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Engaged ETFs and firm performance

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Abstract

Exchange Traded Funds (ETFs) have often tracked indices and charged low fees so their incentives to improve firm performance are questionable although little empirical work has investigated this issue. Theoretically, however, we expect firms to perform better when held by more engaged ETFs. We develop a new measure of engagement using a weighted-average concentration measure which captures the combined effect of the concentration of the portfolios of the ETFs investing in a firm and the ownership of the firm by those ETFs. Using ETFs' investment in US-listed firms for the period 2000–2019, we confirm our expectations that more engaged ETFs improve firm performance.

KEYWORDS

corporate governance, Exchange Traded Funds (ETFs), firm performance, monitoring, portfolio concentration

JEL CLASSIFICATION

C33, C36, G23, G32, G34, L25

1 | INTRODUCTION AND RELATED LITERATURE

In the last decade, Exchange Traded Funds (ETFs) have grown significantly. Ben-David et al. (2018) discuss that the ETFs contribute to around 10% of the market capitalization and 30% of the trading volume of securities traded on US stock exchanges. According to the 2021

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Investment Company Fact Book, there are 2204 US-based ETFs having $5.4 trillion in assets under management (AUM) at the end of 2020. This growing significance of ETFs leads scholars to investigate the implications of the growth of these investment vehicles and this raises many interesting issues. Initially, there are considerable differences between the legal status and operational activities of ETFs and conventional open-ended mutual funds (Elton et al., 2019). The implication of the forgoing is that findings from prior research work on open-ended mutual funds cannot necessarily be assumed to apply to ETFs as we discuss in detail below.

In our paper, we further the debate on the nature and magnitude of ETF activity by considering an important dimension of activity which is the way that ETFs can influence firm performance. Specifically, we ask whether more engaged ETFs can improve firm performance. We conjecture that these ETFs will engage more with firms in their portfolios and can allocate more resources and attention to the stocks they hold. This then translates into stronger governance and monitoring through 'voice' in those companies, and subsequently, leads to better firm performance. To test this conjecture, we develop a new measure of engagement which is more informative than the measures used in previous work on the influence of passive investors on firm performance which has simply used the percentage of firms owned by passive investors (Appel et al., 2016; Schmidt & Fahlenbrach, 2017). We measure engagement using the weighted-average concentration measure which captures the combined effect of the concentration of the portfolios of the ETFs investing in a firm and the ownership of the firm by those ETFs. The formal definition of this adjusted concentration measure is given in Section 2.2 below.

A substantial proportion of ETF money under management is used to track indices so the prior work on the activities of index funds is relevant to our study although, as discussed below, there is evidence that there may be substantial differences between the properties of ETFs and open-ended mutual funds, making ETFs unique for our research. Index tracking funds have different incentives from active investors and debatably are less likely to closely monitor their investments (see, Heath et al., 2022, for evidence and a review of the debate on this matter). It could be argued that the main objective of passive, index-tracking funds is to track the index at low cost and they have no particular incentive to improve the performance of companies making up the index to deliver alpha to their investors. There is, however, evidence that within their cost constraints, passive investors do take actions to improve corporate governance. Appel et al. (2016) argue that passive investors have incentives to improve the performance of the companies in which they invest in that this would increase their money under management and hence future fees. In addition, as they have less ability to divest themselves of poorly managed firms, they are likely to take an interest in improved corporate governance. They also have, like other institutional investors, a fiduciary duty to vote their proxies in the best interest of shareholders. There is also substantial anecdotal evidence that passive investors do take action to improve corporate governance as outlined, for example, in the following quote from the 2018 letter to CEOs from Larry Fink, Chairman and CEO of BlackRock:

'In the $1.7 trillion in active funds we manage, BlackRock can choose to sell the securities of a company if we are doubtful about its strategic direction or long-term growth. In managing our index funds, however, BlackRock cannot express its disapproval by selling the company's securities as long as that company remains in the relevant index. As a result, our responsibility to engage and vote is more important than eve'. (Fink, 2018)

Similarly, funds like Vanguard consistently announce that they exert effort to monitor the firms in their index funds and vote according to their fiduciary duty to their fund holders.[1] Appel et al. (2016) empirically confirm the proposition that passive investors influence firms' governance choices with evidence from a large sample of passively managed mutual funds. They argue that a key mechanism by which index tracking (termed passive) investors affect a firm's governance structure is via their 'voice'. These investors can use their ownership stake and ability to vote to monitor firms and ensure conformity with their views on governance structures. Schmidt and Fahlenbrach (2017) find seemingly contrasting results with increases in passive ownership of companies leading governance choices that are detrimental to the wealth of shareholders. They, however, put forward various potential explanations to reconcile the differing results from the two studies including the fact that they are focusing on governance measures which are more costly to monitor and hence less attractive to passive managers as well as various methodological and data differences.

To a large extent, our work builds on the insights of Appel et al. (2016) regarding the role of passive investors but we focus on the role of ETFs only. There are a number of strong reasons to expect ETFs to differ from other passive investors in their relationships with corporate governance and company performance. These include attitudes to governance and the nature of the underlying holdings and the investors in the funds.

When we consider attitudes to governance, prior research shows substantial heterogeneity between fund management companies and also, in some cases, between funds in the same fund management group, in the way they vote on corporate governance issues Choi et al. (2013). Bubb and Catan (2022) use machine learning to show that fund managers are quite heterogeneous in respect of their attitudes to corporate governance and can be broadly classified into groups with different attitudes to governance. They find that smaller passive managers act differently from the largest passive managers and are more likely to take a compliance approach to voting and outsource it to proxy advisors. Even when the largest three passive managers are considered in isolation, Bebchuk and Hirst (2019) report quite substantial differences between their actions in respect of a number of corporate governance decisions. Relying on these findings, it should not be surprising to expect that both collectively and individually ETFs are likely to differ from other passive mutual funds regarding their effect on governance.

In broad theoretical terms, we believe that fund managers will seek to optimize their corporate government policies in light of the nature of both their holdings and their investors. This will be quite a complex process and the outcome will likely vary between funds and fund managers depending on their attitudes and resources. Any resources spent on corporate governance will need to be initially considered in terms of the value added to the companies involved but ultimately also in terms of the value added to the investors. Now, we would argue that there is considerable evidence that, in aggregate, ETFs tend to have both different investments and different investors compared to other passive funds. In respect to investment holdings, we can see that Glosten et al. (2021), Israeli et al. (2017), El Kalak and Tosun (2022) and Antoniou et al. (2023) show that firms held by ETFs have different properties in various dimensions from those held by other passive mutual funds. Glosten et al. (2021) show ETF activity increases short-run informational efficiency for

[1]Vanguard regularly publishes articles on its website on how they monitor the firms they hold through 'voting' as part of their fiduciary duty.

stocks with weak information environments. They argue that one of the reasons for their findings is that ETFs are not subject to short-selling bans and, hence, the stocks they hold will incorporate new information more efficiently. Conversely, Israeli et al. (2017) show that shares held by ETFs have less informational efficiency in some respects due to a reduction in firm-level liquidity. Antoniou et al. (2023) show that cross-sectionally higher ETF ownership is associated with an increased sensitivity of real investment to Tobin's *Q* and a heightened ability of stock returns to forecast future earnings. El Kalak and Tosun (2022) show that firms included in ETF baskets have higher cash holdings as a precautionary response which is consistent with reduced managerial learning from the stock market and increased uncertainty. In respect of investors, various studies have shown differences between the characteristics of ETF and mutual fund investors. For example, Ben-David et al. (2018) show that investors in ETFs have shorter horizons than mutual fund investors. We would not argue that there is not substantial overlap between the holdings of ETFs and those of other passive mutuals nor would we argue that ETFs necessarily have a greater focus on corporate governance, but relying on the literature above we do think that they cannot be assumed to have the same attributes with respect to corporate governance issues as other passive mutuals which justifies our paper as a separate investigation on ETFs.

Several areas of existing literature are relevant to our work. Previous studies investigate the relationship between investors' portfolio concentration and their engagement with stocks in those portfolios. Goldman et al. (2016) suggest that when portfolios of equity mutual funds are concentrated, they are more actively managed leading to higher portfolio performance. Upson et al. (1975) discuss that common-stock portfolios are more aggressively managed when they are more concentrated with a small number of selected stocks. Ivković et al. (2008) examine information asymmetries between traders and argue that investors with concentrated portfolios are more engaged with their stocks due to asymmetric information. Choi et al. (2017) use data on 10,771 institutional investors from 72 countries and show that those investors become more involved in the firms in their portfolios to gather deeper information when they have concentrated investment strategies. Elliott et al. (2010) and Borochin and Yang (2017) find that dedicated institutional investors have lower portfolio turnover, undertake little momentum trading, and hold more concentrated portfolios through which they are more involved in the firms in which they invest. Brands et al. (2005) argue that concentrated portfolios require active portfolio management by fund managers to reduce their volatility in ways other than diversification. This results in engagement with each stock in the portfolio to obtain more information on those firms and monitor them thoroughly.

Agency theory suggests that when there is a separation of ownership and control of a firm, the agents (managers) have more incentives to engage in activities that will benefit them at the expense of principals (shareholders). Ownership structure is an important mechanism used to reduce this principal-agent conflict. Thomsen and Pedersen (2000) and Thomsen et al. (2006) argue that investors can influence managers through their ownership of firms. Institutional investors, funds and blockholders can improve corporate governance in firms when they engage closely with those firms. Shleifer and Vishny (1986), Kahn and Winton (1998) and Bolton and Von Thadden (1998) illustrate that large shareholders can use the 'voice channel' and intervene in firms in which they invest to correct managerial inefficiency. Similarly, multiple small shareholders can collectively discipline management and improve governance in firms through the 'voice channel' (Kandel et al., 2011). Miletkov et al. (2014) examine the relationship between corporate governance and foreign institutional investors. They demonstrate that firms with higher foreign institutional ownership have more independent boards.

Fich et al. (2015) focus on acquisitions and show that institutional monitoring will be greatest when the target firm represents a significant allocation of funds in the portfolio of that institutional investor. Tosun (2019) shows that there is a positive link between long-term institutional investors and stronger governance. Borochin and Yang (2017) evidence that dedicated institutional investors are associated with better future governance characteristics. Considering their low fees, ETFs likely engage and monitor more only when they have concentrated portfolios and they have more stakes in the constituent firms in their portfolios. This would be more cost-efficient (or a high win/benefits situation) for them (see, Lewellen & Lewellen, 2022, for a discussion of the financial incentives of institutional investors to be engaged in corporate governance).

There is an established literature on the positive link between strong corporate governance and high firm performance. Brown and Caylor (2004) and Bhagat and Bolton, (2008, 2019) consider various factors to measure corporate governance, for example, GIM-Index, director ownership, CEO duality and find that firms with better governance perform better. Duchin et al. (2010) use outside directors to represent stronger governance and show that such directors are effective in improving firm performance due to strong monitoring. Knyazeva et al. (2013) and Kalodimos (2017) examine internal governance and find a positive relation between strong corporate governance and high firm performance. Newton (2015) studies the link between organizational performance and governance quality in large US nonprofit organizations and highlights the importance of strong governance mechanisms in improving performance when firms suffer from severe agency conflicts and ineffective monitoring. Jiao and Ye (2013) and Yeh (2014) focus on large shareholders and funds and show that these investors can effectively discipline entrenched management through engagement leading to firm performance improvement.

To summarise the studies reviewed above we see that there is prior evidence for some institution investors of a positive link between portfolio concentration and good corporate governance although ETFs have not been substantially covered in this work. In turn, there is evidence of positive links between good corporate governance and firm performance. In light of the findings in these prior studies, we hypothesize that ETFs with greater concentration in their portfolios become more involved in firms in their portfolios through 'voice'. This engagement translates into stronger monitoring and governance leading to better firm performance. Testing this hypothesis will add to the emerging and limited literature on the role of ETFs in firm valuation. We use a sample of 60,624 firm-quarter observations across 1867 US listed firms between 2000-Q1 and 2019-Q4. Using a novel measure for ETFs ownership concertation, our findings indicate that the ETFs improve the performance of firms, that is, Return on Assets (ROA) and Return on Equity (ROE), when the weighted-average concentration of the firms in their portfolio increases. Further analyses on the main channel to performance improvement suggest that the ETFs may use the 'voice channel' to engage with firms. The ETFs provide better monitoring through lower managerial entrenchment, less insider trading and more governance-related shareholder proposals when they can engage more with their constituent firms due to higher portfolio concentration. In this study, we do not research why/how ETFs increase/decrease their portfolio concentration. Instead, we examine whether/how the high (low) concentration of ETFs' portfolios is linked to the performance of the firms they have in their baskets, after adjusting for ETFs ownership in those companies. The novelty of the study is around the idea that ETFs with more concentrated portfolios exert more effort and have greater incentives to monitor their portfolios, resulting in better governance and better performance of invested firms. To allay concerns of endogeneity concerning reverse causality

and omitted variables, we test our hypothesis using three different instrumental variable (IV) models. All reported results are consistent with our main hypothesis.

Our paper is close in spirit to Faccio et al. (2011), where they examine the portfolio concentration of controlling shareholders. However, they focus on the relationship between portfolio concentration and risk-taking. Although we consider portfolio concentration in our paper, we research the ETFs particularly. Furthermore, we focus on the performance of firms and show the influence of the ETFs with concentrated portfolios on firm performance through the governance channel.

Our study is also related to Bushee (1998, 2001) and Ekholm and Maury (2014). Bushee (1998, 2001) examine hedge funds, transient and dedicated institutional investors. They show how these specific investors are linked to firms' value and R&D decisions. Ekholm and Maury (2014) investigate the association between the portfolio concentration of 'all shareholders combined' and firm performance. They explain their findings through price informativeness and link informed shareholdings to firm performance through the stock market. Our paper differs from these studies in various ways. Their samples include either all types of investors in a combined fashion, or only hedge funds, transient and dedicated investors. Hence, they reach either a general and collective conclusion, or an interpretation for only a particular group of investors. We focus only on ETFs which are not researched in those studies individually. The importance of the ETFs lies in their increasing popularity as an investment mechanism, their growing significance in AUM and trading volume in stock exchanges, and their tax efficiency (compared to mutual funds). We contribute to the literature by deepening the understanding of the influence of the ETFs on companies and their performance. Distinctly from prior studies, our measure incorporates both aspects needed for the translation of ETFs engagement into firms leading to performance improvement. Particularly, we not only measure the concentration of the ETFs' portfolios but also weight it considering their ownership in firms to give one integrated novel measure. This aspect of concentration and ownership together has not been captured in previous research. We believe this is a valuable addition to the existing studies. Further, prior studies explain the impact on performance through 'exit' and 'learning' channels relying on price efficiency which are common strategies for active investors. Contrary to them, we show evidence for the 'voice' channel to justify corporate governance improvement leading to better performance. Given the nature of the ETFs, the 'voice' strategy is the most plausible explanation for our study (Appel et al., 2016; Bubb & Catan, 2022). Lastly, we address the potential endogeneity issues meticulously using a battery of tests including various IV models.

This paper contributes to two strands of literature. First, we add to the rapidly growing literature on ETFs by arguing that ETFs have a real effect on firms. We not only examine ETFs' ownership in firms but also provide a deeper analysis and understanding of how those ETFs' investment strategies regarding *their portfolios* can influence the performance of constituent firms they hold. We also show evidence for a plausible channel, that is, 'voice', for improved monitoring and corporate governance by the ETFs. Second, we extend the literature on firm performance. Specifically, we provide further understanding of factors that improve firm performance.

The remainder of the paper proceeds as follows. Section 2 describes the data and the variables, and explains the empirical methodology. Section 3 provides descriptive statistics and discusses the main results along with the channel for firm performance improvement. Section 4 addresses endogeneity concerns. Section 5 reports the results of our robustness tests and further analyses. Section 6 concludes.

2 | DATA SELECTION AND EMPIRICAL DESIGN

2.1 | Data sample

We determine the ETFs in the sample using the Center for Research in Security Prices (CRSP), Compustat, Bloomberg and OptionMetrics databases, suggested by Ben-David et al. (2018) and Glosten et al. (2021). First, we pick the securities with a historical share code of 73 in CRSP and add all US-traded securities in Compustat and OptionMetrics to this sample. We limit our sample to the following Lipper Objective Codes: CA, EI, G, GI, MC, MR, SG and SP. Sector Funds investing in US firms with codes BM, CG, CS, FS, H, ID, NR, RE, TK, TL, S and UT are also included. We use ETFs in US exchanges whose portfolios contain US stocks only. After we match this sample of the ETFs to the CRSP Mutual Fund and Thomson Reuters Mutual Fund Ownership databases, we obtain our quarterly ETFs holdings data set. This final data set covers the period 2000 Q1–2019 Q4. We have 456 ETFs in our final sample similar to Ben-David et al. (2018) and Glosten et al. (2021), with 454 ETFs and 447 ETFs in their samples, respectively. Our ETFs holdings data set contains 172,753 firm-quarter observations.

We obtain the data sample of firms from Compustat. We use all available data for US-listed firms on NYSE, AMEX and NASDAQ. We include both active and inactive publicly traded firms to avoid any survivorship bias in the data. Following Antoniou et al. (2023), we exclude financial and utility firms, and include firms with headquarters in the United States only. We exclude data where total assets have a greater value than capital expenditures, total liabilities are greater than total assets and the sum of long-term and short-term debt is greater than total assets. We use the CRSP Mutual Fund, Thomson-Reuters, Factset, ExecuComp and Institutional Shareholder Services (ISS) databases for data on institutional ownership, CEO characteristics and governance. These databases include S&P 1500 firms that cover approximately 90% of the market capitalization of US stocks; thus, we are confident that our analyses are generalizable. We merge the samples of firms, CEO characteristics, governance, ETFs portfolio concentration and institutional ownership, and require the firms to be invested in by at least one ETF. This ensures that our findings identify cross-sectional variation in ETFs portfolio concentration, and not just a difference between firms with zero and positive ETFs portfolio concentration. All variables are winsorized at the 1st and 99th percentiles to avoid the influence of outliers. We lose observations due to missing values for the variables representing CEO characteristics and governance. Hence, the final sample with the full set of variables consists of 60,624 observations across 1867 firms.[2]

2.2 | Variable construction

In this paper, we examine the relation between firm performance and the engagement of the ETFs that hold the shares of those firms in their portfolios. We introduce a new measure of engagement which incorporates information which is not captured in previous studies, such as that of Appel et al. (2016), which use a simple measure of percentage ownership by funds.

[2]The sample excluding variables representing CEO characteristics and governance has 148,560 firm-quarter observations. Our initial data sample is broadly the same as in El Kalak and Tosun (2022). The data that support our findings are available in Center for Research in Security Prices (CRSP), Compustat, Bloomberg, CRSP Mutual Fund, Thomson-Reuters, Factset, ExecuComp, Institutional Shareholder Services (ISS) and OptionMetrics databases.

We incorporate a measure of engagement which indicates the importance of the position in a firm to a particular ETF. This is of key importance in regard to the incentives for that institutional investor to engage in the corporate governance affairs of that firm (Lewellen & Lewellen, 2022). Specifically, our measure focuses on the concentration of each ETF's portfolio which influences the resources that each ETF can allocate to each constituent firm in that portfolio. Additionally, we adjust this measure by the ownership of that ETF in each of its constituent firm which reflects the magnitude of the impact of engagement by that ETF in that firm. As this new measure with two layers differentiates from the simple ownership variable used in previous work, it would not be surprising to expect different results with new insights.

For our new measure of engagement, we need to consider two aspects: (1) how concentrated is the portfolio of the ETFs investing in those firms? (2) what is the percentage of ownership of the ETFs in each of those firms? The former question deals with the level of attention that an ETF can give to each firm in its portfolio, while the latter question focuses on the level of potential impact that ETF's involvement can have on the firm. The full effect of the ETFs on firm performance can only be assessed if both aspects are studied together. Consider the following cases: (1) an ETF with a very highly concentrated portfolio, but the ownership of that ETF in each of the firms in its portfolio is insignificantly small (close to zero). (2) An ETF with a very low portfolio concentration (i.e., highly diversified), but that ETF owns a significant portion of shares in each firm in its portfolio. In the first case, the ETF can engage with each firm in its portfolio more closely due to high portfolio concentration. But it cannot have a big impact on the firm as the ETF owns only a very small proportion of shares of that firm. In the second case, the ETF has high firm ownership, and thus, the potential for any engagement to make a substantial impact on the firm. But the ETF cannot be deeply involved in each firm in its portfolio due to the low portfolio concentration; hence, the engagement of the ETF is lacking and there will be no overall impact on the firm. These examples illustrate the importance of considering both portfolio concentration and ownership in our measure. In fact, preliminary analyses with *t*-tests reported in Supporting Information: Table IA.1[3] shows that firms held by ETFs with high portfolio concentration but low ownership (Case 1 above), for example, 'Vanguard Mega Cap Growth Index Fund', have lower firm performance on average compared to firms held by ETFs with high concentration and high ownership, for example, 'Goldman Sachs Real Estate Securities Fund'. Similarly, when ETFs with low portfolio concentration but high ownership (Case 2 above), for example, 'iShares Russell 2000 Index Fund', invest in firms, those companies have lower performance on average compared to firms held by ETFs with high concentration and high ownership. These examples demonstrate that both aspects of ETFs, i.e. portfolio concentration and ownership, are essential and associated with firm performance; hence, they need to be taken into consideration as we do with our novel measure.

The first step is to calculate ETFs portfolio concentration. There is quite a long history of different concentration measures being using in finance research. Some early papers and those concerned with individual investors, have simply looked at the number of stocks in a portfolio (Ivković et al., 2008; Upson et al., 1975). Rosenbluth (1961) and Marfels (1971) suggest the 'Rosenbluth Index', where security holdings are ranked in descending order by size with the *i*-th firm receiving rank *i*. While Hart (1971) proposes the 'Entropy Measure' to define the portfolio concentration, Marfels (1971) suggests the 'Exponential of Entropy Measure'.

[3]Supporting Information: Table IA.1 includes further descriptive statistics by ETFs concentration and ownership measures.

Horvath (1972) develops the 'Comprehensive Concentration Index' where the largest single portfolio holding plays an essential role. Other papers have looked at deviations from a benchmark index or some other portfolio representing a benchmark level of diversification (Borochin & Yang, 2017; Choi et al., 2017; Elliott et al., 2010). Maybe the most used measure for portfolio concentration is the 'Herfindahl Index' (Lovett, 1988; Polakoff & Durkin, 1981). Woerheide (1993) provides an extensive evaluation of many of these alternative measures and conclude that the Herfindahl Index is the simplest mathematical computation that can explain the degree of diversification of unevenly distributed portfolios as well as portfolio size does for evenly distributed portfolios.

In the strand of literature most relevant to our paper, which looks at the effect of the nature of investors on investment and company performance (e.g., Brands et al., 2005; Goldman et al., 2016; Huij & Derwall, 2011; Kacperczyk et al., 2005), concentration is measured at the industry level relative to some expected benchmark although Goldman et al. (2016) looks at a within-sector concentration index. These papers tend to look at active funds and primarily attribute the better performance of more concentrated funds to the fund managers successfully concentrating on their best investment ideas although this does not exclude the possibility of fund managers positively influencing corporate governance and firm performance. As we are examining passive investors the idea of a fund manager concentrating on particular investments to generate alpha is not really applicable so for measuring concentration, we use the popular and simple Herfindahl Index to construct our measure *ETFconcentration(H)* for each ETF in our sample per quarter:

$$ETFconcentration\,(H) = \sum_{i=1}^{N} W_i^2, \tag{1}$$

where W_i is the proportion of portfolio market value invested in security i, N is the total number of securities in the portfolio.[4]

As an alternative measure, we construct *ETFconcentration(R)* that is the value-weighted representation of each security in an ETF's portfolio per quarter. This measure represents the allocation of an ETF's attention (in %) to each firm in its portfolio considering the market value.

The next step in constructing our engagement measure is to incorporate an adjustment to our ETFs portfolio concentration measures, so that they can reflect the level of potential impact that ETFs engagement can have on the firm. The *ETFconcentration(H)* of each individual ETF that has invested in that particular firm is multiplied by the amount of shares that specific ETF has in that particular firm. This is summed up across all ETFs in that firm and scaled by the total amount of shares outstanding of that firm. This exercise is an adjustment for the weighted-average of ETFs ownership in that particular firm and it might be a more sensitive way to incorporate individual ETF's involvement. It is repeated for each firm per quarter and produces *W.A. ETFconcentration(H)* as an independent variable for our analysis. We obtain *W.A. ETFconcentration(R)* following the same steps.

For illustrative purposes, we provide some examples of firms in our sample representing each of the possible cases: high/low *ETFs ownership* and high/low *W.A. ETFconcentration(H)*. Particularly, Southern Copper Corporation (a mining company) and Continental Resources

[4]To eliminate any potential bias of a single security ETF portfolio, we exclude the observations with *ETFconcentration (H)* equals one. Our results are also robust to inclusion of these observations.

Inc. (a petroleum and gas firm) have low ETFs ownerships, 0.4% and 1.4%, respectively while Southern Copper Corporation has a higher *W.A. ETFconcentration(H)* (17.5%) and Continental Resources Inc. has a lower ETFs concentration of 2%. Focusing on companies with high ETFs ownership, Telephone and Data Systems Inc. (a telecommunication firm) with 13.8% and Interface Inc. (a flooring company) with 12%, the former firm has a higher ETFs concentration of 23.2% and *W.A. ETFconcentration(H)* for the latter one is only 4.7%.

We focus on two main measures as dependent variables to represent both the accounting and financial performance of firms. Return on Assets (*ROA*) is income before extraordinary items divided by total assets. Return on Equity (*ROE*) is net income over total common equity. These measures are constructed at the end of each quarter. These measures capture different aspects of firm performance and concentrate on the general profitability of a firm relative to its total assets and equity, respectively.

Following a vast literature on firm performance and institutional ownership (e.g., Bhagat & Bolton, 2008; Brown & Caylor, 2004; Duggal & Millar, 1999; Hu et al., 2022; Ryan & Wiggins, 2004; Tosun & Moon, 2023; Wahal, 1996), we control for various firm-level attributes that may influence firm performance. *Ln(Assets)* is the natural logarithm of book value of total assets. *Leverage* is debt in current liabilities plus long-term debt, scaled by book value of total assets. *CashRatio* is cash and short-term investments, scaled by book value of total assets. *TobinsQ* is the market value of equity plus book value of total assets minus book value of equity, scaled by book value of total assets. *OProfit* is net cash flow from operations, scaled by book value of total assets. *SalesGrowth* is the difference in net sales between the current and the previous quarter, scaled by net sales of previous quarter. *IndustrySigma* is industry cash flow risk, defined as the mean of the ratio of the standard deviations of cash flows to the book value of total assets over 10 quarters for firms in the same industry (by 2-digit SIC code). To ensure that our ETFs variables do not proxy for institutional ownership in general, we control for non-ETF institutional ownership through *Non-ETF IO*, that is, the percentage of shares owned by institutional investors other than the ETFs per quarter. As we investigate monitoring by ETFs in this study, we need to control for other factors through which the governance and monitoring can be provided. *IndepRatio* is the number of outsider directors on the board scaled by the board size. *Duality* is a dummy that is equal to one if the CEO is also the chairman of the board. *Ln(Tenure)* is the natural logarithm of the number of years the CEO has been in position. *CEOOwnership* is the fraction of total shares outstanding owned by the CEO.

2.3 | Methodology

The period for the main analysis is 2000–2019. We use the following panel fixed-effects (FE) OLS regression model to examine whether firm performance improves with the ETFs adjusted portfolio concentration through ETFs engagement and better governance:

$$Firm\ Performance_{i,t} = \alpha + \beta_1 W.A.\ ETFconcentration(H)_{i,t-1} + \Theta X_{i,t-1} + \eta_i + \phi_t + \varepsilon_{i,t}, \quad (2)$$

where $Firm\ Performance_{i,t}$ denotes two different variables for firm i in quarter t: *ROA* and *ROE*. $W.A.\ ETFconcentration(H)_{i,t-1}$ is the adjusted ETFs portfolio concentration measure for firm i in quarter $t-1$. $X_{i,t-1}$ is a vector of control variables (i.e., *Ln(Assets)*, *Leverage*, *CashRatio*, *TobinsQ*, *OProfit*, *SalesGrowth*, *IndustrySigma*, *Non-ETF IO, IndepRatio*, *Duality*, *Ln(Tenure)*,

and *CEOOwnership*). To control for any unobserved, time-invariant firm-specific factors that may influence firm *i*'s performance, we include firm-fixed effects in the model, indicated with η_i. ϕ_t denotes year-quarter fixed effects to control for any systematic variation in firm performance in any given quarter across all firms that are related to the macro-economy. All explanatory variables and controls are lagged by one quarter. Standard errors are clustered at the firm level.

3 | MAIN ANALYSIS

3.1 | Descriptive statistics

Table 1 reports summary statistics. The ETFs sample statistics provide further insight into the components of our 'weighted-average ETFs concentration measures'. ETFs firm ownership is about 5.8% on average while ETFs portfolio concentration has mean values of 0.046 and 0.064 for *ETFconcentration(H)* and *ETFconcentration(R)*, respectively. These measures have a right-skewed distribution suggesting that there are few ETFs in our sample with high portfolio concentration. Considering the firm sample statistics, the average levels for ETFs' weighted-average portfolio concentration, that is, *W.A. ETFconcentration(H)* and *W.A. ETFconcentration (R)*, are 0.052 and 0.023, respectively. Similarly, the right-skewed distribution indicates that the sample includes few firms invested in by the ETFs with very high portfolio concentration.[5] The firm performance measures are positive, on average. Particularly, they are 0.013 and 0.027 for *ROA* and *ROE*, respectively. An average firm in our sample has a total asset value of $6.986 billion. On average, firms have leverage ratio, cash ratio, and sales growth of 22%, 15.3% and 3%, respectively. About 72.1% of their boards consist of outsider directors. The average tenure of their CEOs is 8.5 years, and, on average, they own about 1.9% of the firms they manage.

3.2 | Main results

Table 2 presents the results from the main analyses. In Columns I and II, where we focus on *ROA*, there are statistically significant and positive estimates for *W.A. ETFconcentration(H)* and *W.A. ETFconcentration(R)*. Specifically, *ROA* improves by 0.07% (0.013×0.055) and 0.09% (0.029×0.031) when *W.A. ETFconcentration(H)* and *W.A. ETFconcentration(R)* increases by one-standard-deviation, that is, 5.5% and 3.1%, respectively. Similarly in Columns III and IV, for *ROE*, there are statistically significant and positive estimates for *W.A. ETFconcentration(H)* and *W.A. ETFconcentration(R)*. *ROE* jumps by about 0.22% (0.039×0.055) and 0.30% (0.096×0.031) when both concentration measures increase by one-standard-deviation. Overall, these findings confirm that higher adjusted ETFs portfolio concentration is associated with improved firm performance after controlling for firm characteristics and corporate governance.

Voting and other issues for governance in firms may be made at the ETFs' fund-family level. To address this further, we identify the fund families and construct our 'weighted-average ETFs

[5]Many ETFs track indexes, and these indexes form widely diversified portfolios. Therefore, one may argue that all ETFs contained in the sample should exhibit little portfolio concentration. This is not a concern for this study because high standard deviation values for our concentration measures indicate that ETFs in the sample have substantial differences in portfolio concentration.

TABLE 1 Descriptive statistics.

This table reports the descriptive statistics for the main variables. The sample contains firm-quarter observations for firms that are held by the ETFs. The time span for this study is between 2000 and 2019. There are 60,624 observations across 1867 firms in this study. *W.A. ETFconcentration(H)* is ETFs portfolio concentration calculated by the Herfindhal Index and adjusted by the weighted-average of ETFs ownership in those particular firms. *W.A. ETFconcentration(R)* is a similar measure that uses the value-weighted representation of each security in in ETF's portfolio, instead. *ROA* is income before extraordinary items over total assets. *ROE* is net income over total common equity. *Ln(Assets)* is the natural logarithm of book value of total assets. *Leverage* is debt in current liabilities plus long-term debt, scaled by book value of total assets. *CashRatio* is cash and short-term investments, scaled by book value of total assets. *TobinsQ* is the market value of equity plus book value of total assets minus book value of equity, scaled by book value of total assets. *OProfit* is net cash flow from operations, scaled by book value of total assets. *SalesGrowth* is the quarterly growth rate in net sales. *IndustrySigma* is industry cash flow risk, defined as the mean of the ratio of the standard deviations of cash flows to the book value of total assets over 10 quarters for firms in the same industry (by 2-digit SIC code). *Non-ETF IO* is the percentage of shares owned by institutional investors other than ETFs per quarter. *IndepRatio* is the number of outsider directors on the board scaled by the board size. *Duality* is a dummy that is equal to one if the CEO is also the chairman of the board. *Ln(Tenure)* is the natural logarithm of the number of years the CEO has been in position. *CEOOwnership* is the fraction of total shares outstanding owned by the CEO. For detailed definitions for these variables, see Table A1.

	Mean	Std. Dev.	p25	Median	p75
ETFs Firm Ownership	0.058	0.044	0.022	0.051	0.086
ETFconcentration(H)	0.046	0.084	0.009	0.026	0.049
ETFconcentration(R)	0.064	0.140	0.001	0.010	0.058
W.A. ETFconcentration(H)	0.052	0.055	0.011	0.034	0.073
W.A. ETFconcentration(R)	0.023	0.031	0.004	0.012	0.028
ROA	0.013	0.029	0.006	0.015	0.025
ROE	0.027	0.135	0.012	0.031	0.052
Total Assets (in $ bil)	6.986	13.339	0.693	1.874	5.678
Leverage	0.220	0.177	0.060	0.210	0.332
CashRatio	0.153	0.162	0.033	0.092	0.219
Tobins*Q*	2.115	1.316	1.296	1.716	2.460
OProfit	0.028	0.035	0.011	0.027	0.044
SalesGrowth	0.030	0.184	−0.041	0.020	0.083
IndustrySigma	0.091	0.219	0.016	0.032	0.071
Non-ETF IO	0.783	0.159	0.695	0.813	0.903
IndepRatio	0.721	0.209	0.667	0.778	0.875
Duality	0.581	0.493	0	1	1
Tenure	8.580	7.325	3	6	11
CEOOwnership	0.019	0.050	0.001	0.003	0.011

TABLE 2 Effect of ETFs portfolio concentration on firm performance.

This table reports estimates for *W.A. ETFconcentration(H)* and *W.A. ETFconcentration(R)* along with *Ln(Assets)*, *Leverage*, *CashRatio*, *TobinsQ*, *OProfit*, *SalesGrowth*, *IndustrySigma*, *Non-ETF IO*, *IndepRatio*, *Duality*, *Ln (Tenure)*, and *CEOOwnership* as control variables. Dependent variables are ROA and ROE. An intercept is included in the regression but is not reported in this table. Variable definitions are given in Table A1. All explanatory variables and controls are lagged by one quarter. Year-quarter and firm fixed effects are included. Standard errors are given in parentheses. The *** indicates statistical significance at the 1% level.

	ROA		**ROE**	
	I	**II**	**III**	**IV**
W.A. ETFconcentration(H)	0.013**		0.039**	
	(0.006)		(0.020)	
W.A. ETFconcentration(R)		0.029***		0.096*
		(0.010)		(0.058)
Ln(Assets)	−0.001	−0.001	0.001	0.002
	(0.001)	(0.001)	(0.002)	(0.004)
Leverage	−0.012***	−0.013***	−0.045***	−0.046**
	(0.002)	(0.002)	(0.006)	(0.020)
CashRatio	−0.001	−0.001	−0.016**	−0.015
	(0.003)	(0.003)	(0.007)	(0.012)
TobinsQ	0.007***	0.007***	0.012***	0.012***
	(0.000)	(0.000)	(0.001)	(0.002)
OProfit	0.041***	0.040***	0.016	0.012
	(0.012)	(0.012)	(0.018)	(0.048)
SalesGrowth	0.011***	0.011***	0.023***	0.023***
	(0.002)	(0.002)	(0.003)	(0.006)
IndustrySigma	−0.001	−0.001	−0.002	−0.002
	(0.001)	(0.001)	(0.003)	(0.004)
Non-ETF IO	0.007**	0.007**	0.026***	0.032***
	(0.003)	(0.003)	(0.008)	(0.013)
IndepRatio	0.003	0.003	0.009	0.013
	(0.002)	(0.002)	(0.007)	(0.008)
Duality	−0.001*	−0.001*	−0.004**	−0.004*
	(0.001)	(0.001)	(0.002)	(0.003)
Ln(Tenure)	0.001***	0.001***	0.002**	0.002*
	(0.000)	(0.000)	(0.001)	(0.001)
CEOOwnership	−0.011	−0.010	0.010	0.012
	(0.008)	(0.008)	(0.022)	(0.023)

(Continues)

TABLE 2 (Continued)

	ROA		ROE	
	I	II	III	IV
Time and firm FE	Yes	Yes	Yes	Yes
Adj. R^2	0.102	0.104	0.014	0.013
Observations	60,609	60,609	60,589	60,589

concentration' measure at the family level. That is, both the concentration and the weighted-average adjustments are done at the fund family-firm level. We rerun our main model in Equation (2) using these new measures. Statistically significant and robust results in Supporting Information: Table IA.2 confirms the positive relation between firm performance and ETFs concentration in those constituent firms even at the fund-family level.

In untabulated analyses, we exclude *IndepRatio*, *Duality*, *Ln(Tenure)* and *CEOOwnership* and replicate our tests using this larger sample. Further, we control for industry concentration and also run subsample tests for competitive industries. Moreover, we conduct the main analyses with net profit margin as an alternative proxy for firm performance and also use the natural logarithm of our ETFs concentration measures. To address that Vanguard ETFs are share classes of the index fund, we identify 38 Vanguard ETFs in our sample and reconstruct our ETFs concentration measures excluding those Vanguard ETFs in a similar way to Elton et al. (2019) and Dannhauser and Hoseinzade (2022). Our original results remain robust in all these cases.

3.3 | Channel: Governance

We have illustrated that firms have better performance when the ETFs investing in those firms have more concentrated portfolios. Now, we examine the potential channel for this relationship. We hypothesize that the ETFs can engage more with the firms in their portfolios if their portfolios are more concentrated. Easley et al. (2021) also argue that ETFs have become more active with their concentrated portfolios in recent decades. Subsequently, these active ETFs can provide better governance and monitoring in those firms as their portfolios are less diversified and hence, their attention can be more focused. Particularly, the ETFs can exercise 'voice' and use their ownership stake and ability to vote to monitor firms. Shareholder voting at annual meetings is a fundamental duty of shareholders (Easterbrook & Fischel, 1983), and votes on management proposals can be a proxy for increased monitoring and better governance by the ETFs. The positive link between investors and firms' corporate governance is well-documented in the literature by many papers including Miletkov et al. (2014), Appel et al. (2016) and Bubb and Catan (2022).[6]

To test our hypothesis, we use four variables to represent governance, monitoring, and engagement by the ETFs. Our first measure is the *Entrenchment Index (E-Index)* following

[6]Bubb and Catan (2022) show that mutual funds engage in various types of voting and they are very much involved in governance of the firms they invest in. They also document that the largest ETFs investment advisors, that is, Black Rock, Vanguard and State Street, vote similarly. This is consistent with our method of aggregating across all ETFs when constructing our concentration measures.

Bebchuk et al. (2009). This index denotes the level of CEO entrenchment and thus, the quality of monitoring and governance in that firm. Next, we define *InsiderVolume*, as the total volume of insider trading. Dai et al. (2016) analyze insider trading to measure how well corporate governance is carried out in firms. We follow Appel et al. (2016) and Schmidt and Fahlenbrach (2017) and use shareholder proposals that are found to be affected by the ETFs. In particular, we construct *Proposals(G-Index)* and *Proposals(Governance)*, as the total number of shareholder proposals on G-Index and overall governance, respectively. To simplify the interpretation of our results, we multiply *E-Index* and *InsiderVolume* by minus one. We use Thomson-Reuters and Institutional Shareholder Services (ISS) databases for data on insider trading and the remaining governance variables, respectively. We use our main model in Equation (2) and regress *E-Index, InsiderVolume, Proposals(G-Index)* and *Proposals(Governance)* on *W.A. ETFconcentration(H)* and *W.A. ETFconcentration(R)* along with control variables, time and firm fixed effects. All explanatory variables and controls are lagged by one quarter. Standard errors are clustered at the firm level.

The results are provided in Table 3. The findings support our hypothesis. They indicate that there is less entrenchment by the CEOs and less insider trading in firms when the ETFs investing in those firms have more concentrated portfolios. Furthermore, those firms have higher G-Index and overall governance-related shareholder proposals as adjusted ETFs portfolio concentration increases. Specifically, *E-Index* and *InsiderVolume* decrease by 6.49% (-1.180×0.055) and 2.67% (-0.486×0.055)[7] while *Proposals(G-Index)* and *Proposals(Governance)* jump about 1.94% (0.352×0.055) and 4.06% (0.738×0.055) when *W.A. ETFconcentration (H)* increases by a one-standard-deviation, that is, 5.5%. We have similar results using *W.A. ETFconcentration(R)*. In further analyses, we examine whether there is a higher likelihood of the respective proposals being accepted (positive voting outcome) when ETFs portfolio concentration is higher. We regress the proportion of shareholder proposals on G-Index and governance that are voted and passed, on *W.A. ETFconcentration(H)* and *W.A. ETFconcentration(R)* along with controls and fixed effects. Statistically significant and positive results in Table A2, indicate that higher adjusted ETFs portfolio concentration is associated with larger proportion of passed proposals on G-Index and governance that implies ETFs concentration indeed affects the firms' governance. Overall, these findings suggest that higher weighted-average ETFs portfolio concentration is associated with higher engagement by those ETFs and better governance and monitoring in firms they invest. Therefore, the relationship between better firm performance and the ETFs with more concentrated portfolios can be explained through improved governance by more involved ETFs.

In line with the literature, suggestive evidence in our paper indicates that the ETFs use 'voice' as the disciplining mechanism to improve governance in firms. However, the ETFs might also use other common strategies, such as 'walk' or 'exit' (Edmans, 2009; Edmans et al., 2013), as alternative mechanisms. To test this hypothesis, we identify cases where the ETFs divest, and we run the main model in Equation (2) while interacting ETFs portfolio concentration measures with a dummy variable indicating ETFs divestment. Table 4 provides statistically insignificant results for *W.A. ETFconcentration(H) x Divest* and *W.A. ETFconcentration(R) x Divest* which suggests firm performance is not associated with ETFs portfolio concentration through 'exit' strategies of the ETFs. Interestingly, the significant and positive

[7]We multiply the positive coefficients of *E-Index* and *InsiderVolume* by minus one for simpler interpretation.

TABLE 3 Analysis on the governance channel for the relation between ETFs portfolio concentration and firm performance.

This table reports estimates for *W.A. ETFconcentration(H) and W.A. ETFconcentration(R)* along with control variables. Dependent variables are *E-Index*, following Bebchuk et al. (2009); *InsiderVolume*, as total volume of insider trading; *Proposals(G-Index)* and *(Governance)*, as total number of shareholder proposals on G-Index and governance, respectively. An intercept is included in the regression but is not reported in this table. Variable definitions are given in Table A1. All explanatory variables and controls are lagged by one quarter. Year-quarter and firm fixed effects are included. Standard errors are given in parentheses. The *** indicates statistical significance at the 1% level.

	E-Index		InsiderVolume		Proposals (G-Index)		Proposals (Governance)	
	I	II	III	IV	V	VI	VII	VIII
W.A. ETFconcentration(H)	1.180***		0.486***		0.352***		0.738***	
	(0.274)		(0.113)		(0.111)		(0.204)	
W.A. ETFconcentration(R)		0.959**		0.855***		0.971***		1.928***
		(0.412)		(0.325)		(0.251)		(0.662)
Ln(Assets)	−0.048	−0.042	0.068***	0.067***	0.049***	0.046**	0.129***	0.108***
	(0.034)	(0.035)	(0.019)	(0.019)	(0.019)	(0.019)	(0.029)	(0.030)
Leverage	−0.005	0.004	−0.010	−0.007	0.008	0.010	0.011	0.021
	(0.098)	(0.099)	(0.047)	(0.046)	(0.045)	(0.044)	(0.099)	(0.100)
CashRatio	0.146	0.157	−0.072	−0.070	−0.017	−0.019	0.053	0.031
	(0.101)	(0.101)	(0.060)	(0.059)	(0.042)	(0.041)	(0.078)	(0.075)
TobinsQ	0.006	0.005	−0.027***	−0.029***	−0.010	−0.012*	−0.031**	−0.034***
	(0.011)	(0.012)	(0.008)	(0.009)	(0.006)	(0.006)	(0.013)	(0.012)
OProfit	−0.091	−0.096	−0.069	−0.071	−0.004	−0.005	0.060	0.069
	(0.108)	(0.108)	(0.099)	(0.098)	(0.079)	(0.079)	(0.111)	(0.111)
SalesGrowth	0.013	0.012	−0.061***	−0.061***	−0.018***	−0.018***	−0.047***	−0.044***
	(0.009)	(0.009)	(0.013)	(0.013)	(0.005)	(0.005)	(0.008)	(0.008)

TABLE 3 (Continued)

	E-Index		InsiderVolume		Proposals (G-Index)		Proposals (Governance)	
	I	II	III	IV	V	VI	VII	VIII
IndustrySigma	0.028	0.028	0.002	0.001	0.022	0.022	0.019	0.016
	(0.036)	(0.036)	(0.014)	(0.014)	(0.024)	(0.024)	(0.041)	(0.041)
Non-ETF IO	−0.171	−0.169	−0.027	−0.024	−0.129**	−0.125**	−0.264**	−0.301***
	(0.122)	(0.122)	(0.061)	(0.061)	(0.054)	(0.053)	(0.106)	(0.107)
IndepRatio	−0.237**	−0.237**	0.151***	0.151***	0.061	0.062	0.224**	0.176*
	(0.101)	(0.101)	(0.044)	(0.044)	(0.047)	(0.047)	(0.096)	(0.094)
Duality	0.008	0.007	0.006	0.005	0.015	0.014	0.019	0.024
	(0.025)	(0.025)	(0.012)	(0.012)	(0.010)	(0.010)	(0.018)	(0.018)
Ln(Tenure)	0.019	0.019	−0.006	−0.006	−0.007	−0.007	−0.009	−0.010
	(0.012)	(0.012)	(0.007)	(0.007)	(0.006)	(0.006)	(0.012)	(0.012)
CEOOwnership	0.952**	0.973**	0.143	0.151	0.024	0.028	0.124	0.124
	(0.396)	(0.397)	(0.170)	(0.170)	(0.103)	(0.103)	(0.168)	(0.168)
Time and firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.330	0.328	0.030	0.031	0.051	0.053	0.066	0.071
Observations	51,142	51,142	60,624	60,624	60,624	60,624	60,624	60,624

TABLE 4 Analysis on 'Walk (Exit)' strategy as governance channel for the relation between ETFs portfolio concentration and firm performance.

This table reports estimates from the regressions of *ROA* and *ROE* on *Divest, W.A. ETFconcentration(H)*, *W.A. ETFconcentration(R)*, *W.A. ETFconcentration(H)* × *Divest*, and *W.A. ETFconcentration(R)* × *Divest* along with control variables. Dependent variables are *ROA* and *ROE*. Divest is a proxy for ETFs' divestment to represent their 'walk' or 'exit' strategy. It is a dummy that is equal to one if ETFs ownership in a firm decreases from $t-1$ to t. The main explanatory variables, that is, *W.A. ETFconcentration(H)* × *Divest* and *W.A. ETFconcentration (R)* × *Divest*, are the interaction between *Divest* and ETFs portfolio concentration measures. Variable definitions are given in Table A1. All explanatory variables and controls are lagged by one quarter. Year-quarter and firm fixed effects are included. Standard errors are given in parentheses. The *** indicates statistical significance at the 1% level.

	ROA		ROE	
	I	II	III	IV
W.A. ETFconcentration(H) × Divest	−0.004		0.003	
	−0.005		−0.023	
W.A. ETFconcentration(H)	0.010*		0.036*	
	−0.006		−0.021	
W.A. ETFconcentration(R) × Divest		0.005		−0.022
		−0.008		−0.04
W.A. ETFconcentration(R)		0.023**		0.076**
		−0.010		−0.031
Divest	0.001	−0.001	−0.001	−0.001
	−0.001	−0.001	−0.002	−0.002
Constant	−0.007	0.001	−0.024	−0.028*
	(0.006)	(0.006)	(0.015)	(0.015)
Controls	Yes	Yes	Yes	Yes
Time and firm FE	Yes	Yes	Yes	Yes
Adj. R^2	0.101	0.107	0.014	0.014
Observations	60,609	60,609	60,589	60,589

coefficients for stand-alone ETFs concentration measures imply that other possible governance channels, for example, 'voice', can be the link to higher firm performance.

It is important to show that the ETFs concentration is working through the governance channel rather than another one. Bhojraj et al. (2020) and Huang et al. (2021) document that more concentrated ETFs help bring fundamental information into prices. Given learning through information efficiency is a plausible channel when ETFs are considered (Antoniou et al., 2023), we conduct further analyses to see if ETFs concentration leads to greater information efficiency in firms. First, we construct measures for stock price informativeness as in Chen et al. (2007) and Ferreira et al. (2011). *Non-Synchronicity* and *Ln(Non-Synchronicity Ratio)* are one minus R^2 and $\text{Ln}((1-R^2)/R^2)$, respectively, where R^2 is obtained from regressing daily returns in the market and industry index over quarter t. Additionally, we calculate

Amihud as the quarterly average of the daily ratio of a stock's absolute return to its dollar volume (multiplied by 10^6) as in Ferreira et al. (2011). We regress these variables on weighted-average ETFs concentration measures along with appropriate control variables following those papers. Statistically insignificant results in Table 5 indicate that there is no relation between ETFs portfolio concentration and information efficiency in their constituent firms. Therefore, it is safe to conclude that stock price informativeness is not the channel to explain the relation between firm performance and ETFs concentration.

4 | ENDOGENEITY CONCERNS

One could argue that our results are driven by reverse causality where high firm performance signals the firm's quality and thus, the ETFs concentrate more on such firms in their portfolios. Moreover, unobserved heterogeneity might be another issue. Some unobserved firm characteristics may drive both the ETFs' investment decisions in the firm and the firms' performance. These concerns are quite unlikely to be problems for our study. First, our measure of weighted-average ETFs portfolio concentration is not a simple variable that focuses only on the ETFs but also incorporates their ownership in firms in comparison to other traders' investments in those firms. Second, we control for firm and quarter fixed effects, as well as, using lagged explanatory and control variables in our model specification. Nevertheless, we address these endogeneity concerns using several identification strategies to highlight the causal effect of adjusted ETFs portfolio concentration on firm performance. We use three different instrumental variable models.

4.1 | IV model with iShares ETFs

In this IV model, our instrument is based on the acquisition of Barclays Global Investors (BGI) and its iShares unit by BlackRock at the end of 2009. At that time, Barclays sold BGI to strengthen its position and avoid a bailout by the United Kingdom government. BlackRock had a stronger brand name, more specialized workforce, and better distribution channels (Zou, 2019)[8]; hence, it could attract capital into its funds, and the assets under management for iShares ETFs increased by 19% after the acquisition (Blackrock, 2010). This acquisition resulted in a significant increase in inflows for iShares ETFs relative to the ETFs not belonging to iShares. Hence, this event suggests that companies owned by iShares ETFs experienced an exogenous increase in ETFs ownership after 2009.

Our mean comparison *t*-test analysis in Panel A of Supporting Information: Table IA.3, confirms a statistically significant difference in iShare ETFs' ownership before and after BlackRock's acquisition. Particularly, there is about a 160%[9] increase in ETFs ownership in firms. In Panel A, we also document a statistically significant decrease in the number of firms

[8]Zou (2019) uses this event to examine whether ETFs ownership contributes to an overvaluation of the stocks included in ETFs baskets.

[9]For example, B&G Foods Inc.(a foods holding company), AZZ Inc. (a metal coating firm), and Cerus Corporation (a biotechnology firm) experience an increase of 174%, 43%, and 210% in ETFs ownership, respectively, comparing ±2 years around the Blackrock acquisition.

TABLE 5 Testing informational efficiency as a channel for the relation between ETFs portfolio concentration and firm performance.

This table reports estimates for *W.A. ETFconcentration(H) and W.A. ETFconcentration(R)* along with control variables. Dependent variables represent stock price informativeness. As in Chen et al. (2007) and Ferreira et al. (2011), *Non-Synchronicity* and *Ln(Non-Synchronicity Ratio)* as one minus R^2 and Ln $((1-R^2)/R^2)$, respectively, in Columns I through IV, where R^2 is obtained from regressing daily returns onin the market and industry index over quarter *t*. As in Ferreira et al. (2011), *Amihud* as the quarterly average of the daily ratio of a stock's absolute return to its dollar volume (multiplied by 10^6) in Columns V and VI. An intercept is included in the regression, but it is not reported in this table. We include the necessary controls. *BM* is the book value of equity (shareholder equity plus deferred taxes) over the market value of equity (common shares outstanding multiplied by the closing price); *Ln(MktValue)* is common shares outstanding multiplied by the closing price; *Return* is the quarterly average of daily stock returns; *Turnover* is the quarterly average of the daily share turnover; *Return Volatility* is the quarterly standard deviation of daily returns; and *Beta*, the estimation coefficient of the market premium, is calculated based on the capital asset pricing model formula, where risk-adjusted daily stock returns are regressed on risk-adjusted market returns (market premium) per quarter. All explanatory variables and controls are lagged by one quarter. Year–quarter and firm FE are included. Standard errors are given in parentheses. The *** indicates statistical significance at the 1% level.

	Nonsynchronicity		**Ln(Nonsynchronicity ratio)**		**Amihud**	
	I	**II**	**III**	**IV**	**V**	**VI**
W.A. ETFconcentration(H)	0.032		0.127		0.150	
	(0.040)		(0.189)		(0.150)	
W.A. ETFconcentration(R)		0.044		0.379		0.073
		(0.060)		(0.290)		(0.249)
BM	−0.003	−0.007	−0.004	−0.005	−0.120***	−0.119***
	(0.007)	(0.007)	(0.035)	(0.035)	(0.023)	(0.023)
Ln(MktValue)	−0.035***	−0.037***	−0.163***	−0.165***	−0.382***	−0.381***
	(0.004)	(0.004)	(0.018)	(0.018)	(0.015)	(0.015)
Return	0.202	0.413*	1.057	0.929	0.488	0.450
	(0.232)	(0.229)	(1.249)	(1.251)	(0.669)	(0.667)
Turnover	0.000	0.000	0.001	0.001	−0.046***	−0.046***
	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Return volatility	−0.643***	−0.522***	−3.340***	−3.353***	6.694***	6.691***
	(0.150)	(0.148)	(0.766)	(0.766)	(0.464)	(0.464)
Beta	−4.921***	−4.989***	−26.900***	−26.905***	1.180*	1.206*
	(0.218)	(0.217)	(1.160)	(1.162)	(0.646)	(0.645)
Non-ETF IO	−0.017	−0.030*	−0.128	−0.126	−0.356***	−0.357***
	(0.017)	(0.017)	(0.088)	(0.088)	(0.066)	(0.066)
Time and firm FE	Yes	Yes	Yes	Yes	Yes	Yes

TABLE 5 (Continued)

	Nonsynchronicity		Ln(Nonsynchronicity ratio)		Amihud	
	I	II	III	IV	V	VI
Adj. R^2	0.282	0.281	0.271	0.271	0.703	0.703
Observations	53,222	53,222	51,515	51,515	53,222	53,222

in iShare ETFs' portfolios. Considering that iShares ETFs have less firms in their portfolios and more net assets under management after the BlackRock acquisition (Blackrock, 2010), their portfolios become more concentrated, by definition. Regardless of whether the excess resource is allocated among the firms in their portfolios evenly or not, the Herfindahl Index will increase which translates as higher portfolio concentration for those ETFs. Since iShare ETFs' ownership also increases exogenously in the firms after the acquisition of iShares, the overall concentration measures in our analyses shall increase. Thus, our instrument is *Post* × *iShares*, where *Post* is a dummy that equals 1 after 2009, and *iShares* is a dummy that flags whether a specific company is owned by iShares ETFs.[10] The exclusion restriction is likely to be satisfied, since there is no economic reason to expect firms owned by iShares ETFs to have different corporate firm policies after 2009, relative to firms not owned by iShares. Further, the shock (Blackrock-BGI merger) should not have any *direct* impact on the ROA/ROE of the constituent firms, as this acquisition happened at the fund-level, not the constituent firm-level. Moreover, if the shock had not happened, both groups (firms owned by iShares vs. firms not owned by iShares) would have had the same market and business conditions. In other words, they all would have subjected to the same 'channels' linked to ROA/ROE. Therefore, the only additional channel now is the BlackRock event that happens to the treatment group but not the control group. Moreover, in untabulated analysis, we observe that the fundamental firm characteristics including size, leverage, growth and firm age, do not differ between firms with and without iShares ETF ownership, and the firms in these two groups operate in similar industries.

To provide further evidence for *Post* × *iShares* as a valid instrument, we regress *ETFconcentration(H), ETFconcentration(R)*, and *ETF Ownership* on *Post* × *iShares* using the same model structure in Equation (2). We examine whether our instrument is associated with ETFs concentration and ownership measures and that link is positive and significant. The statistically significant and positive results in Panel B of Supporting Information: Table IA.3, confirm that iShares ETFs have more concentrated portfolios and their ownership in firms increases after the BlackRock acquisition. It serves as additional evidence that this exogenous event can be used as an instrument in our analyses. Further,

[10]We lose only about 23% of our ETF-quarter observations when we use only iShares ETFs. Further, the predetermined iShares ownership from before the Blackrock merger is used, similar to Azar et al. (2017). Further, we acknowledge that 2009 and the period afterward include the global financial crisis and events such as the Dodd–Frank Wall Street Reform and Consumer Protection Act, which can potentially influence the model design and, thus, the outcome. Bearing this limitation in mind, we trust this should not be a problem for the exercise because these events would affect all firms without exception and would not result in firm differentiation that would intervene with the design of the analysis through iShares ETFs.

the exclusion restriction is likely to be satisfied because there is no economic reason to expect that companies owned by iShares ETFs should have different performance after 2009 and compared to performance of other firms without iShares ETFs ownership. The first stage model of our IV estimation is shown below:

$$ETFs\ Portfolio\ Concentration_{i,t} = \alpha + \beta_1 Instrument_{i,t-1} + \Theta X_{i,t-1} + \eta_i + \phi_t + \varepsilon_{i,t}, \quad (3)$$

where *ETFs Portfolio Concentration* represents *W.A. ETFconcentration(H)* and *W.A. ETFconcentration(R)*; Instrument is Post × iShares. We include controls as in Equation (2). Post and iShares are not included in the model individually as they are subsumed by firm- and time-fixed effects, respectively. In the second stage, we estimate the model below using the same controls, and replacing *ETFs Portfolio Concentration* with the fitted values from the model in Equation (3):

$$Firm\ Performance_{i,t} = \alpha + \beta_1 \widehat{ETFs\ Portfolio\ Concentration}_{i,t-1} + \Theta X_{i,t-1} + \eta_i + \phi_t + \varepsilon_{i,t}. \quad (4)$$

Firm Performance represents *ROA* and *ROE*. Similar to our previous analyses, all left hand-side variables are lagged by one quarter, and we include time and firm fixed effects in all regressions in both stages.

Table 6 reports the results using *Post × iShares* as the IV. In Columns I and II, we provide the first-stage regression results using *W.A. ETFconcentration(H)* and *W.A. ETFconcentration(R)* as the dependent variables, respectively. The coefficients on *Post × iShares* are significant and positive at 1% level. This indicates that ETFs portfolio concentration increases after 2009 for firms owned by iShares ETFs. Columns III–VI present the findings from the second-stage estimation. *W.A. ETFconcentration(H)* and *W.A. ETFconcentration(R)* have consistently positive and statistically significant coefficients for all firm performance variables. In particular, *ROA* and *ROE* increase by 1.04% (0.189 × 0.055) and 3.58% (0.651 × 0.055), respectively when *W.A. ETFconcentration(H)* increases by a one-standard-deviation, that is, 5.5%.[11] We have similar results using *W.A. ETFconcentration(R)*. Overall, these findings suggest that the ETFs with higher portfolio concentration improve the performance of firms by providing better governance and monitoring in those firms in which they invest.[12]

[11]The IV estimates are larger than their OLS counterparts (i.e., for all three IVs, namely: BlackRock, Distracted ETFs and Russell reconstitution). This could be due to: (i) an omitted variable that could be negatively correlated with ETFs concentration measure. This omitted variable would lead to a downward bias in the OLS estimation and (ii) an estimation issue where the IV is estimating the local average treatment effect (ATE) while OLS is estimating the ATE over the entire population. This issue has been well-explained by Ben-David et al. (2018) while using the Russell 1000/2000 reconstitution.

[12]One can argue that the effect of the merger on iShares ETF concentration may be significant only for a shorter period surrounding the exogenous event. In untabulated analyses, we limit the period to ±5 years around the BlackRock acquisition and obtain robust results similar to our original findings. In Supporting Information: Table IA.4, we conduct a placebo test where we shift the *Post* indicator to 2005 and obtain insignificant results. This supports the plausibility of our method.

TABLE 6 Instrumental variable model with BlackRock's purchase of iShares.

This table reports results from instrumental variable regression analysis with *ROA and ROE* as dependent variables in the second-stage model. Columns I and II show the coefficient estimates on the instrument (*Post* × *iShares*) from the first-stage regressions, where the dependent variables are *W.A. ETFconcentration(H) and W.A. ETFconcentration(R)*, respectively. *Post* is a dummy variable that is equal to one for quarters starting year 2010, and zero otherwise. *iShares* is a dummy variable that is equal to one for firms that have ownership by iShares, and zero otherwise. *Post* and *iShares* are not included in the model individually as they are subsumed by firm and time fixed effects, respectively. The controls are included in the model. Variable definitions are given in Table A1. All explanatory variables and controls are lagged by one quarter. Year-quarter and firm fixed effects are included. Standard errors are given in parentheses. For weak and under-identification tests, Cragg-Donald Wald and Anderson Canonical Correlation Likelihood Ratio statistics are shown, respectively. The *** indicates statistical significance at the 1% level.

	First stage results		**Second stage results**			
	W.A. ETFconcentration(H)	**W.A. ETFconcentration(R)**	**ROA**		**ROE**	
	I	**II**	**III**	**IV**	**V**	**VI**
Post × iShares	0.057***	0.026***				
	(0.02)	(0.009)				
W.A. ETFconcentration(H) - Fitted			0.189***		0.651***	
			(0.031)		(0.124)	
W.A. ETFconcentration(R) - Fitted				0.487***		1.401***
				(0.110)		(0.436)
Ln(Assets)	0.011***	0.007***	−0.004***	−0.005***	−0.012**	−0.013**
	(0.002)	(0.001)	(0.001)	(0.001)	(0.005)	(0.006)
Leverage	0.006	0.001	−0.013***	−0.012***	−0.043**	−0.040*
	(0.004)	(0.003)	(0.002)	(0.002)	(0.021)	(0.021)
CashRatio	0.018***	0.008**	−0.005	−0.005	−0.026**	−0.025**
	(0.004)	(0.004)	(0.003)	(0.004)	(0.012)	(0.012)
Tobins*Q*	0.002***	0.003***	0.007***	0.006***	0.011***	0.009***
	(0.000)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
OProfit	−0.006	−0.001	0.039***	0.040***	0.013	0.013
	(0.005)	(0.004)	(0.013)	(0.012)	(0.049)	(0.049)
SalesGrowth	−0.001	0.001	0.011***	0.012***	0.026***	0.027***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.006)	(0.006)

	First Stage Results		Second Stage Results			
	W.A. ETFconcentration(H)	W.A. ETFconcentration(R)	ROA		ROE	
	I	II	III	IV	V	VI
IndustrySigma	0.0004	0.001	−0.001	−0.001	−0.003	−0.003
	(0.001)	(0.001)	(0.001)	(0.001)	(0.004)	(0.004)
Non-ETF IO	−0.006	−0.006*	0.007**	0.009***	0.022	0.028**
	(0.005)	(0.004)	(0.003)	(0.003)	(0.014)	(0.013)
IndepRatio	−0.003	−0.002	0.003	0.003*	0.008	0.010
	(0.004)	(0.003)	(0.003)	(0.002)	(0.009)	(0.009)
Duality	−0.0004	0.001	−0.002	−0.001**	−0.003	−0.004
	(0.001)	(0.001)	(0.002)	(0.001)	(0.003)	(0.003)
Ln(Tenure)	−0.001	−0.001	0.001***	0.001***	0.002*	0.002*
	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)
CEOOwnership	0.022	0.004	−0.014	−0.012	0.007	0.015
	(0.015)	(0.011)	(0.009)	(0.009)	(0.027)	(0.027)
Constant	−0.054***	−0.037***	−0.004	0.005	−0.003	0.021
	(0.013)	(0.010)	(0.007)	(0.007)	(0.035)	(0.039)
Time and firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Weak instrument test	120.316	53.217				
Under-identification test	48.120	47.180				
Adj. R^2	0.591	0.337	0.108	0.106	0.015	0.015
Observations	60,624	60,624	57,667	57,667	57,661	57,661

4.2 | IV model with distracted ETFs

We construct a second IV model to exploit exogenous variation in ETFs monitoring capacity. Kempf et al. (2016) construct an exogenous measure of 'investor distraction' at the firm-level that reflects the current monitoring capacity of a firm's investors. They argue that distracted shareholders shift attention away from a firm which loosens monitoring constraints. Following their study, we identify distracted ETFs by considering constituent firms in their portfolios. If an ETF holds shares of even one firm operating in an industry with shock, we classify that ETF as 'distracted' because the ETF's attention moves away from other stocks in its portfolio to stock (s) with industry shock. As in Barber and Odean (2008), an industry has a shock if it has the highest or lowest return across all 12 Fama-French industries in a given quarter. Subsequently, we expect that a company has an exogenous decrease in ETFs concentration if it is not in an industry with shock and one or more ETFs investing in that firm are distracted. Hence, our instrument in the first stage regression is a dummy variable, that is, *Distracted*, that is equal to one for firms without an industry shock but having ownership by distracted ETFs, and zero

otherwise. We use the same model structure explained in Equations (3) and (4) to conduct this second IV analysis. We believe that the exclusion restriction for our instrument is satisfied because it is unreasonable to expect a firm's own performance to be influenced *directly* by another unrelated firm's industry shock.[13]

Table 7 gives the results with *Distracted* as the IV. The coefficients on *Distracted* are significant and negative at 1% and 5% levels in Columns I and II. This implies that ETFs portfolio concentration decreases for firms owned by distracted ETFs. Columns III–VI present the findings from the second-stage estimation where *W.A. ETFconcentration(H)* and *W.A. ETFconcentration(R)* have positive and statistically significant coefficients. Specifically, *ROA* and *ROE* increase by 1.12% (0.204×0.055) and 3.63% (0.659×0.055), respectively when *W.A. ETFconcentration(H)* increases by a one-standard-deviation, that is, 5.5%. We have similar results using *W.A. ETFconcentration(R)*. Overall, these results are consistent with our original findings on the positive relation between ETFs portfolio concentration and firm performance.

4.3 | IV model with Russell 1000/2000 reconstitution

In this third IV model, we use the variation in ETFs ownership that occurs around the cut-off point used to construct the Russell 1000 and Russell 2000 indexes (Appel et al., 2016; Ben-David et al., 2018; Fich et al., 2015). The Russell 1000 includes the 1000 US stocks with the largest market capitalization and the Russell 2000 comprises the next largest 2000 stocks. The index assignment should directly impact the extent of ETFs ownership of a stock as the portfolio weights assigned to each stock within an index are value-weighted. Particularly, the weights of the top stocks in the Russell 2000 are much larger than those of the bottom stocks in the Russell 1000. This phenomenon should serve as a clean instrument for ETFs adjusted concentration in firms because ETFs ownership is embedded in our weighted average concentration measure. Specifically, we expect that a company has an exogenous increase (decrease) in ETFs investment, and therefore adjusted ETFs concentration, if it switches to the Russell 2000 (1000) Index because the weight of that firm in the portfolio increases (decreases), leading to higher ETFs ownership and thus, higher ETFs adjusted portfolio concentration.

We carry out a two-stage least-squares estimation and repeat the analysis for two separate samples of stocks: (i) those that in May, before index reconstitution, are in the Russell 1000, and (ii) those that are in the Russell 2000. As bandwidth, we consider 300 stocks on each side of the cut-off point.[14] In the first stage, we instrument ETFs portfolio concentration with an indicator for the stocks switching index membership in June and staying in that index until May of next year. For the Russell 1000 sample, the indicator variable, that is, *Switch2000*, flags stocks that switch to Russell 2000, and vice versa for the Russell 2000 sample. We use the same model structure explained in Equations (3) and (4) to conduct this IV analysis. We argue that the exclusion restriction for our instrument is likely to be satisfied, because there is no reason to

[13]We want to highlight that we are not excluding any other channels which may still affect corporate outcome. Instead, we show that Distracted ETFs is the only different channel between treatment and control groups, and hence, it drives our results in this IV setup.

[14]Appel et al. (2016) use 250 stocks as the only bandwidth while Ben-David et al. (2018) include several other bandwidths, that is, 100, 200, 300, 400 and 500. To be consistent with both papers, we pick 300 as the bandwidth. In Supporting Information: Table IA.4, we conduct a placebo test where we change the cut-off boundary for Russell index constituency from 1000 to 1250 and obtain insignificant results. This supports the plausibility of our method.

TABLE 7 Instrumental variable model with distracted ETFs.

This table reports results from instrumental variable regression analysis with *ROA and ROE* as dependent variables in the second-stage model. Columns I and II show the coefficient estimates on the instrument *Distracted* from the first-stage regressions, where the dependent variables are *W.A. ETFconcentration(H) and W.A. ETFconcentration(R)*, respectively. *Distracted* is a dummy variable that is equal to one for firms that don't have an industry shock but have ownership by distracted ETFs, and zero otherwise. The controls are included in the model. Variable definitions are given in Table A1. All explanatory variables and controls are lagged by one quarter. Year-quarter and firm fixed effects are included. Standard errors are given in parentheses. For weak and under-identification tests, Cragg-Donald Wald and Anderson Canonical Correlation Likelihood Ratio statistics are shown, respectively. The *** indicates statistical significance at the 1% level.

	First stage results		**Second stage results**			
	W.A. ETFconcentration (H)	**W.A. ETFconcentration (R)**	**ROA**		**ROE**	
	I	**II**	**III**	**IV**	**V**	**VI**
Distracted	−0.001***	−0.001**				
	(0.000)	(0.000)				
W.A. ETFconcentration(H) - Fitted			0.204***		0.659***	
			(0.031)		(0.124)	
W.A. ETFconcentration(R) - Fitted				0.681***		1.877***
				(0.117)		(0.440)
Ln(Assets)	0.012***	0.007***	−0.004***	−0.006***	−0.011**	−0.016***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.005)	(0.006)
Leverage	0.008**	0.001	−0.014***	−0.013***	−0.045**	−0.040*
	(0.004)	(0.003)	(0.002)	(0.002)	(0.021)	(0.021)
CashRatio	0.019***	0.009**	−0.005	−0.006*	−0.025**	−0.028**
	(0.004)	(0.004)	(0.003)	(0.004)	(0.012)	(0.012)
Tobins*Q*	0.003***	0.003***	0.007***	0.006***	0.011***	0.007***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
OProfit	−0.012***	−0.001	0.039***	0.037***	0.011	0.006
	(0.005)	(0.004)	(0.012)	(0.012)	(0.049)	(0.049)
SalesGrowth	−0.002***	0.001	0.011***	0.012***	0.026***	0.027***
	(0.001)	(0.001)	(0.002)	(0.001)	(0.006)	(0.006)

	First stage results		Second stage results			
	W.A. ETFconcentration (H)	W.A. ETFconcentration (R)	ROA		ROE	
	I	II	III	IV	V	VI
IndustrySigma	0.001	0.001	−0.001	−0.001	−0.003	−0.003
	(0.001)	(0.001)	(0.001)	(0.001)	(0.004)	(0.004)
Non-ETF IO	−0.001	−0.005	0.007**	0.009***	0.023*	0.030**
	(0.006)	(0.004)	(0.003)	(0.003)	(0.013)	(0.014)
IndepRatio	−0.001	−0.002	0.003	0.004*	0.007	0.010
	(0.004)	(0.003)	(0.002)	(0.002)	(0.009)	(0.009)
Duality	−0.001	0.001	−0.001	−0.001**	−0.003	−0.004
	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)
Ln(Tenure)	−0.001	−0.001	0.001***	0.001***	0.002*	0.003**
	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)
CEOOwnership	0.022	0.004	−0.014	−0.013	0.007	0.014
	(0.016)	(0.011)	(0.001)	(0.009)	(0.027)	(0.027)
Constant	−0.023*	−0.027***	0.004	0.016**	0.019	0.050
	(0.013)	(0.009)	(0.007)	(0.007)	(0.037)	(0.041)
Time and firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Weak instrument test	61.788	150.607				
Under-identification test	9.885	70.633				
Adj. R^2	0.554	0.333	0.104	0.104	0.014	0.014
Observations	60,624	60,624	57,667	57,667	57,661	57,661

expect that inclusion in the Russell 1000/2000 index should *directly* affect those firms' *accounting performance*, after restricting the sample to stocks close to the Russell 1000/2000 cutoff and controlling for the relevant factors. Further, previous literature (i.e., Boone & White, 2015) argues that firms switching from Russell 1000 to 2000 and vice versa, have similar characteristics as they are still near the index cut-off point. The differences only become substantial in the top of the Russell 2000 and bottom of Russell 1000. So, when a firm switches between Russell 1000 and 2000 samples, its firm characteristics do not change considerably from those that do not and this does not create a differentiation between those two groups of firms with the only difference being the ETFs ownership.

Table 8 reports the findings for stocks that belong to Russell 1000 before index reconstitution (Panel A) and stocks belonging to Russell 2000 before index reconstitution (Panel B). The first-stage regression results in Columns I and II are significant and positive (negative) for *Switch2000 (Switch1000)* which indicate that ETFs portfolio concentration increases (decreases) in firms that descend to the Russell 2000 index (ascend to the Russell 1000 index). Columns III–VI present the

findings from the second-stage estimation. We find that for both independent variables, *W.A. ETFconcentration(H)-fitted* and *W.A. ETFconcentration(R)-fitted*, the coefficient estimates remain consistently positive and statistically significant, supporting the positive relationship between ETFs portfolio concentration and firm performance. For instance, in Panel A, a 5.5%, that is, one standard deviation, increase in *W.A. ETFconcentration(H)* is associated with an increase in ROA and ROE by 0.79% (0.144×0.055) and 2.04% (0.371×0.055), respectively.

After 2006, Russell Indices do not have a single firm size cutoff anymore that designates index constituency. To avoid any issues with the subsequent 'banding' approach, Appel et al. (2016) end their sample in 2006. Chang et al. (2015) use a specific approach that accommodates banding. Particularly, they use market capitalization to compute certain percentiles through which they determine the implied cutoffs for every year in which banding is used. Following these studies, we address possible banding concerns by ending our sample in 2006 and also calculating implied cutoffs. In Supporting Information: Table IA.5, we obtain robust results giving support to our original method and findings. In the Russell index setup, firms on either side of the cutoff may have similar characteristics. Thus, firm fixed effects may absorb too much variation in the data. We address this concern in untabulated analyses where we drop firm FE, as well as, replace it with industry FE, and obtain robust findings.

Our instruments in all three main IV models are not subject to the issues of weak instruments and under-identification. To address these issues, we first conduct Cragg-Donald's Wald *F*-test for weak instruments and find that all *F* statistics are above the Stock-Yogo critical *F*-statistic value of 19.93: Our instruments pass the weak instrument test. Second, we perform Anderson's canonical correlation χ^2 test for under-identification. The χ^2 values are statistically significant at the 1% level which suggests that canonical correlation is different from zero and under-identification is not an issue in our analyses.

5 | ROBUSTNESS AND FURTHER ANALYSES

5.1 | Other institutional investors

The ETFs are not the only institutional traders investing in firms. Active, index and closed-end mutual funds also own shares in the companies in which ETFs invest. Thus, they may also influence firm performance through their portfolio concentration. Although we control for the aggregate 'non-ETF' ownership in our analyses,[15] it can provide further insight to include them individually in the model. Following Ben-David et al. (2018), we calculate separately the ownership by active open-ended mutual funds, index open-end mutual funds, and closed-end mutual funds, that is, *Active Ownership*, *Index Ownership* and *Closed-End Ownership*. We repeat the main analysis controlling for these variables explicitly. The findings in Table 9 show that even after controlling for ownership by other institutional investors separately, higher ETFs portfolio concentration is still associated with an increase in firm performance.

We provide further robustness for our main findings despite the other non-ETF institutional holders. Nevertheless, it is important to examine any differences between

[15]We obtain robust results in Supporting Information: Table IA.6 when we also include ETFs ownership as a separate control in our analysis.

TABLE 8 Instrumental variable model with the Russell 1000/2000 reconstitution.

This table reports results from instrumental variable regression analysis with *ROA* and *ROE* as dependent variables in the second-stage model. In Panel A (Panel B), Columns I and II show the coefficient estimates on the instrument Switch2000 (Switch1000) from the first-stage regressions, where the dependent variables are *W.A. ETFconcentration(H)* and *W.A. ETFconcentration(R)*, respectively. *Switch2000 (Switch1000)* is an indicator variable flags stocks that switch to the Russell 2000 (1000). The controls are included in the model. Regressions include an intercept but is not reported in this table. Variable definitions are given in Table A1. All explanatory variables and controls are lagged by one quarter. Year-quarter and firm fixed effects are included. Standard errors are given in parentheses. For weak and under-identification tests, Cragg-Donald Wald and Anderson Canonical Correlation Likelihood Ratio statistics are shown, respectively. The *** indicates statistical significance at the 1% level.

Panel A: Switch to Russell 2000 with Bandwidth: ±300						
	First stage results		**Second stage results**			
	W.A. ETFconcentration(H)	**W.A. ETFconcentration(R)**	**ROA**		**ROE**	
	I	**II**	**III**	**IV**	**V**	**VI**
Switch2000	0.004**	0.002**				
	(0.002)	(0.001)				
W.A. ETFconcentration			0.144**		0.371*	
(H) - Fitted			(0.065)		(0.209)	
W.A. ETFconcentration				0.259**		1.031**
(R) - Fitted				(0.131)		(0.498)
Controls, time and firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Weak instrument test	287.427	101.440				
Under-identification test	86.534	57.225				
Adj. R^2	0.459	0.207	0.109	0.097	0.035	0.025
Observations	17,970	17,970	17,576	17,576	17,576	17,576

Panel B: Switch to Russell 1000 with Bandwidth: ±300						
	First stage results		Second stage results			
	W.A. ETFconcentration(H)	W.A. ETFconcentration(R)	ROA		ROE	
	I	II	III	IV	V	VI
Switch1000	−0.003**	−0.003***				
	(0.002)	(0.001)				
W.A. ETFconcentration			0.340***		0.848**	
(H) - Fitted			(0.112)		(0.342)	
W.A. ETFconcentration				0.629***		1.634**
(R) - Fitted				(0.192)		(0.718)
Controls, time and firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Weak instrument test	287.468	101.381				
Under-identification test	86.554	57.360				
Adj. R^2	0.445	0.196	0.105	0.108	0.032	0.032
Observations	17,970	17,970	17,576	17,576	17,576	17,576

TABLE 9 Ownership by other institutional investors.

This table reports estimates for *W.A. ETFconcentration(H) and W.A. ETFconcentration(R)*. Dependent variables are *ROA and ROE*. An intercept is included in the model but is not reported in this table. Following Ben-David et al. (2018), we calculate separately the ownership by active open-end mutual funds, index open-end mutual funds, and closed-end mutual funds, that is, *Active Ownership*, *Index Ownership* and *Closed-End Ownership*. These additional controls are included in the model along with the original control variables. Variable definitions are given in Table A1. All explanatory variables and controls are lagged by one quarter. Year-quarter and firm fixed effects are included. Standard errors are given in parentheses. The *** indicates statistical significance at the 1% level.

	ROA		**ROE**	
	I	**II**	**III**	**IV**
W.A. ETFconcentration(H)	0.019***		0.068*	
	(0.007)		(0.040)	
W.A. ETFconcentration(R)		0.046***		0.098***
		(0.011)		(0.032)
Active ownership	0.836	0.945	3.095	3.238**
	(0.635)	(0.640)	(3.561)	(1.438)
Index ownership	−0.925	−1.042	−3.158	−3.282**
	(0.635)	(0.641)	(3.553)	(1.439)
Closed-end ownership	−0.008	−0.012	−0.420	−0.417*
	(0.079)	(0.079)	(0.542)	(0.240)
Controls	Yes	Yes	Yes	Yes
Time and firm FE	Yes	Yes	Yes	Yes
Adj. R^2	0.102	0.104	0.014	0.013
Observations	60,609	60,609	60,589	60,589

ETFs and these other types of institutional equity holders. Therefore, we calculate the weighted-average concentration measure for active open-ended mutual funds, index open-end mutual funds, and closed-end mutual funds; and we research the effect of their portfolio concentration on constituent firms' performance. This exercise would provide a comparison to our findings with ETFs. We replicate the main analyses with *W.A. Activeconcentration(H), W.A. Indexconcentration(H), W.A. Closed-Endconcentration (H), W.A. Activeconcentration(R), W.A. Indexconcentration(R)*, and *W.A. Closed-Endconcentration(R)*. Table A3 reveals that none of these other types of institutional investors have a consistently significant impact on performance of their constituent firms, contrary to the significantly positive association between ETFs portfolio concentration and firm performance. These findings confirm that ETFs are different than other passive or index funds in contributing to the performance of their constituent firms. Further, our original results are not driven by pure ETFs ownership nor by the change in focus from any mutual funds to ETFs.

TABLE 10 Industry analysis.

This table reports estimates for *W.A. ETFconcentration(H) and W.A. ETFconcentration(R)* regarding different industries. Dependent variables are *ROA* and *ROE* in Panels A and B, respectively. The exercise is repeated using three different industry groups, constructed using Fama-French (48) industry classification: *Health, Services, and Computer & Electronics*. These are top three industries in the sample and correspond to 49% of the overall sample. Variable definitions are given in Table A1. The controls are included in the model. All explanatory variables and controls are lagged by one quarter. Year-quarter and firm fixed effects are included. Standard errors are given in parentheses. The *** indicates statistical significance at the 1% level.

Panel A: Analyses for ROA						
	Health		**Services**		**Comp & Electronics**	
	I	**II**	**III**	**IV**	**V**	**VI**
W.A. ETFconcentration(H)	0.041*		0.030**		0.061***	
	(0.022)		(0.013)		(0.022)	
W.A. ETFconcentration(R)		0.058*		0.078***		0.137***
		(0.031)		(0.019)		(0.043)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Time and firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.119	0.124	0.096	0.097	0.180	0.181
Observations	8256	8256	8177	8177	7345	7345
Panel B: Analyses for ROE						
	Health		**Services**		**Comp & Electronics**	
	I	**II**	**III**	**IV**	**V**	**VI**
W.A. ETFconcentration(H)	0.099*		0.129**		0.153**	
	(0.059)		(0.066)		(0.062)	
W.A. ETFconcentration(R)		0.143**		0.369***		0.057
		(0.072)		(0.123)		(0.106)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Time and firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.028	0.028	0.024	0.025	0.041	0.034
Observations	8256	8256	8177	8177	7345	7345

5.2 | Industry analysis

Our sample includes firms operating in various industries. One potential concern might be that the findings are driven by particular industries only. To mitigate this issue, we focus on the top three industries in the sample constructed using Fama-French (48) industry classification: *Health, Services*, and *Computer & Electronics*. These industries correspond to 49% of the overall sample. We run the main model in Equation (2) for these three industry groups.

Table 10 gives the results for *ROA* and *ROE*. In Panels A and B, the coefficients of *W.A. ETFconcentration(H)* and *W.A. ETFconcentration(R)* are statistically significant and positive across different industries. These findings confirm that our original results are not driven by certain industries only. Further, the relation between improved firm performance and the ETFs with higher portfolio concentration is robust across various industries.

5.3 | Persistency of the ETFs portfolio concentration and firm performance

Given our analyses are at quarterly frequency, we investigate further whether the effect of the ETFs portfolio concentration is persistent on firm performance. We run our main analyses using ROA and ROE in quarters $t+1$, $t+2$, and $t+3$ while all right-hand-side variables are in quarter *t-1*. Results in Panel A of Table A4 indicate that the impact of ETFs concentration on firm performance is indeed sticky and it lasts up to two (in some cases three) quarters. Although the magnitude and the significance of this effect diminish in future quarters, it is persistent. The next natural question is whether this prolonged improvement in firm performance influences our original results. To examine that, we control for past firm performance in our main models. Panel B in Table A4 presents robust results that support our original findings even though we include ROA and ROE in quarters $t-1$ and $t-2$. Overall, we confirm that the effect on firm performance is persistent at quarterly frequency; nevertheless, it does not influence nor drive our main findings in the paper.

5.4 | Poorly governed firms

Consistent with Miletkov et al. (2014) and Appel et al. (2016), we evidence that the channel leading to improved firm performance is better governance and monitoring by the ETFs when their portfolios are less diversified and hence, they can engage more with those firms. If this is true, then firms in more vulnerable condition, for example, with a lack of good governance, should benefit more from the ETFs' increased involvement due to their more concentrated portfolios. To test this hypothesis further, we focus on two cases to represent firms with weak governance. The first measure is *InsiderVolume*, as the total volume of insider trading. Dai et al. (2016) suggest that poorly governed firms have high levels of insider trading due to exploitation of private information. The second measure is *Real Earnings Management (REM)*, as the abnormal values of reduction in cash flow from operations, following Roychowdhury (2006) and Cohen and Zarowin (2010). They argue that firms managing earnings upwards are likely to have unusually low cash flow from operations. We run the main model in Equation (2) for firms in the top quartile (Q4) of *InsiderVolume*, as well as in the bottom quartile (Q1) of *REM*.

Table A5 shows the results for *ROA* representing accounting-based performance. *W.A. ETFconcentration(H)* and *W.A. ETFconcentration(R)* have statistically significant and positive coefficients that are higher in magnitude than the ones in Table 2. Overall, these findings further confirm our hypothesis that improved governance and monitoring is likely the channel leading to better firm performance when the ETFs can pay more attention to firms in their portfolios as they are more concentrated. Their effect on firm performance is more pronounced for firms lacking strong governance.

5.5 | Firms with financial constraints

Chae et al. (2009) and La Porta et al. (2000) argue that firms with financial constraints need better corporate governance to establish a reputation for moderation in expropriating shareholders. Due to their constrained state, those firms usually have lower performance, for example, lower ROE, sales, and profits. Hence, financially constrained firms should benefit more from improved governance and monitoring by the ETFs through higher adjusted portfolio concentration compared to companies that do not face financial difficulties. To test this hypothesis, we determine financially constrained firms and run the main model in Equation (2) using those companies. Following Aktas et al. (2019), we determine firms that have no credit rating information on their debt or have their long-term debt associated with a speculative grade rating. As a second method to verify firms with financial constraints, we pick firms with their WW-Index above the median, suggested by Whited and Wu (2006).

The results in Table A6 confirm that the coefficients of *W.A. ETFconcentration(H)* and *W.A. ETFconcentration(R)* have larger coefficients than the ones in Table 2. On the whole, these findings support the hypothesis that financially constrained firms can improve their performance even more than the other firms when the ETFs have less diversified portfolios and hence give more attention to those firms in which they invest and provide stronger governance.

5.6 | Level of concentration

We show firm performance can be improved when the ETFs investing in those firms have highly concentrated portfolios. An alternative way to test this relation is to examine firms having ETFs with high and low levels of portfolio concentration, and see whether our results hold for the high concentration group. For this exercise, we construct two groups where high (low) concentration refers to observations above (below) the median of *W.A. ETFconcentration (H)*. The same process is repeated using *W.A. ETFconcentration(R)* as the benchmark measure. We replicate the model in Equation (2) using these groups. Table A7 gives significant and positive results for *ROA* and *ROE* considering the high concentration group while there is no significant relation between firm performance and the ETFs with low portfolio concentration. Overall, these findings are consistent with our previous findings and show their robustness.

5.7 | Forward-looking stock prices

One can argue that stock prices are forward looking, and hence, they can lead to higher concentration in those firms by ETFs which happen to be better governed. To test the robustness of our findings against this plausible scenario, we create two subsamples based on firms' stock returns. Particularly, firms are allocated into a Low (High) group if in quarter $t-1$ they have returns below (above) the cross-sectional stock return median value. So, if in quarter t we still obtain similar regression results from both subgroups, this could confirm that forward-looking stock prices do not have any influence on the relationship between firm performance and ETFs concentration. Results in Table A8 are statistically significant and positive for both groups, and they are consistent with our original findings. Therefore, we can conclude that forward-looking stock prices (although plausible) do not explain our findings in this paper.

5.8 | Financial crises

Financially unstable periods can be difficult for firms with, inter alia, the possibility of unfavorable market conditions, difficulties in generating funds, loss of sales, less profits, and drop in share prices. These are the times when strong corporate governance can particularly benefit firms in making operational and policy decisions. To examine whether ETFs engagement due to higher concentration on firms in their portfolios can improve performance in those firms through better governance in such troubled times, we run our main model in Equation (2) only for the period of the 2000–2002 stock market crash associated with the dot-com bubble and the 2007–2009 subprime mortgage crisis. In Table A9 of the Appendix, positive estimates for *W.A. ETFconcentration(H)* and *W.A. ETFconcentration (R)* are observed with larger coefficients than the corresponding ones in Table 2 for both performance measures. These findings indicate that firms indeed benefit from stronger governance by the ETFs with higher portfolio concentration and have better performance especially during financial crises.

6 | CONCLUSION

There are various studies on how investors' portfolio engagement is linked to its performance and that of the firms in the portfolio. However, this literature has not really kept up with the changing nature of investment particularly the increased popularity and role of ETFs in markets. ETFs have clearly different characteristics from traditional fund managers and have often been characterized as passive. In addition, previous work in this area has used the percentage of firms owned by investors which is a rather simplistic measure of engagement. In this paper, we investigate these matters further. We ask whether firm performance can be improved by more engaged ETFs. We develop a new measure of engagement which uses a weighted-average concentration measure which incorporates the combined effect of the concentration of the portfolios of the ETFs investing in a firm and the ownership of the firm by those ETFs. Our new measure captures the incentives for ETFs to engage more with firms through 'voice'. Further, we research whether the channel leading to better firm performance is improved governance and monitoring by more involved ETFs with more concentrated portfolios.

Our results show strong evidence that the performance of firms increases when ETFs have more concentrated portfolios in those firms. These findings remain consistent after addressing endogeneity concerns using the IV approach. Further analyses indicate that the channel to higher firm performance is likely to be corporate governance. The results imply that as the ETFs have more concentrated portfolios, the governance and monitoring in those invested firms improve significantly. In addition, we conduct several tests to verify the robustness of our main findings. We control for persistency of the effect by ETFs portfolio concentration on firm performance. We rerun our main model for different levels of concentration. We control for ownership by other institutional investors explicitly while we test the possible influence by forward looking stock prices. We also study the top three industries, that constitute about 49% of our sample, individually. Our results remain robust after these tests. Further, we examine whether the relation between improved firm performance and higher ETFs portfolio concentration is more pronounced for firms that can benefit from stronger governance. We replicate our main analyses for firms with financial

constraints and weak corporate governance, as well as for periods of financial crises. We find supportive evidence for that hypothesis.

This study highlights the importance of the ETFs for firms while building a link between financial institutions' investment strategies and the performance of the firms in which they invest. It may guide ETFs in forming their portfolios regarding the degree of involvement they desire to have in firms. This research has implications not only for funds but also for regulators and policy makers who can rely on our findings while designing regulations for ETFs. They need to factor in the positive impact of ETFs on the performance of firms when they develop further policies on ETFs.

Our study provides various avenues for future research. Scholars can explore the *activeness* of ETFs in their engagement with constituent firms more deeply. Further, material differences in ETFs' involvement in corporate governance due to ETF activeness can be examined at a more granular level considering smart beta ETFs and other more active ETFs. As thematic funds are created, sometimes to follow the latest investor trends and increase ownership in firms accordingly, future studies can investigate their relation to firm performance. Moreover, an intriguing research idea would be to focus on comparisons between ETFs that use representative sampling to match their index benchmarks as opposed to full replication. The flexibility of representative sampling might help ETFs to monitor their constituent firms more easily. Furthermore, other factors that may influence the effects of ETFs portfolio concentration, for example, ETFs managers' capacities and fund staffing, can be studied. A larger ETF may hold more stocks to accommodate its capital, but its size may also allow the fund to hire additional analysts to research the fund's holdings and consider its corporate governance in more depth. In future research, the validity of our findings in this paper can be investigated further through these various analyses.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available in Center for Research in Security Prices (CRSP), Compustat, Bloomberg, CRSP Mutual Fund, Thomson-Reuters, Factset, ExecuComp, Institutional Shareholder Services (ISS) and OptionMetrics databases.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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APPENDIX

TABLE A1 Definition of variables.

Variables	Description
W.A. ETFconcentration(H)	*ETFconcentration(H)* is ETFs portfolio concentration per quarter that is calculated by the Herfindhal Index. *ETFconcentration(H)* of each individual ETF that has invested in that particular firm is multiplied by the amount of shares that specific ETF has in that particular firm. This is summed up across all ETFs in that firm and scaled by the total amount of shares outstanding of that firm. This exercise is an adjustment for weighted-average of ETFs ownership in that particular firm. It is repeated for each firm per quarter and produces *W.A. ETFconcentration(H)*.
W.A. ETFconcentration(R)	*ETFconcentration(R)* is ETFs portfolio concentration per quarter that is the value-weighted representation of each security in ETF's portfolio. *ETFconcentration(R)* of each individual ETF that has invested in that particular firm is multiplied by the amount of shares that specific ETF has in that particular firm. This is summed up across all ETFs in that firm and scaled by the total amount of shares outstanding of that firm. This exercise is an adjustment for the weighted-average of ETFs ownership in that particular firm. It is repeated for each firm per quarter and produces *W.A. ETFconcentration(R)*.
ROA	Income before extraordinary items over total assets.
ROE	Net income over total common equity.
Ln(Assets)	The natural logarithm of book value of total assets.
Leverage	Debt in current liabilities plus long-term debt, scaled by book value of total assets.
CashRatio	Cash and short-term investments, scaled by book value of total assets.
TobinsQ	The market value of equity plus book value of total assets minus book value of equity, scaled by book value of total assets.
OProfit	Net cash flow from operations, scaled by book value of total assets.
SalesGrowth	The quarterly growth rate (%) in net sales.
IndustrySigma	Industry cash flow risk, defined as the mean of the ratio of the standard deviations of cash flows to the total assets over 10 quarters for firms in the same industry (by 2-digit SIC code).
Non-ETF IO	Percentage of shares owned by institutional investors other than ETFs at the end of that quarter.
IndepRatio	The number of outsider directors on the board scaled by the board size.
Duality	A dummy that is equal to one if the CEO is also the chairman of the board.
Ln(Tenure)	The natural logarithm of the number of years the CEO has been in position.
CEOOwnership	The fraction of total shares outstanding owned by the CEO.

TABLE A2 Further analysis on the governance channel with passed proposals.

This table reports regression estimates for *W.A. ETFconcentration(H) and W.A. ETFconcentration(R)* along with control variables. An intercept is included in the regression, but is not reported in this table for brevity. Dependent variables are *Passed Proposals(G-Index)* and *(Governance)*, as the proportion of shareholder proposals on G-Index and governance that are voted and passed. Variable definitions are given in Table A1. All explanatory variables and controls are lagged by one quarter. Year-quarter and firm fixed effects are included. Standard errors are given in parentheses. The *** indicates statistical significance at the 1% level.

	Passed Proposals(G-Index)		**Passed Proposals(Governance)**	
	I	**II**	**III**	**IV**
W.A. ETFconcentration(H)	0.080***		0.095***	
	(0.030)		(0.037)	
W.A. ETFconcentration(R)		0.037**		0.041**
		(0.019)		(0.021)
Controls	Yes	Yes	Yes	Yes
Time and firm FE	Yes	Yes	Yes	Yes
Adj. R^2	0.012	0.010	0.012	0.010
Observations	60,624	60,624	60,624	60,624

TABLE A3 Analyses with other institutional investors' portfolio concentration.

This table reports estimates for *W.A. Activeconcentration (H)*, *W.A. Indexconcentration(H)*, *W.A. Closed-Endconcentration(H)*, *W.A. Activeconcentration(R)*, *W.A. Indexconcentration(R)* and *W.A. Closed-Endconcentration(R)*. Dependent variables are *ROA* and *ROE*. An intercept is included in the model but is not reported in this table. We follow the same procedure for 'weighted-average ETFs portfolio concentration' but we use active open-end mutual funds, index open-end mutual funds and closed-end mutual funds instead, as identified by Ben-David et al. (2018). This exercise produces the independent variables in this model. The original control variables are included in the model. All explanatory variables and controls are lagged by one quarter. Year-quarter and firm fixed effects are included. Standard errors are given in parentheses. The *** indicates statistical significance at the 1% level.

	ROA						ROE					
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
W.A. Activeconcentration(H)	0.006						0.094					
	(0.013)						(0.071)					
W.A. Indexconcentration(H)		0.330						1.177				
		(0.228)						(1.202)				
W.A. Closed-Endconcentration(H)			0.020						0.065			
			(0.014)						(0.068)			
W.A. Activeconcentration(R)				0.046**						0.205		
				(0.017)						(0.129)		
W.A. Indexconcentration(R)					0.490						1.659	
					(0.299)						(1.445)	
W.A. Closed-Endconcentration(R)						0.032*						0.171
						(0.017)						(0.107)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time and firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.105	0.107	0.107	0.105	0.104	0.104	0.016	0.016	0.016	0.016	0.016	0.016
Observations	60,609	60,609	60,609	60,609	60,609	60,609	60,589	60,589	60,589	60,589	60,589	60,589

TABLE A4 Analyses on persistency of the effect by ETFs portfolio concentration on firm performance.

This table reports estimates for *W.A. ETFconcentration(H)* and *W.A. ETFconcentration(R)*. Dependent variables are *ROA* and *ROE*. An intercept is included in the regression but is not reported in this table. In Panel A, future firm performance for *t, t + 1, t + 2*, and *t + 3* are examined, where *t* represents year-quarter. In Panel B, potential impact by past firm performance values is controlled. Variable definitions are given in Table A1. The original control variables are included in the model. All explanatory variables and controls are lagged by one quarter. Year-quarter and firm fixed effects are included. Standard errors are given in parentheses. The *** indicates statistical significance at the 1% level.

Panel A: Persistency of the effect by ETFs portfolio concentration on firm performance

	ROA							
	t	***t* + 1**	***t* + 2**	***t* + 3**	***t***	***t* + 1**	***t* + 2**	***t* + 3**
	I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**
W.A. ETFconcentration(H)	0.013**	0.010*	0.008	0.008				
	(0.006)	(0.006)	(0.005)	(0.006)				
W.A. ETFconcentration(R)					0.030***	0.030***	0.029***	0.020**
					(0.010)	(0.010)	(0.010)	(0.010)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time and firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.102	0.090	0.088	0.099	0.104	0.090	0.089	0.099
Observations	60,609	58,675	57,272	55,668	60,609	58,675	57,272	55,668
	ROE							
	t	***t* + 1**	***t* + 2**	***t* + 3**	***t***	***t* + 1**	***t* + 2**	***t* + 3**
	I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**
W.A. ETFconcentration(H)	0.039**	0.035*	0.022	0.028				
	(0.020)	(0.021)	(0.021)	(0.021)				
W.A. ETFconcentration(R)					0.096*	0.105*	0.093*	0.079
					(0.058)	(0.057)	(0.055)	(0.061)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time and firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.014	0.012	0.014	0.016	0.013	0.012	0.014	0.016
Observations	60,589	58,657	57,253	55,657	60,589	58,657	57,253	55,657

Panel B: Analyses with past performance measures as controls				
	ROA_t		ROE_t	
	I	II	III	IV
W.A. ETFconcentration $(H)_{t-1}$	0.012***		0.036**	
	(0.005)		(0.018)	
W.A. ETFconcentration $(R)_{t-1}$		0.025***		0.074*
		(0.008)		(0.043)
ROA_{t-1}	0.148***	0.150***		
	(0.013)	(0.013)		
ROA_{t-2}	0.106***	0.105***		
	(0.011)	(0.011)		
ROE_{t-1}			0.263***	0.264***
			(0.004)	(0.029)
ROE_{t-2}			0.077***	0.077***
			(0.004)	(0.022)
Controls	Yes	Yes	Yes	Yes
Time and firm FE	Yes	Yes	Yes	Yes
Adj. R^2	0.136	0.137	0.096	0.096
Observations	59,381	59,381	59,353	59,353

TABLE A5 Analyses with poorly governed firms.

This table reports estimates for *W.A. ETFconcentration(H)* and *W.A. ETFconcentration(R)*. Dependent variables are *ROA* (Columns I to IV) and *ROE* (Columns V–VIII). The exercise is repeated using two different groups, each representing weak governance: Top quartile (Q4) of *InsiderVolume*, as total volume of insider trading; Bottom quartile (Q1) of Real Earnings Management (*REM*), as the abnormal values of reduction in cash flow from operations, following Roychowdhury (2006) and Cohen and Zarowin (2010). Variable definitions are given in Table A1. The controls are included in the model. All explanatory variables and controls are lagged by one quarter. Year-quarter and firm fixed effects are included. Standard errors are given in parentheses. The *** indicates statistical significance at the 1% level.

	ROA				**ROE**			
	Insider Volume (Q4)	**REM (Q1)**	**Insider Volume (Q4)**	**REM (Q1)**	**Insider Volume (Q4)**	**REM (Q1)**	**Insider Volume (Q4)**	**REM (Q1)**
	I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**
W.A. ETFconcentration(H)	0.021**	0.021**			0.097**	0.106*		
	(0.009)	(0.011)			(0.041)	(0.063)		
W.A. ETFconcentration(R)			0.042***	0.048***			0.169**	0.120**
			(0.014)	(0.018)			(0.071)	(0.058)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time and firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.114	0.139	0.119	0.140	0.018	0.013	0.019	0.011
Observations	14,554	14818	14,554	14818	14,554	14818	14,554	14818

TABLE A6 Analyses with financially constrained firms.

This table reports estimates for *W.A. ETFconcentration(H) and W.A. ETFconcentration(R)*. Dependent variables are *ROA* and *ROE*. The exercise is repeated using two different groups, each representing firms with financial constraints. Following Aktas et al. (2019), first group includes firms that have no credit rating information on the debt or their long-term debt is associated with a speculative grade rating. Following Whited and Wu (2006), second group includes firms with their WW-Index above the median. Variable definitions are given in Table A1. The controls are included in the model. All explanatory variables and controls are lagged by one quarter. Year-quarter and firm fixed effects are included. Standard errors are given in parentheses. The *** indicates statistical significance at the 1% level.

	Rating				**WW index**			
	ROA		**ROE**		**ROA**		**ROE**	
	I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**
W.A. ETFconcentration(H)	0.020**		0.053*		0.021*		0.062**	
	(0.010)		(0.031)		(0.012)		(0.028)	
W.A. ETFconcentration(R)		0.030*		0.087*		0.033*		0.079*
		(0.016)		(0.053)		(0.019)		(0.047)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time and firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.082	0.080	0.012	0.012	0.104	0.103	0.014	0.014
Observations	29,129	29,129	29,118	29,118	29,026	29,026	29,993	29,993

TABLE A7 Analyses with different levels of ETFs portfolio concentration.

This table reports estimates for *W.A. ETFconcentration(H)* and *W.A. ETFconcentration(R)*. Dependent variables are *ROA* and *ROE*. The exercise is repeated for two levels of ETFs portfolio concentration. High (Low) Concentration refers to observations above (below) the median of *W.A. ETFconcentration(H)* or *W.A. ETFconcentration(R)*, where applicable. Variable definitions are given in Table A1. The controls are included in the model. All explanatory variables and controls are lagged by one quarter. Year-quarter and firm fixed effects are included. Standard errors are given in parentheses. The *** indicates statistical significance at the 1% level.

	ROA				**ROE**			
	Low Concentration	**High Concentration**	**Low Concentration**	**High Concentration**	**Low Concentration**	**High Concentration**	**Low Concentration**	**High Concentration**
	I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**
Adj.	−0.050	0.012**			−0.252	0.038*		
ETFconcentration (H)	(0.036)	(0.006)			(0.245)	(0.022)		
Adj.			0.047	0.029***			0.373	0.100*
ETFconcentration (R)			(0.059)	(0.010)			(0.505)	(0.059)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	YES	YES
Time and firm FE	Yes	Yes	Yes	Yes	Yes	Yes	YES	YES
Adj. R^2	0.091	0.100	0.102	0.104	0.025	0.011	0.031	0.012
Observations	29,205	29,205	29,227	29,227	29,195	29,195	29,320	29,320

TABLE A8 Testing the potential influence of forward-looking stock prices.

This table reports estimates for *W.A. ETFconcentration(H)* and *W.A. ETFconcentration(R)*. Dependent variables are *ROA* and *ROE*. The analysis is repeated for two subsamples based on firms' stock returns. Particularly, firms have been allocated into a Low (High) group if in $t-1$ quarter they have stock returns below (above) the cross-sectional stock return median value. Variable definitions are given in Table A1. The controls are included in the model. All explanatory variables and controls are lagged by one quarter. Year-quarter and firm fixed effects are included. Standard errors are given in parentheses. The *** indicates statistical significance at the 1% level.

	ROA				**ROE**			
	Low return	**High return**	**Low return**	**High return**	**Low return**	**High return**	**Low return**	**High return**
	I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**
W.A. ETFconcentration (H)	0.017**	0.010**			0.068*	0.037*		
	(0.008)	(0.004)			(0.041)	(0.021)		
W.A. ETFconcentration (R)			0.035***	0.030***			0.096**	0.070*
			(0.013)	(0.006)			(0.046)	(0.040)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time and firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.099	0.119	0.097	0.117	0.020	0.011	0.019	0.011
Observations	29,684	30,712	29,684	30,712	29,677	30,699	29,677	30,699

TABLE A9 Financial crises.

This table reports estimates for *W.A. ETFconcentration(H)* and *W.A. ETFconcentration(R)*. Dependent variables are *ROA* and *ROE*. The analyses are conducted including only the periods with financial crises: 2000–2002 stock market crash associated with the dot-com bubble and the 2007–2009 subprime mortgage crisis. Variable definitions are given in Table A1. The controls are included in the model. All explanatory variables and controls are lagged by one quarter. Year-quarter and firm fixed effects are included. Standard errors are given in parentheses. The *** indicates statistical significance at the 1% level.

	ROA		**ROE**	
	I	**II**	**III**	**IV**
W.A. ETFconcentration(H)	0.032**		0.093*	
	(0.016)		(0.056)	
W.A. ETFconcentration(R)		0.053**		0.178**
		(0.025)		(0.082)
Controls	Yes	Yes	Yes	Yes
Time and firm FE	Yes	Yes	Yes	Yes
Adj. R^2	0.082	0.086	0.022	0.024
Observations	12,928	12,928	12,921	12,921