)	(-1.142)
Observations	10,240	10,240	8,374	8,374
R-squared	0.731	0.730	0.725	0.724
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes

Table 8

Which Corporate Governance Outcomes Were Affected?

This table presents the results of a linear regression model where the dependent variable is the percentage of independent directors in Panel A, the percentage of female directors in Panel B, an indicator for whether the firm had a staggered board in Panel C, an indicator for whether the firm had a poison pill in Panel D, and an indicator for whether the firm had a majority voting standard in Panel E. All models use board-level data from fiscal years 2016 to 2022, and *Post-Abolition* equals 1 for fiscal years starting 2020. All models include firm and year fixed effects. All standard errors are robust and clustered at the firm level, and t-statistics are presented in parentheses. All variables are described in Table 1. The ***, **, and * denote significance at the 1%, 5%, and 10% levels.

Panel A. Percentage of Independent Directors

	(1)	(2)	(3)	(4)
$Treat_1$ *x* Post-Abolition	2.151		5.864	
	(0.298)		(0.770)	
$Treat_2$ *x* Post-Abolition		-0.152		-0.0793
		(-0.493)		(-0.228)
Ln(Assets)			0.339	0.586**
			(1.113)	(2.214)
Return on Assets			0.199	-0.150
			(0.301)	(-0.275)
Cash Ratio			-0.185	0.622
			(-0.242)	(0.952)
Debt Ratio			-0.873	-0.535
			(-1.042)	(-0.725)
Observations	19,119	23,923	14,786	19,002
R-squared	0.827	0.825	0.825	0.825
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes

Panel B. Percentage of Female Directors

	(1)	(2)	(3)	(4)
$Treat_1$ *x* Post-Abolition	1.123		2.401	
	(0.306)		(0.612)	
$Treat_2$ *x* Post-Abolition		0.152		0.0583
		(0.927)		(0.316)
Ln(Assets)			0.123	0.165
			(0.846)	(1.341)
Return on Assets			-0.469	-0.116
			(-1.205)	(-0.385)
Cash Ratio			-0.706	-0.0330
			(-1.353)	(-0.0812)
Debt Ratio			-0.287	-0.162
			(-0.652)	(-0.436)
Observations	19,119	23,923	14,786	19,002
R-squared	0.224	0.258	0.236	0.270
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes

Panel C. Indicator for Staggered Board

	(1)	(2)	(3)	(4)
$Treat_1$ *x* Post-Abolition	0.240		0.374	
	(0.678)		(1.017)	
$Treat_2$ *x* Post-Abolition		-0.00553		0.00392
		(-0.428)		(0.293)
Ln(Assets)			-0.00655	-0.00626
			(-0.460)	(-0.440)
Return on Assets			0.0271	0.0269
			(0.470)	(0.468)
Cash Ratio			-0.0103	-0.00991
			(-0.237)	(-0.227)
Debt Ratio			-0.00982	-0.00815
			(-0.245)	(-0.203)
Observations	9,268	9,268	7,455	7,455
R-squared	0.920	0.920	0.919	0.919
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes

Panel D. Indicator for Poison Pill

	(1)	(2)	(3)	(4)
$Treat_1$ *x* Post-Abolition	0.223*		0.175	
	(1.706)		(1.318)	
$Treat_2$ *x* Post-Abolition		0.00341		0.00149
		(0.968)		(0.393)
Ln(Assets)			0.000567	0.000703
			(0.135)	(0.167)
Return on Assets			-0.0172	-0.0173
			(-1.525)	(-1.516)
Cash Ratio			0.00439	0.00462
			(0.183)	(0.193)
Debt Ratio			0.0204*	0.0213*
			(1.649)	(1.705)
Observations	9,268	9,268	7,455	7,455
R-squared	0.863	0.863	0.884	0.884
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes

Panel E. Indicator for Majority Voting Standard

	(1)	(2)	(3)	(4)
$Treat_1$ *x* Post-Abolition	-0.227*		-0.272**	
	(-1.889)		(-2.168)	
$Treat_2$ *x* Post-Abolition		-0.00485		-0.00732**
		(-1.628)		(-2.233)
Ln(Assets)			-0.00265	-0.00284
			(-0.468)	(-0.498)
Return on Assets			-0.0138	-0.0131
			(-0.902)	(-0.854)
Cash Ratio			0.00121	0.00179
			(0.0713)	(0.104)
Debt Ratio			-0.0139	-0.0141
			(-0.741)	(-0.739)
Observations	9,268	9,268	7,455	7,455
R-squared	0.980	0.980	0.980	0.980
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes

Table 9

Changes in Quorum Requirements

This table presents the results of a linear probability model where the dependent variable is an indicator variable equaling 1 if the firm decreased (increased) quorum requirements for shareholder meetings in Panel A (Panel B). All models use board-level data from fiscal years 2016 to 2022, and *Post-Abolition* equals 1 for fiscal years starting 2020. All models include industry and year fixed effects. All standard errors are robust and clustered at the industry level, and t-statistics are presented in parentheses. All variables are described in Table 1. The ***, **, and * denote significance at the 1%, 5%, and 10% levels.

Panel A. Decrease in Quorum Requirements

	(1)	(2)	(3)	(4)
$Treat_1$	0.006	0.010		
	(0.779)	(1.007)		
$Treat_1$ *x* Post-Abolition	0.045**	0.056***		
	(2.447)	(2.702)		
$Treat_2$			0.000	0.000
			(0.451)	(0.526)
$Treat_2$ *x* Post-Abolition			0.001*	0.001*
			(1.754)	(1.707)
Ln(Assets)		-0.000***		-0.000***
		(-3.257)		(-3.380)
Return on Assets		-0.003		-0.003
		(-1.617)		(-1.542)
Cash Ratio		-0.001		-0.001
		(-0.682)		(-0.831)
Debt Ratio		0.000		0.000
		(0.328)		(0.341)
Observations	45,561	22,364	45,561	22,364
R-squared	0.002	0.005	0.002	0.004
Industry Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes

Panel B. Increase in Quorum Requirements

	(1)	(2)	(3)	(4)
$Treat_1$	0.002*	0.003		
	(1.824)	(1.572)		
$Treat_1$ *x* Post-Abolition	-0.016	-0.025**		
	(-1.171)	(-2.104)		
$Treat_2$			0.000	0.000
			(1.388)	(1.109)
$Treat_2$ *x* Post-Abolition			-0.001*	-0.001**
			(-1.817)	(-2.478)
Ln(Assets)		-0.000		-0.000
		(-0.155)		(-0.212)
Return on Assets		-0.000		-0.000
		(-0.235)		(-0.253)
Cash Ratio		0.000		0.000
		(0.154)		(0.263)
Debt Ratio		-0.001		-0.001
		(-1.418)		(-1.415)
Observations	45,561	22,364	45,561	22,364
R-squared	0.001	0.001	0.001	0.001
Industry Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes

Table 10

Change in Non-Institutional Ownership: Matched and Entropy-Balanced Sample Analysis

This table presents the results of a linear regression model where the dependent variable is the share of non-institutional ownership, based on 13-F data. For columns (1) and (2), we run these equations on a matched sample, where we match firms in the top quartile of abnormal returns on October 1, 2019 to other companies by size and profitability. For columns (3) and (4), we run these equations on an entropy-balanced sample, where we balance the first three moments of covariates for firms in the top quartile of abnormal returns on October 1, 2019 and other companies. All models use data from fiscal years 2016 to 2022, and *Post-Abolition* equals 1 for reporting dates after October 1, 2019. All models include firm and year fixed effects. All standard errors are robust and clustered at the firm level, and t-statistics are presented in parentheses. All variables are described in Table 1. The ***, **, and * denote significance at the 1%, 5%, and 10% levels.

	(1)	(2)	(3)	(4)
	Matched Sample		*Entropy-Balanced Sample*	
Post-Abolition	-0.0178***	-0.0151***	-0.0140***	-0.0123***
	(-3.361)	(-2.777)	(-5.834)	(-5.413)
$Treat_2$ *x* Post-Abolition	0.0188***	0.0173***	0.0170***	0.0136***
	(3.374)	(3.126)	(3.944)	(3.402)
Ln(Assets)		-0.0807***		-0.0860***
		(-13.20)		(-17.53)
Return on Assets		0.000117		-0.00453
		(0.00789)		(-0.405)
Cash Ratio		-0.0358**		-0.0220*
		(-2.146)		(-1.787)
Debt Ratio		0.0530***		0.0463***
		(3.077)		(3.480)
Observations	54,891	42,933	64,652	64,652
R-squared	0.938	0.946	0.932	0.937
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes

Table 11

Event Study with Event Window Encompassing IBKR Lite Announcement

This table presents the results of a linear regression model where the dependent variable is the cumulative abnormal return for each firm on September 26, 2019 and October 1, 2019, when major brokerages announced they would abolish trading commissions (IBKR on September 26 and others, including Schwab, on October 1). We use the Fama-French three-factor asset pricing model to compute abnormal returns. Non-Institutional ownership is measured as 1 minus the fraction of institutional ownership as reported in 13-F data as of September 30, 2019. All models include industry fixed effects. All standard errors are robust and clustered at the industry level, and t-statistics are presented in parentheses. All variables are described in Table 1. The ***, **, and * denote significance at the 1%, 5%, and 10% levels.

	(1)	(2)
Non-Institutional	0.568*	1.107***
Ownership	(1.895)	(3.226)
Ln(Assets)		0.0344
		(1.171)
Return on Assets		2.685***
		(4.312)
Cash Ratio		-0.364
		(-1.178)
Debt Ratio		0.320
		(1.119)
Observations	6,807	3,278
R-squared	0.137	0.146
Industry Fixed Effects	Yes	Yes

Table 12

Placebo Event Studies

This table presents the results of a linear regression model where the dependent variable in columns (1) and (2) is the abnormal return for each firm on October 17, 2019, when Charles Schwab announced it was introducing fractional trading ("FT"). The dependent variable in columns (3) and (4) is the abnormal return on November 25, when Interactive Brokers announced the advent of fractional trading. We use the Fama-French three-factor asset pricing model to compute abnormal returns. Non-Institutional ownership is measured as 1 minus the fraction of institutional ownership as reported in 13-F data as of September 30, 2019. All models include industry fixed effects. All standard errors are robust and clustered at the industry level, and t-statistics are presented in parentheses. All variables are described in Table 1. The ***, **, and * denote significance at the 1%, 5%, and 10% levels.

	(1)	(2)	(3)	(4)
	Schwab FT Announcement		Interactive Brokers FT Announcement	
	Baseline	With Financials	Baseline	With Financials
Non-Institutional Ownership	-0.197*	-0.167	-0.0214	0.0856
	(-1.703)	(-0.990)	(-0.167)	(0.586)
Ln(Assets)		0.0248		0.00670
		(0.913)		(0.374)
Return on Assets		0.421**		1.272***
		(2.453)		(3.480)
Cash Ratio		-0.0241		0.128
		(-0.0786)		(0.794)
Debt Ratio		-0.0996		-0.243
		(-0.538)		(-0.811)
Observations	6,844	3,299	6,920	3,341
R-squared	0.051	0.060	0.038	0.053
Industry Fixed Effects	Yes	Yes	Yes	Yes